HOW USE OF SCREEN MEDIA AFFECTS THE EMOTIONAL DEVELOPMENT OF INFANTS

Carole Napier undertook a literature review to explore the research into the effects of watching television and other electronic devices on parent-child interactions

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Abstract

This article reviews the literature relating to the potential impact of exposure to screen media on the emotional development of infants. The available literature suggests that screen media, in particular television, has a substantially disruptive effect on the quantity and quality of parent-child interactions, which are essential for developing secure attachments. Parental attitudes towards screen media, that is if they are happy to use it as a 'babysitter' or do not see any negative consequences to excessive exposure, are also noted to be major factors in how much screen time children have daily. There is a critical need for evidence-based guidelines for parents and professionals concerning the use of screen media.

Keywords
Infant attachment, infant emotional development, media exposure, parent-child interaction, screen time, television

A LITERATURE review of the databases CINAHL, Internurse, Cochrane Library and Maternity and Infant Care was undertaken using the search words 'screen time', 'infant viewing', 'media use', 'television viewing' and derivatives. The search was restricted to preschool children, particularly those aged under two because most brain development occurs in the first two to three years of life (Balbernie 2013). Research also shows that brains continue to develop after birth and are shaped by relationships and experiences (Burns 2006, Zeedyk 2013). It is therefore likely that very young children will be particularly susceptible to the effects of their environment (Zeedyk 2013).

The publication date of the research was set between 2003 and 2013. The initial search yielded 39 results, although 11 were discounted. These irrelevant studies included eight centred mainly on the acquisition of speech and three focused on an older age group. Hand searching of new journals was also undertaken and identified a further three relevant articles.

From the 31 remaining sources of research, reference lists were checked and accessed where appropriate, yielding a further four articles. Relevant policies and guidelines were reviewed to give an appreciation of the current situation regarding infant media use.

The search highlighted a lack of UK-based research, with most of the evidence originating from the US. This was, however, considered appropriate given the similarities in rising media use in the two countries, including by children (Sigman 2012).

The results of the literature search were divided into primary sources, secondary sources and non-research reviews. They were critically appraised using the Critical Skills Appraisal Programme checklists relevant to the type of evidence. Evidence scoring highest in terms of methodological rigour and content of research papers and key content

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Table 1 Potential effects of exposure to screen media on the emotional development of infants

Foreground media	Barriers to reducing use
■ Exposure may cause harm to infants through overstimulation. ■ Television watching does not have any advantages for the brain development in children aged under two. ■ Exposure can result in the absence of social stimulation needed for brain development when used as a 'babysitter' and not balanced with quality interactions.	■ Exposure to media not seen as a serious issue. ■ Heavy use can be said to be a 'parenting style', whereby children are deliberately left in front of the television/computer screen unaccompanied. ■ Unwillingness/inability to replace screen media time with more developmentally nurturing activity.
Background media	**Barriers to reducing use**
■ Use of media may cause distraction, resulting in decreasing parent-child interactions. ■ There may be reduced maternal responsiveness in the presence of television. ■ Young children have a poor ability to filter irrelevant stimuli. ■ Background media reduces concentration and interferes with complex tasks such as interactions. ■ Quality as well as quantity of parent-child interactions diminished in presence of background television.	■ Habit to leave the television turned on most of the time – possibly unaware. ■ Very little research into effects of background media so difficult to provide evidence-based advice. ■ Not seen as a serious issue.

of remaining information sources was given greater emphasis.

The main findings indicate that use of screen media is rapidly increasing, extending to younger and younger children (Christakis 2009, Sigman 2012), but the effects of such exposure on the emotional development of young children are largely unknown (Anderson and Pempek 2005). It is recognised, however, that media exerts a significant influence on a child's development (Christakis 2009) and that early exposure to television is associated with negative outcomes (Schmidt *et al* 2008, 2009, Kirkorian *et al* 2009, Richert *et al* 2011, Nathanson and Manohar 2011) (Table 1).

Brain development

Brains are shaped by relationships and experiences (Burns 2006, Robinson 2010), and most brain development occurs in the first two to three years of life (Balbernie 2013). Early experiences become the basis for relationships, self-control, a sense of coherence and future responses to anxiety and threat, as well as the ability to develop resilience (Burns 2009, Zeedyk 2013).

Social interactions are essential for establishing and building secure attachments, and are crucial for positive emotional development (Zeanah *et al* 2011, Balbernie 2013). Anything that disturbs this, including the use of screen media, has the potential to cause problems (Zeedyk 2013).

A review by Christakis (2009) reports a connection between early brain development and the external environment. In addition to the potential harm to infants of overstimulation caused by watching television, Christakis asserts that this activity means infants spend a large amount of time alone, something that was previously not possible due to babies' inability to entertain themselves. The need for quality interactions to ensure the interpersonal stimulation necessary for optimal brain development is highlighted throughout the review.

A study by Fidler *et al* (2010) similarly concludes that increased television use is resulting in children spending large amounts of time alone and not interacting. Fidler *et al* stress the importance of social interaction on cognitive development, asserting that there is no advantage to brain development for children under two years of age from watching television, although a study by Mumme and Fernald (2003) suggests that infants as young as one year can learn from the medium.

Schmidt *et al* (2009) conducted a study to determine the effects of television viewing on the developing cognition of young children. The conclusion reached, in common with the findings of Fidler *et al* (2010) and in contrast to Mumme and Fernald (2003), was that there is no benefit in watching television in the first two years of life. While the study focused on language and visual motor skills, it also recognised the benefits of limiting media exposure, including a lower risk of attention problems and better sleep quality.

A systematic review completed by Richert *et al* (2011) aimed to highlight the implications for understanding the impact of screen media in raising healthy children. While the review was more concerned with learning ability from television rather than emotional development, it recognised the importance of social interaction in relation to overall healthy development and the fact that television reduces the quantity and quality of parent-child interaction.

Strasburger (2007), in an editorial, shares the view that there is little evidence that babies under two can learn anything positive from television, claiming that there is significant evidence that harm is possible. The editorial asserts that TV is a multifaceted

medium that requires brain maturation and cognitive skill to understand, which do not normally occur until two or three years of age.

Klorer (2009) shares the opinion expressed by Christakis (2009) – that young children are being overstimulated by technology – suggesting that this has a profound detrimental effect on development. Klorer states that, where television is replacing quality interactions, the child may not be getting the relational stimulation needed for optimal brain development.

A review by Sigman (2012) suggests that, as the young child's malleable brain evolves, shifting in focus towards new technological skills, it digresses from fundamental social skills. Sigman also recognises that infants are social beings, and that social and emotional skills, which are essential for mental health, are complex and technical, and need to be learned person to person.

Extent of screen time and media use

Due to a lack of UK-based evidence on screen media exposure of children aged under two, it is necessary to look at US studies which, as mentioned, can be considered relevant given the similarities in rising media use in both countries (Sellgren 2011, Sigman 2012).

It is widely recognised that screen media, including television, are a ubiquitous presence in the lives of children (Christakis 2009, Bittman *et al* 2011), which is increasing with the proliferation of new forms of media, such as smartphones and portable tablet devices (Calvert and Wilson 2008, Mendelsohn *et al* 2010).

Mendelsohn *et al* (2010) carried out a study to determine the effect of verbal interactions between mothers and infants during media exposure. Although the study focused on language development, the authors suggest that the adverse effects of media exposure are evident in infancy and therefore that the quantity of such exposure is increasingly becoming a public health issue.

The growth in use of screen media is also recognised by Strasburger *et al* (2010) who claim that infants spend more time in interaction with screen media than they do in any other activity, except sleeping. The review concludes that, while more research is needed, there is enough data to cause concern.

In 2011, the American Academy of Pediatricians (AAP) (Council on Communications and Media and Brown 2011) updated its 1999 policy statement on the use of media technology by young children. It recommends discouraging parents from exposing children under two to television. The way screen media affects this age group is considered to be different compared with its effect on older age groups, possibly due to very young children's underdeveloped cognitive skills (Bittman *et al* 2011).

Despite these recommendations, a study by Vandewater *et al* (2005) found that television use by American children under two years continues to rise, with 70% of parents out of step with the AAP guideline. Vandewater *et al* (2005) state that media use is a normative part of young children's daily life and suggest that, because there are more unknowns than knowns in knowledge about how exposure to screen and electronic media affects very young children's development, there is a need for further research.

The importance of toy play in early cognitive and social development is identified in a randomised controlled trial by Setliff and Courage (2011). Frequent distractions caused by television and other media are recognised as a concern with regard to children's development. Parent-child co-viewing is also identified as infrequent, previously recognised by Christakis (2009) and Fidler *et al* (2010).

A systematic review focusing on television and very young children by Anderson and Pempek (2005) led the authors to conclude that 'as a society we are engaged in a vast and uncontrolled experiment with our infants and toddlers, plunging them into home environments that are saturated with electronic media'. This is unsurprising, given the significant environmental influence electronic media exert on children's development (Christakis 2009), as well as the recognition that early exposure to TV is associated with negative outcomes (Kirkorian *et al* 2009).

Background television

A further concept to consider with regard to infant development is that of background television, which is when the set is switched on, but children are not watching it (Council on Communications and Media and Brown 2011). The AAP (Council on Communications and Media and Brown 2011) further identifies that what is background television for the child can be foreground television for the parent. There is even less research on the consequences of background television than the little available on the effects of screen media on infants' development.

Vandewater *et al* (2005) undertook a study to determine the effect of heavy television exposure on young children's development. They found that over one third of American children live in homes where the television is always on or is on most of the time. The authors recognise that background television creates a distraction, but also identify a need for further research into how this affects children's development.

The lack of research surrounding the effects of background television on infants' development is recognised in a randomised controlled trial undertaken by Schmidt *et al* (2008), who state that young children have poorly developed higher level control and therefore a poorer ability to filter irrelevant stimuli. In addition, they identify the noise of background television as a barrier to parent-child interactions, as well as being a visual distraction.

The same research (Schmidt *et al* 2008) suggests that the quantity and quality of parent-child interactions are affected negatively in the presence of background television. Mothers' responsiveness to their children's needs and actions has been identified as crucial to fostering a secure attachment (Nathanson and Rasmussen 2011, Svanberg 2013). However, Schmidt *et al* (2008) note that there is a marked decrease in mothers' responsiveness to their children in the presence of background television.

While the focus of this study concerned toy play behaviour in the presence of television, the findings can be applied equally to emotional development, as parent-child interactions were studied. Schmidt *et al* (2008) acknowledge background TV as an environmental risk factor for children's development.

Kirkorian *et al* (2009) report similar findings, following a randomised controlled trial that had the broad aim of testing the hypothesis that background television affects interactions between parents and very young children. The researchers suggest that, where background television for the child can be foreground TV for the parent, this may distract the parent, decreasing parent-child interactions. They also recognise that adult-oriented television programmes directly influence children's social behaviour, in that it can be seen to diminish in the presence of background television.

This trial (Kirkorian *et al* 2009) also identified the negative effects of background television on parents' concentration, concluding that it can interfere with complex tasks, including engaging with infants. The researchers suggest that further work is needed into the effects of background TV.

Anderson and Pempek (2005), in common with studies focusing on background television, identify, through a systematic review, the ubiquitous presence of television in the homes of young children and the lack of research into its effects on children's development. They also highlight the distraction that background television provides, particularly for the parent, and the consequence of a lower level of parent-child interaction. Anderson and Pempek conclude that, with the abundance of ever-larger televisions, as well as new forms of media, such as smartphones and computer tablets, it is fair to assume that the substantially disruptive effects of background media will increase.

Parental attitudes

Unsurprisingly, background television is more prevalent in homes where parents have a positive attitude towards media (Vandewater *et al* 2007). Reasons cited by parents for using television include its ability to act as a peacekeeper and as a safe activity for children to do while the parents are engaged in, for example, undertaking household chores (Council on Communications and Media and Brown 2011).

Given that young children have little say in the presence of media in the home, parental attitudes towards television have a great influence in its use (Vandewater *et al* 2007). The AAP (Council on Communications and Media and Brown 2011) claims that parents' screen media regime influences their children's use of technology, so parents need to recognise that their behaviour can affect their children negatively.

Vandewater *et al* (2007) recommend further research into the developmental influence of media, including their effect on neurological development, and they recognise the issue as important to public health. The serious effects of media exposure is highlighted by Courage and Setliff (2009); they assert that, because the first three years of life are so significant in terms of brain development, parents' choices, including those surrounding screen media use, need to be made carefully as they can determine long-term outcomes in children.

Television viewing is a complex behaviour according to a study by Davies and Gentile (2012). They claim that family media use encompasses multiple aspects of a family's life beyond time spent viewing television and assert that certain families may be more susceptible to media influences, although they are unable to pinpoint why this is the case.

However, the AAP (Council on Communications and Media and Brown 2011) makes the distinction that children who live in homes with lower socio-economic status and those of single or less educated mothers are likely to spend more time in front of a screen every day, an observation shared by Calvert and Wilson (2008). Vandewater *et al* (2007) refute this claim and assert that there is no relationship between TV use and any particular demographic characteristic. Nevertheless, socio-economic status may need to be considered when assessing risk factors for excessive screen media use.

A study by Nathanson and Manohar (2011) shares the view of the AAP (Council on Communications and Media and Brown 2011) that television can be

used deliberately and can be considered a form of parenting. They suggest that parents may see children's viewing as a time to be independent of their children. They also mention other bodies of work that examine the relationship between attachment and media use, concluding that weak attachment to parents is linked to more TV viewing and playing on a computer.

Nathanson and Manohar's study concerns attachment theory, working models of parenting and expectations for using television in childrearing. They conclude that avoidant adults – those who did not develop a secure attachment as a child – may be more likely to rely on TV with their own children. The AAP (Council on Communications and Media and Brown 2011) also recognises that excessive use of media may be a parenting style and says it cannot be assumed that parents will spend developmentally nurturing time with their child when the television is turned off.

The findings of a systematic review by DeLoache and Chiong (2009) also suggest that the TV can be used as a form of parenting and seen as a 'babysitter'. They assert that babies learn an enormous amount from direct experience of the world, especially by interacting with others, and that no one knows the effect media viewing has on early development. They acknowledge the need for further research.

Nathanson and Rasmussen (2011) studied the effect of TV viewing on responsive maternal communication with toddlers and preschoolers in comparison with book reading. They assert that the problems associated with young children's excessive exposure to television are addressed only when TV is replaced with more nurturing activities. This is also acknowledged by the AAP (Council on Communications and Media and Brown 2011), which recommends that parents play with and read to their children to achieve optimal emotional development.

Another parental attitude towards the use of screen media concerns the perception that they are actually educational, a theory examined by Zack *et al* (2009) through a randomised controlled trial. This study acknowledges that transference of learning from television or computer is not straightforward.

The educational claims associated with screen media have largely been dismissed and labelled the 'video deficit' (Anderson and Pempek 2005), because to learn effectively babies and young children need social cues (O'Doherty *et al* 2011). Despite the lack of evidence supporting the educational benefits of baby DVDs and other media, their sales continue to rise (Zack *et al* 2009, Cardany 2010). This is perhaps due to the fact that the most popular infant videos and DVDs on sale claim to be educational (Zimmerman *et al* 2007).

Implications for public health

According to Christakis (2009), the presence of screen media is vast and growing in the lives of young children. The Christakis study, which concerned parent-child interactions in relation to audible television, concluded that parents need to exercise caution in exposing infants to excessive media. It affirmed that, while there is little conclusive data on the effects of TV on infant development, the existing research gives cause for concern. Also acknowledged is the need for parents to be better informed about activities more relevant to promoting healthy development in young children.

Christakis goes on to suggest that, rather than attempting to reduce television use later in life, it would be more beneficial to establish appropriate use in infancy and early childhood.

The AAP (Council on Communications and Media and Brown 2011) attempts to encourage this but, according to Vandewater *et al* (2007), many American parents claim to be unaware of recommendations regarding media use for children under two. Vandewater *et al* (2007), as mentioned, conducted a study on media use in early childhood, concluding that it is almost certain to play an ever-increasing role in daily life, even among the very young. They acknowledge the need for research and contend that the influence of screen media in relation to infant development is crucial to public health.

The need for more work on the effects of screen media on infant development is highlighted by Cardany (2010), who states that research has not kept pace with the introduction of new forms of technology. Cardany asserts that parents and professionals need evidence-based guidelines on the appropriate use of screen media by infants, concluding that the best way to contribute to their development is by disconnecting from screen media.

Given the huge presence of television and screen media, Davies and Gentile (2012) identify that little is known about its effects, particularly in relation to infants' development. Recognising that limiting screen media exposure in early childhood can result in multiple benefits, they call for training in the fundamentals of media literacy to help families counter the negative effects.

As identified above, Schmidt *et al* (2008) recognise the separate issue of background television, reporting that more research is needed

The educational claims associated with screen media have largely been dismissed and labelled the 'video deficit'

on its effects, particularly the need to distinguish between the consequences of foreground and background screen media. Despite the large body of evidence identifying the lack of research into screen media and its effect on infant development, Sigman (2012) and Calvert and Wilson (2008) acknowledge the lack of funding and public appetite for investigating the negative effects of the world's favourite pastime.

Sigman (2012), in a UK-based review, states that across the industrialised world watching screen media is the favourite pastime of children. According to the review, the sheer amount of daily screen time is considered a separate risk factor for disease, independent of other forms of sedentary behaviour. This is recognised by some governments, but not by the UK or most of the European Union. The Scottish Government (2011) acknowledges the negative effects of screen media, such as emotional and behavioural problems in young children (Pagani *et al* 2010, Page *et al* 2011), yet concedes that there are no UK guidelines relating to screen media use by infants. Christakis (2009) and Sigman (2012) report that the French government has recently banned TV programmes aimed at infants.

Sigman calls for the medical establishments in the UK and other European countries to draw up guidance. He goes on to claim that most parents are keen to minimise health risks for their children provided they understand the reasoning behind the advice and are offered a clear course of action.

Sigman also reports that parents and professionals are largely unaware of screen time as a health issue, although he argues that, given television is recognised as so influential and potentially dangerous there is a need for effective action. He suggests the need to view screen time as another form of consumption, which should be measured in units of hours and minutes consumed per day.

The US government appears to recognise the significant risk of screen media, with the US Department of Health and Human Services (2013) identifying a decrease in screen time as a key health-improvement priority in achieving its national ten-year health promotion and disease prevention objectives.

Given that there is little evidence babies under two years of age can learn anything from TV and significant evidence that harm is possible (Strasburger 2007), it is apparent that further studies are vital. The need for research is also acknowledged by Vandewater *et al* (2007), DeLoache and Chiong (2009) and Anderson and Pempek (2005), who contend that the effect of screen media in relation to infant development is central to public health, a view shared by the AAP (2011). Zimmerman *et al* (2007) also call for further research, particularly to determine the effect of baby DVDs, to provide scientific information to guide parents.

Nathanson and Rasmussen (2011) recognise that it is not enough to simply turn off the TV, but that parents need to be educated about the importance of parent-child communication, especially in the first three years. Fidler *et al* (2010) also acknowledge the important role parents have to play in mediating their infant's screen media use.

Nathanson and Manohar (2011) recognise that the relationship between parents and media use is complex, suggesting that not only should the attachment between parent and child be considered, but the parent's own attachment may have relevance to their media use. Strasburger *et al* (2010) claim that too little has been done to protect children from the harmful media effects and that parents, health care practitioners, schools, the entertainment industry and government all have a responsibility.

Conclusion

Infants are spending large amounts of time alone and not interacting with others. The possibility that screen media can overstimulate the developing brain is postulated, as is the potential to cause detrimental effects on development. It is widely recognised that there is a need for social interaction to provide the stimulation necessary for optimal brain development.

Despite one study suggesting that there are educational benefits for very young children, the consensus is that there are no benefits from watching television for children under two. It is recognised that television can reduce the quantity and quality of parent-child interaction. Given that this is crucial for developing secure infant attachment, media use with regard to brain development requires further attention.

Screen media use is largely a ubiquitous presence in the lives of young children and is continuing to rise with the proliferation of new forms of electronic media. The quantity of infant exposure to the technology is therefore becoming a public health issue. It is suggested that adverse effects of media begin in infancy and, while inconclusive, there is enough data to cause concern. The distraction caused by screen media can be harmful to children's development. The need for further research is a unanimous theme.

It is generally accepted that background TV causes a distraction that can impede parent-child interactions, including a marked decrease in maternal responsiveness, which is necessary for developing a secure attachment. The number of

homes where the television is on all or most of the time is rising, thereby increasing the potential for problems. The need for further research into the effects of background TV on infants' development is also accepted.

Undoubtedly, parental attitudes and susceptibility to screen media play a dominant role in the level of exposure young children have to television and other media. The deliberate use of television as a form of parenting, in place of a babysitter, can be difficult to change.

It is apparent that TV viewing is a complex behaviour and, while there is disagreement on the relationship between any particular demographic characteristic, the fact that parents' screen media regimes influence their children's habits is generally accepted. Parents' choices regarding screen media need to be made carefully. Again, the need for further research is acknowledged. The need to replace screen media with more developmentally nurturing activities calls for parental education on the issue.

Media presence is vast and growing in the lives of young children and is becoming a public health issue. There is a need to establish appropriate television use in infancy and early childhood. Research on early brain development shows the need for direct interactions with parents. It is not enough to simply turn the TV off, but parents need to be educated about the importance of parent-child communication, especially in the first three years of their child's life.

The relationship between parents and media use is complex, and this should be considered when providing advice on this activity. Because little is known about the effects of TV and screen media on infant development, there is a need for research, and parents and professionals need evidence-based guidance concerning appropriate use of screen time by infants.

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Conflict of interest
None declared

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