Believe in children
Barnardo's Northern Ireland

Connections

Parenting Infants in a Digital World

2018

Dr Donna Kernaghan

Content

Figures and Tables

Figures

Tables

Acknowledgements

Barnardo's Northern Ireland would like to acknowledge the efforts of all involved in the Connections: Parenting Infants in a Digital World research study. Special thanks are particularly due to Nicola Darnbrook for data entry and project support.

The author would like to thank the early years' specialists from Barnardo's NI who met as members of the Research Advisory Group for generously giving their time and expertise which was an invaluable contribution to this project:

- **Claire Humphrey**, Family Connections
- **Joanna Tarach,** Family Learning and Integration Project
- **Kevin McCormick**, Forward Steps
- **Margaret Armstrong**, Horizon Sure Start
- **Mary Tennyson**, G-Old Community Partnership Sure Start
- **Roberta Marshall**, Parent and Infant Programme
- **Sharon Hasson**, Strabane Sure Start

Finally, Barnardo's NI would like to express gratitude to all the parents who participated in the research in order to share with us their experiences of parenting infants in a digital world.

Executive Summary

Introduction

It is now widely recognised that the early years of a child's life represent a unique opportunity in the life cycle for brain development. The first three years of life mark the fastest growth in brain development for humans and as such is a crucial time for social, emotional and cognitive development. Parents are central to their child's development as a warm responsive caregiver facilitates an infant's sense of safety and builds good infant mental health. Decades of research have found that interferences to building a secure attachment such as parental mental health problems, domestic violence, substance misuse, neglect and experience of trauma can disrupt infant brain development and lead to long term health and emotional problems (Burke Harris, 2018; Perry, 2002).

More recently, technology has introduced a new dimension to childhood and family life. As research has not kept pace with the rapid growth of infants' use of digital technology, the implications of infants' interactions with technology on cognitive, social and emotional development are largely unknown. This lack of empirical evidence makes it difficult for parents to have a clear understanding of the benefits and risks digital technology may pose at this stage of development. As digital technology has become embedded in all aspects of society, it is essential to gain a better understanding of the nature and extent that digital technology is used every day at home and how this may influence interactions between parents and infants.

Purpose of Research

The aim of the Connections: Parenting Infants in a Digital World project was to provide greater insight into how digital technology may influence interactions between parents and infants aged 0 – 3 years old at home. The study considers the relatively new phenomenon of 'technoference' by exploring the extent to which parental use of digital technology in the home may interfere with activities or time spent with infants. Specifically the main objectives of the research were to:

1. Gain an understanding of parents' and infants' use of digital technology in everyday home life and how this may impact on parent-infant interactions;

2. Explore parents' awareness of infant mental health with specific reference to the 'Five to Thrive' approach and the parenting styles used with infants;

3. Identify the areas parents of infants could benefit from additional support in order to improve service delivery.

Definitions

Please note for the purposes of clarity and brevity, the term 'infants' is used throughout the report to refer to children aged 0 – 3 years old only while 'children' is used to describe children in other age groups which may also include those aged 0 – 3 years old.

The use of 'digital technology' throughout the report is an all-encompassing term that includes both the *types* of digital devices used such as tablets and smartphones and the *activities* that infants and parents engage in using these devices such as watching videos online or playing games.

Respondents

Participants for this study were identified through seven Barnardo's NI services related to parenting in the early years including three Sure Start services. Potential participants must have satisfied all three of the following criteria before taking part in the survey:

1. have a child or children aged 0 – 3 years old;
2. currently live with a child or children aged 0 – 3 years old;
3. accessed a Barnardo's NI service in the past six months.

This resulted in a total of 199 completed questionnaires drawn from every county in NI with the exception of County Fermanagh. These respondents reported a total of 369 children between them. As a qualifying criteria was to have a child aged 0 – 3 years old, all participants reported having at least one child within this age group resulting in a total of 246 infants.

Measure

This research was quantitative in nature and data was captured through an anonymous questionnaire completed by parents. Both online and paper versions of the questionnaire were available during March 2018. The survey was divided into four main sections relating to the aims and objectives of the research:

- **Section 1:** Parenting Styles including awareness of the Five to Thrive approach
- **Section 2:** Parental Digital Use at Home
- **Section 3:** Children's Digital Use at Home
- **Section 4:** Support for Parents

Data collected by the survey was systematically analysed using SPSS with qualitative comments thematically coded. It is important to note that the results presented in the report rely on parents' ability to recall their own behaviour and that of their child. As with any self-reported survey, there is likely to be some degree of under and over-reporting.

Key Findings

Parenting Styles:
Participants primarily identified with an authoritative parenting style across all five areas of:

(i) behaviour;
(ii) daily routine;
(iii) discipline;
(iv) limit setting; and
(v) parenting style.

No parents identified with either an authoritarian, permissive or uninvolved parenting style across all five areas.

Five to Thrive Approach:
Since attending a Barnardo's NI service, the majority of parents were aware of the Five to Thrive approach and agreed it had raised their awareness regarding child development in the following areas:

98.9% agreed they had better understanding that early years interactions between infants and parents have a long term impact on their child's development;

97.7% agreed they had a better understanding that they are the main influence on their infant's emotional development;

94.9% agreed they had a better understanding of child brain development.

Digital Technology in the Home Environment:
Households had an average of 8.5 devices each with 97.5% having access to the internet. The socioeconomic status of the household did not restrict the range of devices at home but reduced the average number of devices in households of average or below average weekly income. Across all income categories, the most common two devices at home were televisions and tablets.

Parental Use of Digital Technology:
Most participants felt that they used their phone too much at home (61.3%) with over fifty five percent (56.9%) reporting that they could not resist checking their device when they received an alert or notification. Forty percent of parents agreed that their use of devices can interfere with activities with their child. Parental use of digital technology impacted on their parenting in a number of ways:

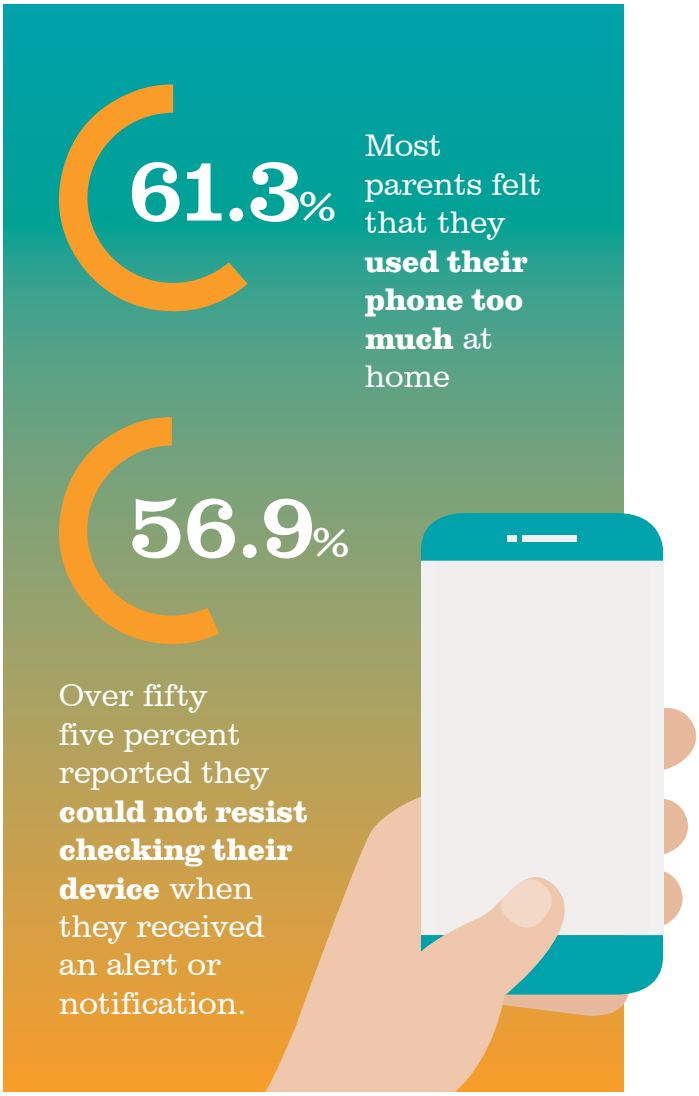
- Participants with high levels of use at home were more likely to permit their child to use devices to access a range of content alone for longer periods of time.
- The greater parents' own interaction with devices and the internet at home, the less likely they were to feel they were being a good role model to their child in terms of how they used digital technology.
- Parents with high use of digital technology at home were more likely to have no rules limiting infants' use of digital technology compared to those with medium or low levels of use.

Infants' Use of Digital Technology:
Infants spent most time on non-digital activities. Infants also spent time on activities involving digital technology on a typical day. The television was predominate with infants watching TV for up to one hour with a parent (61.5%) and watching TV for up to one hour alone (48.6%). It is worthwhile noting that some infants are using digital technology alone regularly to access games, mobile applications (apps) and videos. Restriction of infants' use of digital technology by parents related to:

- time spent on devices (68.8%);
- only watching children's programmes (67.3%);
- only using devices with adult supervision (64.3%);
- not allowing digital technology at family mealtimes (60.3%).

Digital Technology as a Parenting Tool:
Findings show that parents used digital technology in many situations as a way to divert or entertain their infants. The three most common situations in which participants used digital technology as a parenting tool were when they were busy with tasks in the home, to reward their child for good behaviour and to calm their child when they are upset.

Support for Parents:
Participants expressed the need for guidance around digital technology with most parents indicating that they would benefit from guidance around screen time for infants (58.3%) and information about online safety for young children (51.3%).



Recommendations

Drawing from the findings of the Connections: Parenting Infants in a Digital World research, a number of key areas have been identified as requiring further consideration:

Recommendation 1

The Public Health Agency's Infant Mental Health Framework for Northern Ireland is well placed to further explore how digital technology may impact infant mental health across its three existing areas of work:

(i) Evidence and policy:
Additional research is needed to explore how digital technology impacts on the lives of infants, their relationships to others and their social, emotional and cognitive development. It is particularly crucial that a range of methods are used to gather evidence and that the voices of young children including those with disabilities and linguistic diversity are sought. This evidence should be the basis for policy development and consistent and accessible messages to parents to support infant mental health.

(ii) Workforce development:
Training for practitioners across all relevant disciplines should be developed to raise awareness amongst the workforce of the benefits and risks associated with the use of digital technology by both parents and infants relating to infant mental health. This training should be reviewed at regular intervals to ensure that it remains relevant.

(iii) Service development:
Consideration should be given to revising and updating service delivery to reflect the ways in which digital technology has changed the home environment and may impact on interactions between parents and children. This may include both universal programmes and the development of targeted interventions for parents who find their use of digital technology is adversely impacting on their interactions with their child.

Recommendation 2

The Department of Education should introduce evidence based guidance for Sure Start services and DE funded pre-school settings regarding how digital technology should be used in these settings and at home to facilitate the maximum educational benefits for infants and preschool children.

Recommendation 3

A cross – departmental campaign and dissemination plan should be developed to raise awareness amongst parents around the specific benefits and risks digital technology offers infants. Messages should focus on:

- Promoting the importance of face to face engagement and consistent parental responses to enhance infants' cognitive, social and emotional development.
- Raising awareness of how parents' use of digital technology at home can interrupt their interactions or reduce the time spent with infants which may have consequences for secure attachment and good infant mental health.
- Widening parents' understanding of 'screen time' to shift the focus from quantity of time spent with digital technology to the quality of time spent with specific reference to the context of use, high quality content and connections with others during use.
- Identifying ways in which parents can use digital technology to benefit their child in terms of learning, play and developing skills including ways parents can assess the educational benefits of apps and programmes.

Dissemination should be at key points during the perinatal period and at the 3+ Health Review. Engagement with a wide range of parents should be sought to ascertain the most effective ways in which to promote messages focused on infant mental health and digital technology.

Chapter 1: The Early Years Review

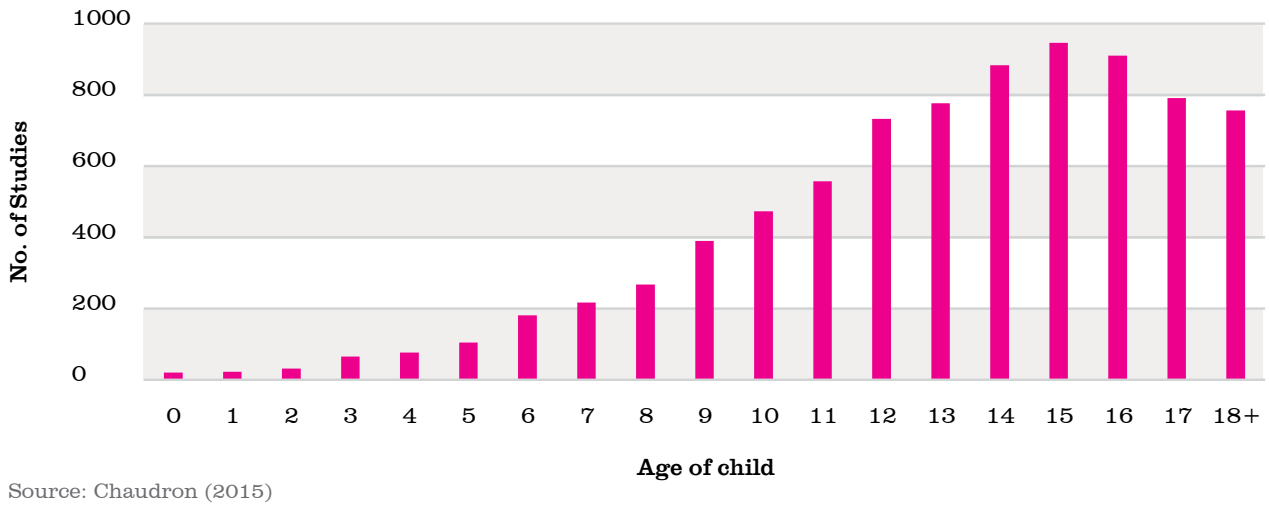
Early Childhood Experiences

The significance of early childhood experiences and the impact they have across a child's life course has been widely recognised in the UK and the rest of the world. Positive experiences facilitated by an engaged parent support the brain to develop in healthy ways promoting good infant mental health and better life outcomes. In contrast, adverse experiences such as neglect, trauma or abuse cause the brain to develop differently in ways that are detrimental to a child's physical and emotional health in both the short and long term. Advances in the field of neuroscience have underpinned a growing understanding that in the first three years of life there is a unique opportunity to influence all aspects of a child's development and improve longer term outcomes. This period has been found to be a particularly effective time to support parents and infants in order to prevent problems arising in the future. This preventative approach, commonly referred to in the UK as early intervention, can relate to both children in early childhood or children and young people with emerging difficulties and is typically delivered through a combination of universal and targeted interventions. Furthermore, it has been shown that effective early intervention approaches have economic benefits with £10 spent on providing a good foundation for a child's mental health and wellbeing saving up to £70 in the costs of care and support in adolescence and adulthood.[1]

To date, very little research has been conducted into young children's use of technology or the potential risks or opportunities relating to their development. In fact, the age group 0 – 3 years old has the least number of examples of research and practice (Paciga and Donohue, 2017). Instead, research has focused on older children and young people's use of technology and how this may provide a host of opportunities and risks that previous generations could not experience.

This has been reflected in the policy development and guidance from statutory agencies which has tended to focus on the potential harmful outcomes of children and young people's use of technology such as cyberbullying, exposure to inappropriate content and risks relating to contact with strangers (Kidron and Rudkin, 2017). Figure 1 illustrates the lack of research conducted amongst infants aged 0 – 3 years old in comparison to older children across 1500+ studies gathered in the EU Kids Online database (Chaudron, 2015).

Figure 1: Number of Studies relating to Children and Digital Technology by Age of Child



Source: Chaudron (2015)

[1] Mental Health Foundation, Babies in Mind Project https://www.mentalhealth.org.uk/projects/babies-mind.

Many of the studies that have been carried out regarding infants have been small scale and tended to focus primarily on the time spent on devices rather than the content viewed, context of use or impact on connections with others (Blum-Ross and Livingstone, 2016). Furthermore, it has been noted that infants with special needs, disabilities, linguistic diversity or from homes with low socio-economic status have rarely been included (Paciga and Donohue, 2017). As a consequence, significant gaps in knowledge remain regarding the impact of infants' use of digital technology on their development and interactions with others. This lack of evidence has resulted in a policy vacuum in the UK for this age group relating to digital technology. This is an area that needs to be addressed using an early intervention approach in order to prevent harm and maximise benefits for children as they grow.

Northern Ireland Policy and Practice Context

In addition to UK wide policies that have increased maternity, paternity and parenting leave to support families with infants, recognition of the importance of emotional, social and cognitive development in the early years has influenced the recent policy landscape in Northern Ireland. A number of key policies and approaches relating to children's early years have been invested in as outlined below:

Infant Mental Health Framework for Northern Ireland (2016)
The aim of the framework is to promote positive social and emotional development from pre-birth to 3 years old. Infant Mental Health is defined in the Framework using the Association of Infant Mental Health UK definition of, "the study of mental health as it applies to infants and their families". The Framework draws on Bronfenbrenner's (1979) ecological systems theory approach in which the child is in the centre of a series of structures and systems which impact on their development as displayed in Figure 2. In this way, infant mental health should be regarded as 'everybody's business'.

The Framework sets out three priority areas relating to:

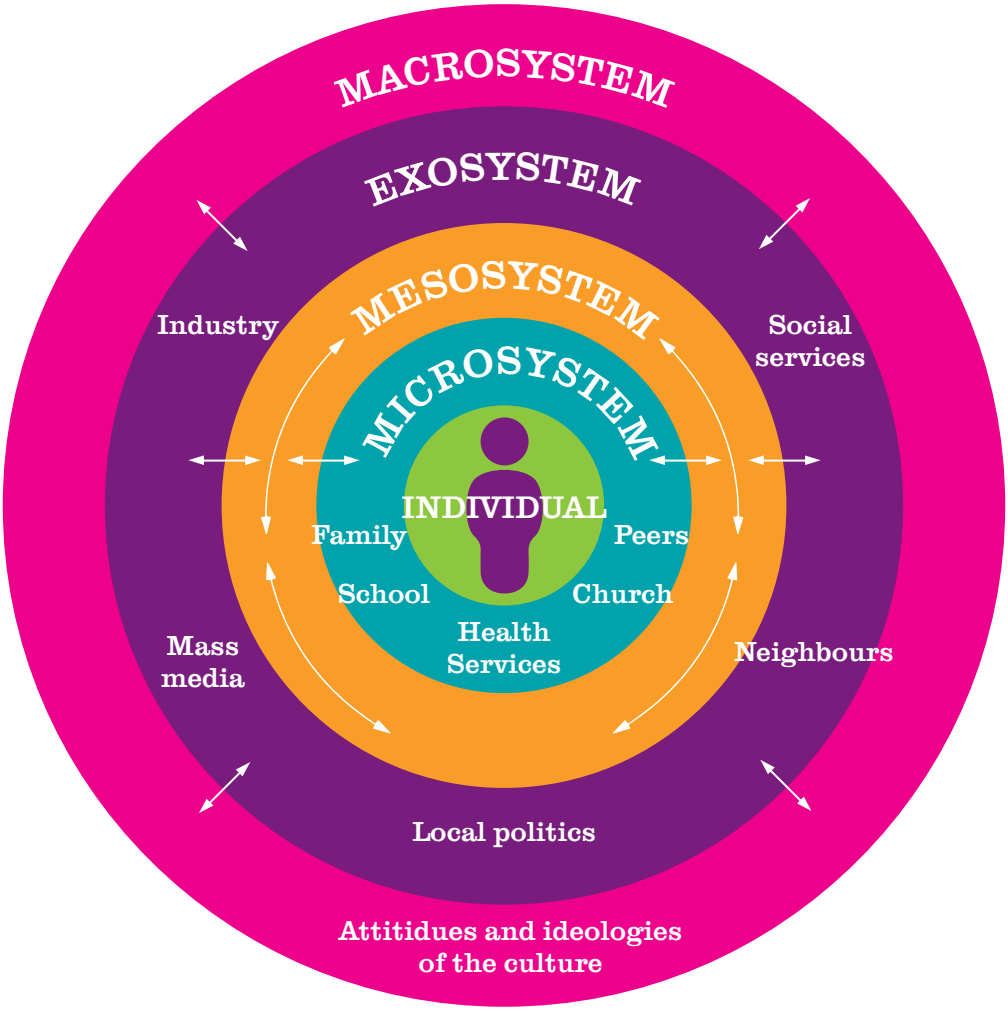
(i) evidence and policy;
(ii) workforce development; and
(iii) service development.

Each area has key recommendations and is accompanied by a timescale with key actions. An overarching aim of the Framework is to disseminate evidence-based/informed messages using consistent language to both practitioners and parents and to develop services aligned to the needs identified by parents and practitioners. While there is reference to social media being used as a tool to engage parents, no consideration of how the use of digital technology may impact on infant mental health is provided.

Draft Children and Young People's Strategy 2017 - 2027
The central approach of the draft Children and Young People's Strategy is a focus on early intervention. Specific reference to infants include the importance of developing good physical and mental health habits, recognition of the importance of play for infants' development and the need for good quality childcare and early educational services. It is important to note that no reference to infants' use of digital technology has been made in this Strategy although there is some focus on internet safety, cyberbullying and development of skills for older children and young people.

Draft Programme for Government Framework 2016 - 2021
Within the Draft Programme for Government Framework (PfG), Outcome 14 identified the commitment to give children and young people in Northern Ireland the best start in life. The PfG acknowledges that "Early intervention in the early years provides an opportunity to interrupt intergenerational transmission of underachievement and lost opportunity, and to improve outcomes for children and their families". This policy renews the focus on foetal and neonatal health outcomes, the home learning environment and early years provision. While it also recognises the role of the parent as their child's first and ongoing educator, no specific reference is made to the use of digital technology in the home.

Figure 2:
Model of Bronfenbrenner's Ecological Systems Theory



Department of Education Policy on Digital Technology and Infants

Currently, policies related to digital technology from the Department of Education in Northern Ireland (DE) are exclusively for schools and are intended for all school age groups. The focus of this guidance refers to: (i) the introduction of mobile digital devices in the classroom to ensure the most appropriate and effective ways to support education[2]; and (ii) online safety for children[3]. No specific DE policy exists for the use of digital technology to support education in a nursery or pre-school setting. Furthermore, there is a lack of guidance for parents of infants and pre-school children regarding how the use of digital technology may promote learning.

Early Intervention Transformation Programme

The Early Intervention Transformation Programme (EITP) began in 2014 as a Signature Project of the Delivering Social Change framework in partnership between five Northern Ireland (NI) Assembly Departments and private philanthropy. The Programme aims to improve outcomes for children and young people across Northern Ireland through embedding early intervention approaches with the purpose of achieving three distinct objectives:

- **Workstream 1:** equipping parents with the skills needed to give their child the best start in life;

[2] Circular 2016/26 Effective Educational Uses of Mobile Digital Devices.
[3] Circular 2016/27 Online Safety.

- **Workstream 2:** supporting families when problems first emerge, before they become embedded or statutory services are required;

- **Workstream 3:** positively addressing the impact of adversity on children by intervening both earlier and more effectively to reduce the risk of poor outcomes later in life.

Workstream 1 is particularly pertinent for infants and consists of three elements relating to different stages of development from baby, toddler to preschool child. Under Workstream 1, the Personal Child Health Record, known as the 'Red Book' has been revised in collaboration with the Public Health Agency (PHA). This book is given to all parents following the birth of their child or if they move to Northern Ireland from another country to record developmental progress, immunisations and growth measurements. This revised 'Red Book' contains up to date information for parents on how to keep your baby safe when sleeping, when to get emergency help, meningitis signs and symptoms and signposting to other useful resources.

The introduction of a '3+ Health Review' has also been introduced under Workstream 1 of the EITP in 2016. This is a joint initiative between the Public Health Agency and the Department of Education (DE), whereby a named Health Visitor is assigned to every DE-funded pre-school setting. Children have three contacts per year with the named Health Visitor and parents are asked to complete the 'Ages and Stages Questionnaire: Social Emotional' to assess the social and emotional development of their child and identify any support needed. Within this initiative, there is an opportunity to discuss topics that parents can find challenging. Screen time and appropriate use of technology is one topic which may be discussed.

Sure Start Services

Sure Start is a UK wide initiative aimed at giving children under four years old, the best possible start in life by enhancing parenting skills and providing child development and learning opportunities to ensure children thrive in their early years. In Northern Ireland, there are 39 Sure Start programmes located in areas within the top 20% most deprived electoral wards.

While Sure Starts provide a wide range of services based on local need there are six services that must be provided in all Sure Start projects. These are:

- home based support for families;
- support to families and parents;
- healthcare and advice from local healthcare professionals;
- support for good quality play, learning and childcare experiences for children both at home and together with other children in group activities;
- support for speech, language and communication;
- support for all children in the community and recognising that they all have different needs.

Sure Start is the only universal early years intervention in Northern Ireland, focused on both the needs of children under the age of four years old and parents and families in targeted, disadvantaged areas. An independent evaluation of the service found that if Sure Start did not exist, then children from disadvantaged areas would not receive the development support that Sure Start provides (RSM McClure Watters, 2015).

The Five to Thrive Approach
As the largest children's charity, Barnardo's NI is well established in working with children and families in the early years. We provide over 15 services, including three Sure Starts, which parents of infants may access with many specific programmes such as Incredible Years and Parent and Infant Programmes designed to support parents of infants. Within our service delivery, Barnardo's NI has embedded the Five to Thrive approach in our early years work.

The Five to Thrive approach, developed by Kate Cairns Associates (KCA), encapsulates the idea of enhancing parental awareness of their child's development in practical ways. Drawing from a recommendation made in The Allen Report (2011) which identified the need for a national parenting campaign on early intervention, work was developed to devise clear guidance for parents to support their child's development. Using the basis that the 'five a day' concept was already well known in the UK for the recommended daily intake of fruit and vegetables, potential for a campaign based on the key idea of 'five a day for child development' was explored (Paterson, 2011). Drawn from research on interactions that promote secure attachment between parents and children, the Five to Thrive approach identified five key everyday activities as the 'building blocks for a healthy brain' (KCA, 2015). These are:

- **Respond**: Being responded to feeds the brain while responding to others exercises the brain. Both need to take place for healthy brain development.
- **Cuddle:** Engaging through physical touch helps infants feel safe and builds strong connections in the brain to regulate emotions.
- **Relax:** Infants are less able than adults to relax when stressed. They need responsive adults to help them self-regulate.
- **Play:** Playfulness is a non-verbal form of communication between parent and child. As children are much more affected by how we communicate than what we communicate, playfulness activates their brains.
- **Talk:** Words powerfully shape the human brain. Reassurance and praise through verbal communication build strong patterns of self-worth and resilience.

Barnardo's has trained over 1,500 staff in all four UK nations in the Five to Thrive approach since 2014. This training includes practitioners learning about the neuroscience underpinning the Five to Thrive approach and they are encouraged to embed the principles in their work with families through providing parents with practical examples such as those in Figure 3.

x1,500
Barnardo's has trained over 1,500 staff in all four UK nations in the Five to Thrive approach since 2014.

Figure 3:
Barnardo's Practical Examples of the Five to Thrive Approach

RESPOND
Respond to your child by copying their facial expressions and sounds and give them time to respond back.

CUDDLE
Pretend your child's favourite toy needs cuddles for comfort because it is upset or ill. Show your child how to comfort and talk calmly to the toy to make it feel better.

RELAX
Take your child out for a walk and talk about everything you see and hear.

PLAY
Engage in simple games such as Peekaboo. Encourage your child to copy you and take it in turns to play this game.

TALK
Read a book to your baby or toddler and give your child a chance to join in.

For more ideas see http://www.barnardos.org.uk/baby-workout.pdf

What is Infant Mental Health?

This section of the report will consider the factors which contribute to infant mental health and identifies potential barriers including discussion on the evidence of digital technology on infants' development. The phrase 'infant mental health' was first coined in the 1970s by Selma Fraiberg. It refers to how well a child develops socially and emotionally during the first three years of life. The central tenets of infant mental health are:

- the capacity to develop close relationships with others;
- the ability to express and manage emotions;
- the confidence to explore and learn about their environment.

Simply put, infant mental health is the capacity to grow well and love well (Lieberman and Van Horn 2008). The first three years of a child's life sees unparalleled growth in all aspects of development. In these early years, children reach numerous milestones in how they move, communicate with others and interact with the world around them. This time period provides 'windows of opportunity' to support infant mental health in terms of brain, emotional and social development.

Brain Development

Infancy marks the fastest growth in brain development for humans. During this time the brain develops rapidly through the formation of one million new neural connections per second (Centre on the Developing Child, 2009). These connections are developed and strengthened through repetition and practice and are the building blocks upon which all social, emotional and cognitive development depends in both the short and long term. Research over many decades has found that while genetics provide the 'blueprint' for the brain to develop, early experiences and interactions have a profound, long lasting impact on the architecture of the brain. Indeed, environmental influences shape the genetic and chemical structure of the brain as the brain adapts to what it sees, hears and feels. The field of epigenetics is the study of enduring changes in gene activity that do not change the DNA code but through chemical changes, do influence how the code is used. Many environmental factors and experiences result in chemical marks on certain parts of the genes and these epigenetic changes can influence the activity or expression of the gene. Experiences of adversity or chronic stress in childhood are factors which influence some genes that regulate the brain, immune and hormonal systems to switch on or off changing how the child's body works (Burke Harris, 2018). It is during infancy when the brain is most sensitive to experience and therefore most easy to influence in both positive and negative ways (Perry, 2002).

Emotional Development

The connections made in the brain during infancy are essential for forming emotional relationships. Experiences during the age of 0 – 3 years old shape a child's ability to create and maintain healthy emotional relationships with others. Positive, attentive and consistent interactions between parents and infants which satisfy the infant's core needs of parental love, protection and socialisation provide the basis for healthy and secure attachment.

Attachment has been defined as, "a lasting psychological connectedness between human beings" (Bowlby, 1969). Perry (2002) highlighted that attachment between a parent

and child has a number of key elements:

- an attachment bond is an enduring emotional relationship with a specific person;
- the relationship brings safety, comfort, soothing and pleasure;
- loss or threat of loss of the person evokes intense distress.

Secure attachment acts as a 'buffer' when children experience stressful situations in life. Securely-attached children are more likely to relate better to others, to have more capacity for concentration and cooperation and to be more confident and resilient at age six (Bowlby, 1988). In contrast, children with insecure attachment lack the capacity for emotional regulation and empathy that goes with secure attachment and appear to be associated with emotional and behavioural problems later in life (Balbernie, 2013; Perry, 2002). Secure attachment is encouraged through the quality of interactions between parents and infants rather than the quantity of time spent together. The quality of interactions refers to how sensitive parents are to their infants' signals, their actions with their infants' ongoing behaviours and how psychological and physically accessible a parent is. This type of reciprocation is often described as 'serve and return' interactions in which the infant 'serves' through facial expressions, verbal communication or gestures and the parent 'returns' by responding in a sensitive and consistent manner.

Social Development

Parents play a crucial role supporting all aspects of their child's development during the early years. Findings from a series of reports from the longitudinal research project investigating The Effective Provision of Pre-School Education (EPPE)[4] showed that for all children, the quality of the home learning environment is more important for intellectual and social development than other factors such as parental occupation, education or income. Evidence from the EPPE findings have established that what parents *do* is more important than who parents *are* (Sylva et al, 2004; Sylva et al, 2008). A range of activities that parents undertake with pre-school children were identified in the study as having a positive effect on preschool children's cognitive and social development. This includes:

- reading with the child;
- teaching songs and nursery rhymes;
- painting and drawing;
- playing with letters and numbers;
- visiting the library;
- teaching the alphabet and numbers;
- taking children on visits;
- creating regular opportunities for them to play with their friends at home.

The Allen Review (2011) reported that the early home learning environment is the single biggest influence on a child's development – more important than material circumstances or parental income, occupation or education. The Review states that the quality of a child's relationships and learning experiences in the family has more influence on achievement than innate ability, material circumstances or the quality of pre-school and school provision. This point has been reiterated by Paterson (2011) who writes, "the single most important factor influencing a child's intellectual and social development is the quality of parenting and care they receive and the quality of the Home Learning Environment that this creates: *what parents do is ultimately more important than who parents are.*"

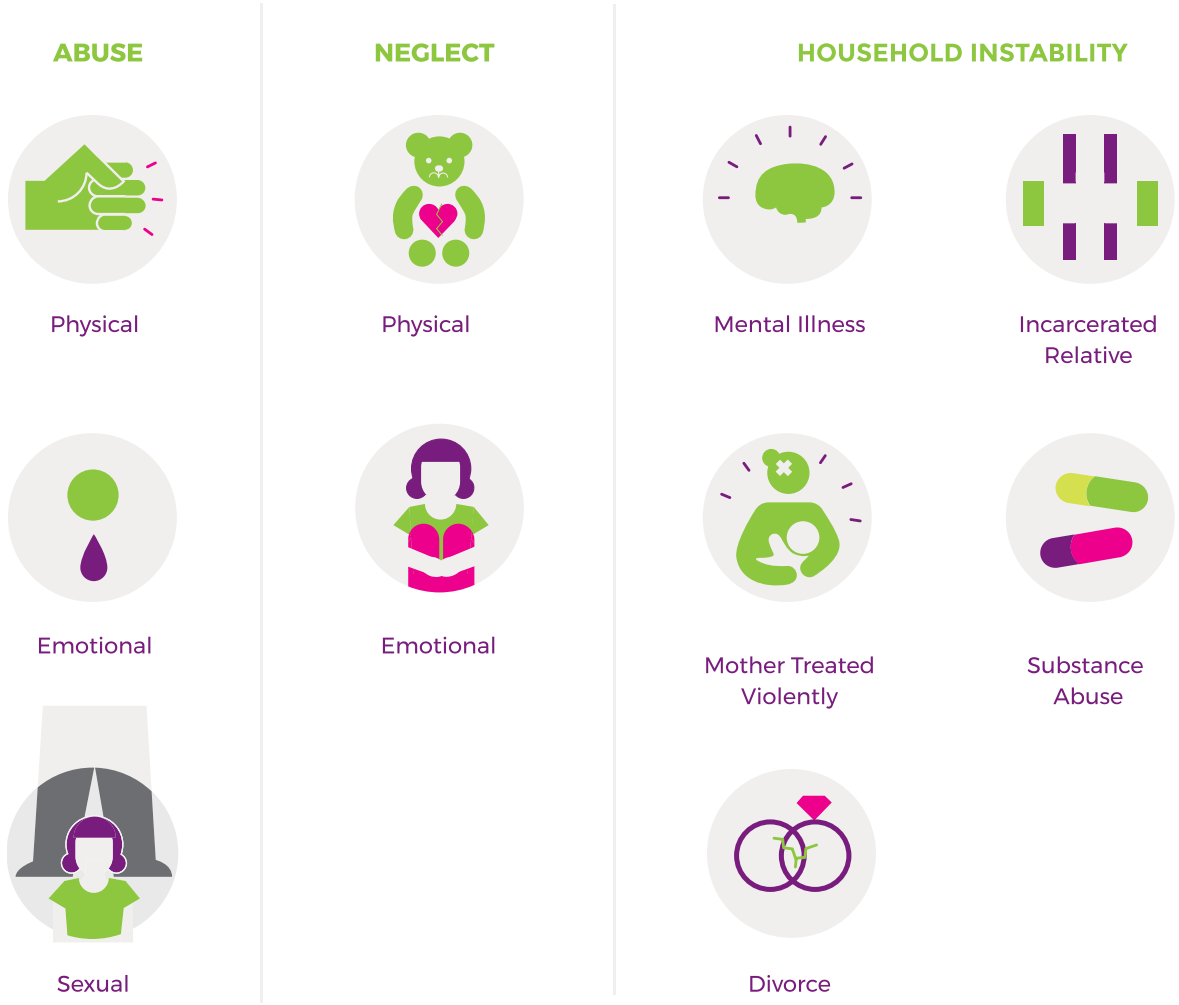
Environmental Factors Affecting Infant Development

In addition to "windows of opportunity" during this critical developmental stage as discussed above, key environmental factors may influence how infants develop socially and emotionally. Both the presence of adverse experiences in the home and parenting styles contribute to the home environment and may influence an infant's cognitive development and social interaction with others. In addition, an important area to explore is the ways in which digital technology is used at home by both parents and children and what emerging evidence is available relating to the potential impact on interactions between parents and infants and infants' development.

[4] Sylva, K., Melhuish, E., Sammons, P., Siraj-Blatchford, I. and Taggart, B. (2004) The Effective Provision of Pre-school Education (EPPE) Project: Findings from pre-school to end of key stage 1.

Adverse Childhood Experiences
Adverse childhood experiences have the potential to damage brain development and cause long term health and emotional problems. The internationally acclaimed work conducted by Dr Vincent Felliti in the Adverse Childhood Experiences Study (ACE) found significant association between adverse childhood experiences and health and social problems as an adult.[5] The ACE study identified ten types of childhood adversity categorised as abuse, neglect or household instabilities as shown in Figure 4.

Figure 4:
Overview of Adverse Childhood Experiences



Source: Centers for Disease Control and Prevention

[5] Further details on ACEs see Davidson, Bunting and Webb (2012) Families experiencing multiple adversities: A review of the international literature http://www.barnardos.org.uk/9281_multiple_adversities_report_web.pdf.

Research carried out by Barnardo's NI in partnership with the National Society for the Prevention of Cruelty to Children NI, the National Children's Bureau NI and Queen's University, Belfast identified further adversities within the local NI context including poverty, social isolation, housing instability, children with carer responsibilities and involvement in the Troubles (Webb, Bunting, Shannon, Kernaghan, Cunningham and Geraghty, 2014). These adversities experienced by parents may result in chaotic, inattentive and ignorant caregiving (Perry, 2002) which undermines the basic conditions of safety and attachment that an infant needs to feel secure.

Research has shown that children who have experiences of adversity may have significant changes to their biological make up in the form of alterations to brain functioning and development and atypical patterns of cortisol and adrenaline production (Lieberman and Van Horn, 2008). When a child experiences frequent and/or prolonged adversity such as those shown in Figure 5 without adequate adult support, a 'toxic stress' response can occur.

Figure 5:
Toxic Stress Definition

What is Toxic Stress?

Toxic stress response can occur when a child experiences strong, frequent, and/or prolonged adversity - such as physical or emotional abuse, chronic neglect, caregiver substance abuse or mental illness, exposure to violence, and/or the accumulated burdens of family economic hardship - without adequate adult support. This kind of prolonged activation of the stress response systems can disrupt the development of brain architecture and other organ systems, and increase the risk for stress-related disease and cognitive impairment, well into the adult years.

Source: National Scientific Council on the Developing Child (2005/2014)

The effect of toxic stress may manifest itself in infants in the form of developmental issues. This may include language delays, fine and large motor skill delays, impulsivity, disorganised attachment, dysphoria, attention deficiency and hyperactivity caused by abnormalities in the brain (Perry, 2002; Burke Harris, 2018). Children impacted by ACEs may also have sleep problems, frequent headaches or tummy aches, become upset more than usual, regress to bed wetting or baby talk or developing new fears. In this way, adverse childhood experiences in early childhood can impact on cognitive and social development and can act as a barrier to good infant mental health.

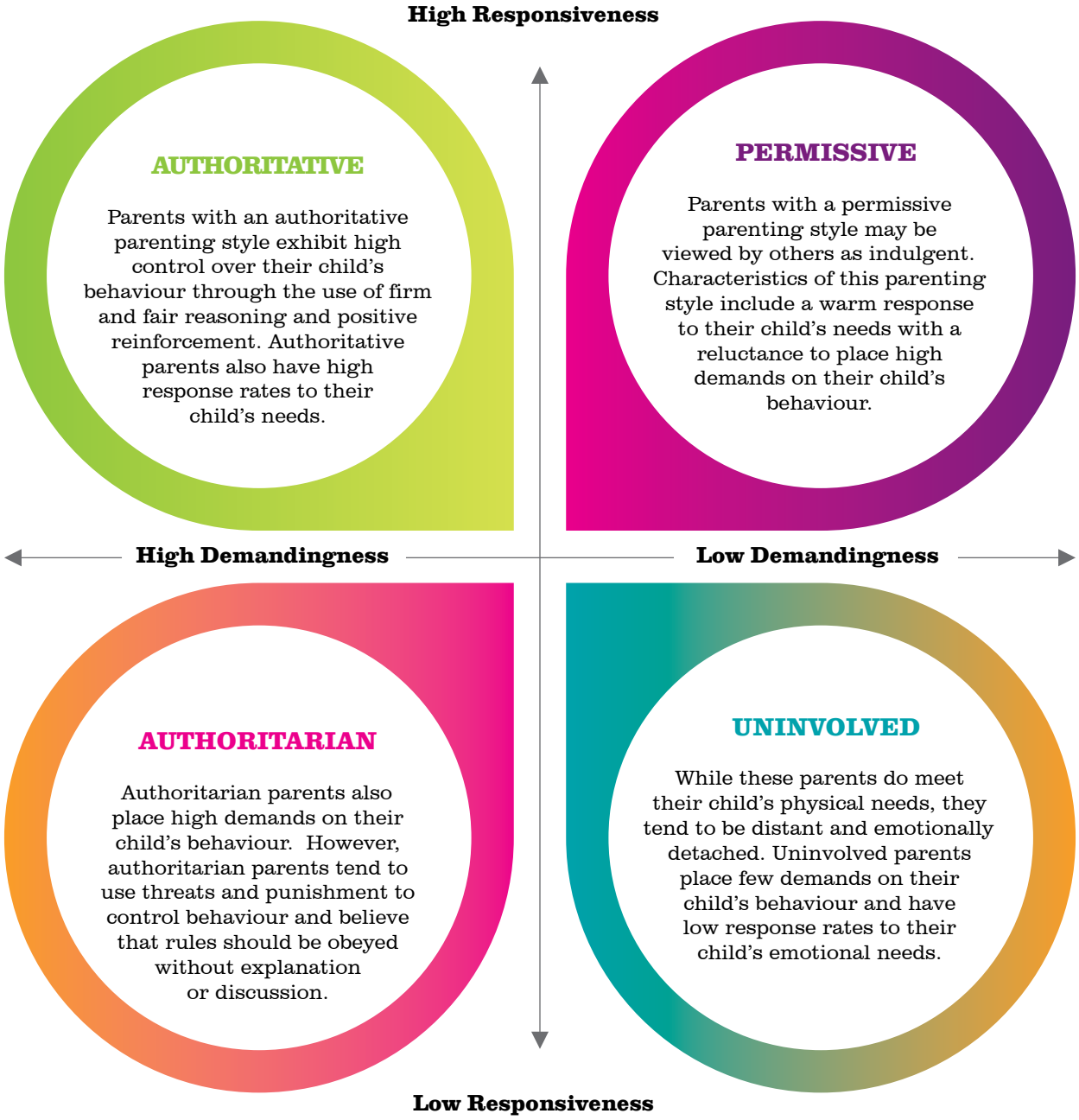
Parenting Styles

Parenting is a balancing act. Typically, parents strive to balance their parenting styles between protective behaviours that provide a growing child with age appropriate nurturing and safety and letting go behaviours that encourage their child to explore without fear (Lieberman and Van Horn, 2008). Parents play a crucial role in the lives of infants and have the ability to influence their child's development in both positive and negative ways. Diana Baumrind constructed three prototypical descriptions of parenting behaviour in the 1960's by identifying three groups of preschool children who showed very different patterns of behaviour. Baumrind observed that each type of behaviour exhibited by the infants correlated to a specific parenting style:

(i) Authoritative;
(ii) Authoritarian; and
(iii) Permissive.

Maccoby and Martin (1983) developed Baumrind's seminal typology further by identifying a fourth parenting style: Uninvolved. These four parenting styles can be shown on a continuum along two axis of responsiveness and demandingness as shown in the model in Figure 6.

Figure 6:
Baumrind's Four Parenting Styles Typology



Responsiveness relates to the extent to which a parent communicates sensitively and responds warmly to their child's needs and intentionally works to foster "individuality, self-regulation and self-assertion" (Baumrind, 1991). Demandingness describes the extent to which parents use discipline techniques and seek to exert control on their child based on their expectations of good behaviour.

Evidence from longitudinal studies consistently shows that an authoritative parenting style has the best outcomes for children as it is associated with higher self-esteem and subjective well-being, better GCSE results and higher odds of staying on in education beyond school-leaving age (Baumrind, 1991; Chan and Koo, 2011). In contrast, youths with authoritarian or permissive parents have lower self-esteem and are less happy than youths with authoritative parents (Chan and Koo, 2011). It is, however, important to note that other factors influence parenting styles such as cultural and ethnic background, socioeconomic status, family structure and the personal attributes relating to the child such as temperament, gender or disability.

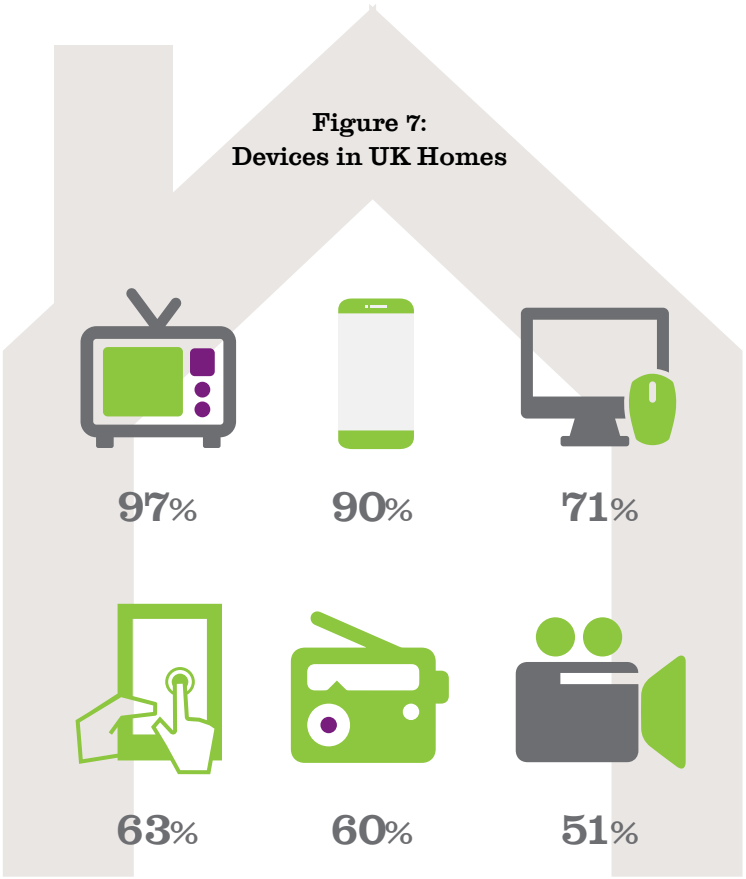
Digital Technology

Children in the UK are growing up in media rich home environments. According to Ofcom Adults' Media Use and Attitudes Report 2017, 88% of households now have internet access with a majority of UK adults having access to six devices in the home:

- a TV set - either standard or smart (97%)
- a mobile phone (90%) (smartphone 72% and non smartphone 18%)
- a desktop, laptop or netbook computer (71%)
- a tablet (63%)
- a radio set (60%)
- a digital video recorder (DVR) (51%)

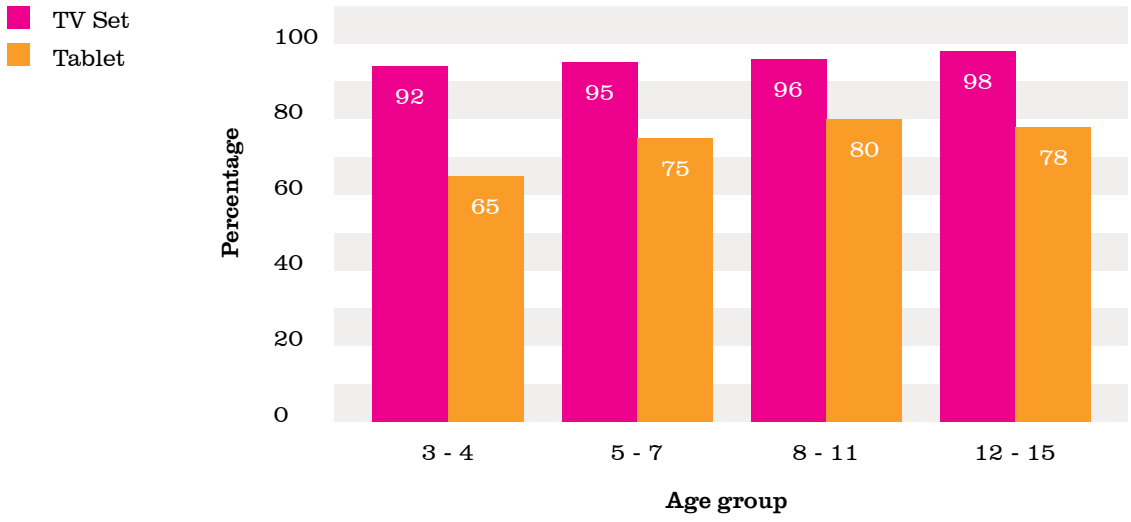
This home access to the internet and devices is reflected in the increase of young children using digital technology. Data collected by Ofcom (2017) relating to parents and children aged 3-15 years old, found that 53% of 3-4 year olds are now online with 79% of 5-7s, 94% of 8-11s and 99% of 12-15s also online. There are two devices that continue to be used by a majority of children in each age group: television sets and tablets as illustrated in Figure 8. No data for infants aged 0 – 3 years is currently available from this data set.

Figure 7:
Devices in UK Homes



Source: Ofcom Adults' Media Use and Attitudes Report 2017

Figure 8:
Percentage of Children's Use of Devices by Age Group



Source: Ofcom Children and Parents: Media Use and Attitudes Report (2017)

Interestingly, results show a ten percentage point increase in the growth of tablets used by 3 – 4 year olds from 2016 to 2017. Figures from the Technology and Play project (TAP)[6] showed that 25% of 0 – 3 year olds owned their own tablet. The increasing popularity of tablets and smartphones with a touchscreen interface has resulted in younger children being able to access this type of technology more independently at an earlier age than other devices such as laptops (Herodotou, 2017; Livingstone, Marsh, Plowman, Ottovordemgentschenfelde and Fletcher-Watson, 2014). The versatility of these types of devices in terms of portability and use to watch videos, play games, send messages, take pictures, and make video-calls and phone-calls make them a favourite with young children (Kidron and Rudkin, 2017; Chaudron, 2015).

As with all aspects of healthy infant development, parents play a vital role in managing their child's use of digital technology. Infants need parental support to use digital technologies as they are particularly vulnerable to risk as their capacity to actively engage alone is limited by their level of physical and cognitive development. The term "parental mediation" is widely seen to capture the parental management of the relationship between children and media (Livingstone and Helsper, 2008). The types of parental mediation used has been found to vary on a range of factors including a parent's educational background and level of media literacy, the age and gender of the child and the frequency of technology use in the family (Smahelova et al, 2017). Drawing from the literature on parental mediation (Livingstone and Helsper, 2008; Nikken and Schols, 2015; Smahelova et al, 2017), three main types of mediation for infants and young children tend to be employed by parents:

- **Restrictive Mediation:**
  Poses limits on child's use of technology by setting time limits, restricting location of use and access to content.

- **Active Mediation:**
  Discusses with child about content they are engaged with including explaining instructions of use and outlining potential risks.

- **Co-Using:**
  Intentionally uses media together with child primarily for educational or entertainment purposes.

Parents may need to adjust or combine the types of mediation used as the child grows such as supervision of screens when their child is using them independently, using technical restrictions such as 'parenting controls' to regulate or block content or contact and monitoring their child's online activities.

Infants and Technology

As previously discussed, there is a lack of empirical evidence into how digital technology is used by infants in their everyday lives and what implications this use may have on their development. Concerns raised around infants' use of technology tend to centre on overuse leading to less social interaction and physical activity, disruption to sleep due to the blue light emitted from devices, overstimulation, aggressive behaviour and attention deficits and impact on language development. While there is some evidence to suggest that these concerns are valid, more robust research is needed at this stage of cognitive development to explore what benefits and risks digital technology may pose for infants. Due to infants' varying stages of development, their needs and influences of parents differ from older children and young people. In this way, much of the research and guidance to parents conducted with children in older age groups is not applicable to infants.

Furthermore, advice on how parents may guide infants to maximise benefits and reduce risk is often contradictory or inaccessible (Kardefelt-Winther, 2017). The American Academy of Pediatrics (AAP) recommendations for children's media use is often cited internationally as best practice for parents to adhere to as highlighted in Figure 9. These guidelines were updated in 2016 to reflect a shift away from only focussing on screen time to placing greater emphasis on the quality of content children use and context of how children are supported by parents through co-viewing to relate this to their everyday lives.

[6] Marsh, J., Plowman, L., Yamada-Rice, D., Bishop, J.C., Lahmar, J., Scott, F., Davenport, A., Davis, S., French, K., Piras, M., Thornhill, S., Robinson, P. and Winter, P. (2015) Exploring Play and Creativity in Pre-Schoolers' Use of Apps: Final Project Report. Available at: www.techandplay.org

Figure 9:
AAP Recommendations for Media Use and Young Children

- For children younger than 18 months, use of screen media other than video-chatting should be discouraged.
- Parents of children 18 to 24 months of age who want to introduce digital media should choose high-quality programmes and applications (apps) and use them together with children, because this is how toddlers learn best. Letting children use media by themselves should be avoided.
- For children older than 2 years, media limits are very appropriate. Limit screen use to no more than 1 hour or less per day of high-quality programming. Co-view or co-play with your children, and find other activities to do together that are healthy for the body and mind.
- Keep bedrooms, mealtimes, and parent–child playtimes screen free for children and parents.
- No screens during meals and for 1 hour before bedtime.

Source: American Academy of Pediatrics (2016)

While the updated AAP recommendations offer a starting point for parents, much confusion and lack of up to date high quality evidence remains. At this point, the effects of digital technology on infants' cognitive development are unknown. Like any aspect of infant development many factors including parenting style, socioeconomic status, and child temperament, modify the positive and negative effects of media on children's behaviour and development (Radesky, Schumacher, Zuckerman 2015). The following section outlines the key areas in the discourse around risk and opportunities for children's use of digital technology.

Educational and Learning Opportunities
Evidence is mixed about the extent of educational and learning opportunities infants may gain from digital technology at this stage in their development. Research suggests that before two and a half years old, infants learning from 2-dimensional (2D) screens is less effective than learning from equivalent real-life situations (Lerner and Barr, 2014; Anderson and Hanson, 2013). Furthermore, memory constraints at this stage of development impede what learning infants can transfer from 2D screens (Herodotou, 2017). It may also be the case that the visual design, sound effects, and touchscreen interface of interactive media can either engage young children or distract them from educational content (Radesky et al, 2015).

However, other studies suggest that high quality age appropriate programmes may result in an increased vocabulary and provide learning opportunities (Radesky et al, 2015; Billington, 2016). The development of digital skills are also possible for very young children. Marsh et al (2015) found that most 3 - 5 year olds could do a series of activities on a tablet without assistance including swipe the tablet to change page (76%), trace shapes with their fingers (75%), open apps (75%) and draw things (73%). Although not to the same extent as the 3 - 5 year old age group, those aged 0 – 2 were also able to swipe the tablet to change page (54%), trace shapes with their fingers (44%), open apps (44%) and draw things (44%) unassisted.

While research on how digital technology can influence children's learning is itself in its infancy, consensus is forming around the environment that encourages educational benefits from digital technology in early learning. Reports have identified that infants may reap educational benefits from digital technology as long as two critical factors are taken into consideration: (i) content; and (ii) context (Lerner and Barr, 2014; Blum-Ross and Livingstone, 2016). Firstly, content relates to what the child is watching and using. When this content is of high quality, age appropriate and interactive it is possible for learning to take place (Lerner and Barr, 2014). Context refers to both where the child is using technology as well as the extent to which parents support infants to relate what they see on screen to 'real life'. Other factors which may determine the level of educational benefits relate to the individual child, particularly if special educational needs have been identified.

Screen Time – Quantity and Quality

Screen time refers to the amount of time spent viewing a screen whether it be watching television, playing on a games console, using a tablet or computer or using an app on a smartphone. As highlighted in Figure 9, The AAP recommends that screen time for children less than 18 months be discouraged with those aged 18 – 24 months avoiding using a screen alone. The AAP's (2016) policy statement reports, "Evidence is sufficient to recommend time limitations on digital media use for children 2 to 5 years to no more than 1 hour per day to allow children ample time to engage in other activities important to their health and development and to establish media viewing habits associated with lower risk of obesity later in life". This approach stems from a displacement hypothesis which states that time spent with digital technology may reduce the time an infant spends on activities with proven benefits such as reading, sleeping, physical activity and face to face social interaction (Galpin and Taylor, 2018). However, some have suggested that this displacement hypothesis focusing on time spent is too simplistic (Kardefelt-Winther, 2017) and obsolete (Blum- Ross and Livingstone, 2016). Furthermore, there is a lack of consensus around what could be defined as overuse and how this may change at different points in children's development. Instead, it could be more beneficial to broaden the focus from quantity of time spent using screens to include other aspects relating to the quality of activities using digital technology:

- **Contexts: How is digital technology being used?**
  This includes where and how infants use it and whether it is active interaction or passive viewing.

- **Content: What is being viewed?**
  For infants this should be high quality and age appropriate.

- **Connections: What is beyond the screen?**
  How does infants' use of digital technology enhance or reduce their social interactions?

Technoference

The accessibility of digital technology has the potential to distract parents from engaging with infants in ways that encourage and nurture a trusting secure attachment such as making eye contact, talking, playing and responding to their needs. In Radesky et al (2014) nonparticipant observational study of families with children aged 0 – 10 years old in fast food restaurants, many parents became highly absorbed in their own devices to the extent to which the primary focus of the caregiver's attention and engagement was with the device rather than the child. From their observations, this absorption in digital technology by a parent when present with a child had three typical effects:

1. **Decrease in responsiveness to the child:** This manifested itself through little or no response to a child's actions and lack of eye contact with the child.

2. **Decrease in communication with child:** This was typically showed by lack of talking at the table or with a parent speaking in flat tones with an expressionless face during absorption in their device.

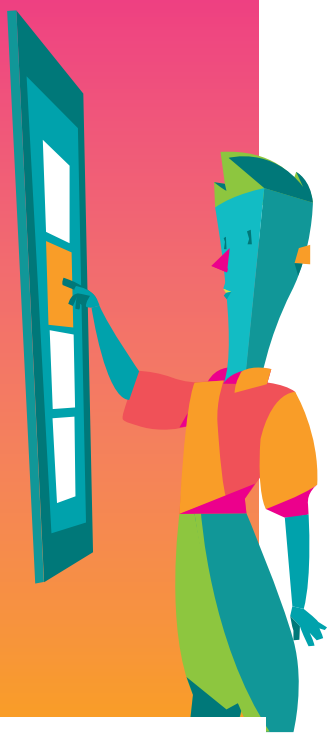
3. **Child escalation:** Observers found that after a period which parents were continuously absorbed on their devices, many children attempted to gain their attention. This was often through exhibiting limit testing behaviours.

The concept of how digital technology can interfere with parent-infant interactions has been further developed by McDaniel and Radesky (2017) using the term 'technoference'. Technoference has been defined as "everyday interruptions in interpersonal interactions or time spent together that occur due to digital and mobile technology devices". This definition is particularly applicable to parent-infants' relations and infant mental health as it includes both the interruptions in interactions and the time spent together being impacted by digital technology. McDaniel and Radesky (2017) explored how the behaviour of children under 5 years old was affected by their parents' use of digital technology. Results found that technoference was associated with child problem behaviours as the more parents reported technological interference when interacting with their child the more behavioural problems they rated their children as displaying. As this study has yet to be replicated it is unclear if challenging behaviours in children cause parents to 'escape' more using technology or if parents' use of technology cause children to act in ways to claim back their parents' attention. Furthermore, this study also found that the more screen time parents reported, the more likely their child was to have increased use of digital technology. This is an area that requires further research, as evidence shows that in this stage of development, infants require quality time with a parent able to engage in repeated 'serve and return' interactions to support their cognitive development and secure attachment.

Summary

Evidence of the impact of digital technology on infants' mental health and development is at an early stage. It is clear that many questions remain unanswered about the physical, mental, emotional and social consequences of digital use amongst infants and their families due to the lack of high quality evidence. The evidence that does exist indicates that factors including time spent, type and quality of content and interaction with a parent are important in how infants can experience and benefit from digital technology. However, agreement amongst researchers and early years' specialists is clear that social, cognitive and physical activity is crucial for infants' development and that digital technology should not displace interactions with parents. The importance of a sensitive responsive adult in the early years is well established and an essential aspect to healthy child development. Any benefits that digital technology may offer infants in terms of their development should be within the context of an environment which offers consistent parent-child interactions.

Technoference has been defined as **"everyday interruptions in interpersonal interactions or time spent together** that occur due to digital and mobile technology devices".



Chapter 2: Methodology

Methodology

The purpose of the Connections: Parenting Infants in a Digital World research was to gain insight into the typical use of digital technology at home and explore what influence this may have on interactions between parents and infants. It sought to explore what parenting styles are used with infants and gather parents' views on the 'Five to Thrive' approach which is embedded in Barnardo's NI early years services.

Aims and Objectives

The aim of the project was to provide a better understanding of how digital technology may influence interactions between parents and infants aged 0 – 3 years old at home. Specifically, the main objectives of the research were to:

1. Gain an understanding of parents' and infants' use of digital technology in everyday home life and how this may impact on parent-infant interactions;
2. Explore parents' awareness of infant mental health with specific reference to the 'Five to Thrive' approach and the parenting styles used with infants;
3. Identify the areas parents of infants could benefit from additional support to improve service delivery.

Definitions

Please note for the purposes of clarity and brevity, the term 'infants' is used throughout the report to refer to children aged 0 – 3 years old only while 'children' is used to describe children in other age groups which may also include those aged 0 – 3 years old.

The use of 'digital technology' throughout the report is an all-encompassing term that includes both the *types* of digital devices used such as tablets and smartphones and the *activities* that infants and parents engage in using these devices such as watching videos online or playing games.

Respondents

Participants for this study were identified through seven Barnardo's NI services related to parenting in the early years including:

- Family Connections
- Family Learning and Integration Project (FLIP)
- Forward Steps
- G-Old Community Partnership Sure Start
- Horizon Sure Start
- Parent and Infant Project (PIP)
- Strabane Sure Start

Potential participants must have satisfied all three of the following criteria before taking part in the survey:

1. have a child or children aged 0 – 3 years old;
2. currently live with a child or children aged 0 – 3 years old;
3. accessed a Barnardo's NI service in the past six months.

This resulted in a total of 199 completed questionnaires during March 2018. Participants were drawn from every county in NI with the exception of County Fermanagh. The majority of respondents were female (97.0%) which typically reflects those who access early years services with most aged 19 to 40 years old (88.9%). These respondents reported a total of 369 children between them. As a qualifying criteria was to have a child aged 0 – 3 years old all participants reported having at least one child within this age group resulting in 246 infants. A further 12 older children ranging in age from 4 to 16 years old were identified by age in the survey.

Measure

This research was quantitative in nature and data was captured through an anonymous questionnaire completed by the parents. Both online and paper versions of the questionnaire were available during March 2018. The survey was divided into four main sections relating to the aims and objectives of the research:

- **Section 1:**
  Parenting Styles including awareness of the Five to Thrive approach
- **Section 2:**
  Parental Digital Use at Home
- **Section 3:**
  Children's Digital Use at Home
- **Section 4:**
  Support for Parents

Data collected by the survey was systematically analysed using SPSS with qualitative comments thematically coded.

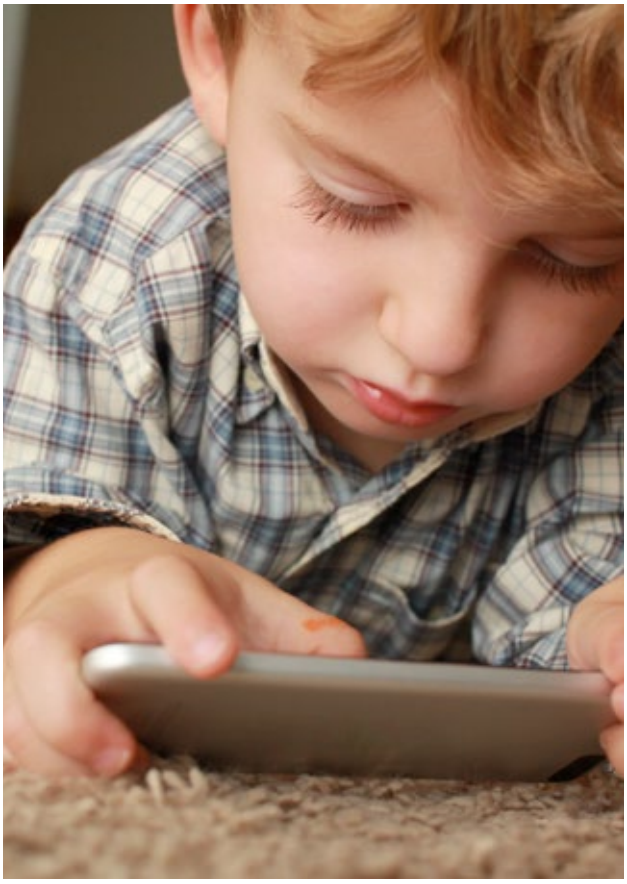
Ethical Considerations

The design of this study has been reviewed and approved by Barnardo's UK Research Ethics Committee. In the current study, a Research Advisory Group (RAG) was used prior to data collection. The RAG was drawn from seven Children's Services Managers who are expert in working with parents of infants. The purpose of the RAG was to act as a sounding board during the development of the questionnaire and to ensure correct administration of the questionnaire in their services. The RAG will also provide ongoing support for the future dissemination of the research through their local networks.

Limitations of Research

Despite the survey being open to both mothers and fathers, most respondents were female. While this does reflect Barnardo's NI typical early years' service user, this places limitations on how generalised the findings can be made for all parents.

It is important to note that the results presented in the report rely on parents' ability to recall their own behaviour and that of their child. As with any self-reported survey, it is likely that there will be a degree of under- and over-reporting.



Chapter 3: Results

Overview

As outlined in Chapter 1, research exploring infants' use of digital technology has been limited to date. Due to their stage of development, infants' use of digital technology and the role of their parents differ from that of older children and young people. The central focus of this research was to understand the nature and scope of digital technology in the home environment and how this interplays with parent - infant interactions. This chapter presents the results of the survey in three sections:

- **Section 1:**
  Parenting Styles presents how participants view their own parenting style in relation to four parenting styles:

  (i) Authoritative;
  (ii) Authoritarian;
  (iii) Permissive; and
  (iv) Uninvolved.

  It also outlines parents' perceptions of the Five to Thrive approach which has been embedded in Barnardo's early years' service provision.

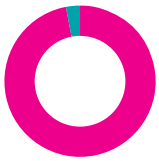
- **Section 2:**
  Digital Technology in the Home Environment explores how both parents and infants use digital technology and how this may influence the quality and time spent interacting with each other. This section includes data relating to the concept of 'technoference' and provides insight into the ways in which digital technology may be used as a parenting tool.

- **Section 3:**
  Support for Parents considers what support parents feel they received when a baby is born with specific reference to what guidance would be beneficial to parents in terms of digital technology and infants.

Key Demographic Overview

The Connections: Parenting Infants in a Digital World survey was completed by 199 parents of infants aged 0 – 3 years old drawn from every county in Northern Ireland with the exception of County Fermanagh. Key demographic information about the sample includes:

Gender



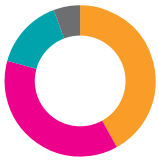
The majority of respondents were female (97.0%) reflecting Barnardo's NI typical service user for early years provision.

Age of Participant

Nearly sixty five percent (64.8%) of participants were in their thirties, while almost a quarter (24.1%) were aged 19 to 29 years old. Parents aged 40 or older accounted for 11.0% of the overall sample.

Family Structure

The most common family type reported was non lone parent households (76.7%) followed by lone parent families accounting for 23.3%.



Parents participating in the survey tended to have either two children (41.1%) or one child (38.6%). Less common was larger families of three (14.7%) or four children (5.6%).

Household Income

The average household income before housing cost in Northern Ireland is £436 per week.[7] Using this figure, 19.1% of respondents reporting having an income in a similar bracket of £401- £500. Over forty percent (41.5%) reported a higher income than the NI average weekly income ranging from £501 - £1000+ per week. Just under forty percent (39.3%) reported a lower than average weekly income ranging from £101 to £400 per week.

Child Demographics

Participants had a total number of 369 children between them. All participants reported having at least one child aged 0 – 3 years old which accounted for 246 infants. Table 1 shows the numbers of infants aged 0 – 3 by age category. A further 12 children aged 4 - 16 years old were identified by their age although many parents did not provide the age of their older children.

Table 1:
Number of Infants by Age Category

Age Category in Years	No. of Children
0 - 1	94
1 - 2	77
2 - 3	75
Total	**246**

In terms of gender, 53.7% of children aged 0 – 3 years were male while 46.3% were female. A small number of parents reported infants had a range of medical and developmental issues accounting for 7.3% of the total number of children related to the survey. Issues included Autism, Down Syndrome, Asthma and issues with speech, eye sight and hearing. A number of children were in the process of being assessed.

[7] Department for Communities (2017) Households below Average Income Northern Ireland 2015/16 Report https://www.communities-ni.gov.uk/sites/default/files/publications/communities/hbai-2015-16.pdf

Section 1:
Parenting

Parenting Styles

It is important to first explore parenting styles and participants' attitudes to parenting to provide context for understanding parents and infants' use of digital technology in the home. Drawing from the literature, parenting style has been shown to have a significant influence on infant mental health. As discussed in Chapter 1, four main styles of parenting have been identified: (i) Authoritative; (ii) Authoritarian; (iii) Permissive; and (iv) Uninvolved. As an indicator of what style parents tend to use, participants of the survey were asked which statements sounded most like them across five key areas including:

- behaviour;
- daily routine;
- discipline;
- limit setting; and
- parenting style.

Options for each statement were drawn from the broad types of parenting style identified as shown in Table 2.

Participants related mainly to an authoritative parenting style across all five areas with 44.7% of parents identifying with statements such as "Children need nurturing with clear expectations of how to act" and "I think firm and kind discipline works best". No parents identified with either an authoritarian, permissive or uninvolved parenting style across all five areas. Results indicate that while participants tend to predominately identify with an authoritative parenting style they can employ different approaches in terms of setting limits, daily routine, discipline and dealing with unwanted behaviour.

Enjoyable Aspects of Parenting

To gain insight into the attitudes of parents in NI, participants were asked to identify the most enjoyable aspects of parenting. Thematic analysis identified three main areas that parents reported that they enjoyed. The most frequently identified area related to watching their child grow and develop. Parents expressed pleasure at being able to watch their child achieve milestones, become more independent and develop their own personalities:

> *"Watching your child grow, learn and react. Constantly amazed!"*
> Parent of four children

> *"The most enjoyable aspect of parenting is watching this small infant grow and nurture every day, and watch their personalities take shape. It's the most rewarding thing in life to be part of."*
> Parent of two children

Table 2: **Parenting Style of Participants**

Areas of Parenting	Style of Parenting			
	Authoritative %	Authoritarian %	Permissive %	Uninvolved %
Behaviour of child	87.8	6.1	1.5	4.6
Daily routine	80.8	9.6	5.6	4.0
Discipline	79.2	6.6	9.1	5.1
Limit setting	85.9	2.5	9.6	2.0
Parenting style	82.8	2.0	1.0	14.1

Base N = 199

"Watching them grow and become more independent, watching them gain new skills and the joy they get from this."
Parent of two children

Participants also reported that the love they give to and receive from their child was one of the most enjoyable aspects of parenting. This was often described as unconditional and joyful. Specifically, parents highlighted that affection such as cuddles, kisses, smiles and expressions of 'I love you' made parenting enjoyable:

"The unconditional love both ways. They are the centre of your world and you are theirs."
Parent of one child

"Most enjoyable aspect of parenting to me is waking up in the morning and he looks for a cuddle and says those loving words to me, I love you mummy."
Parent of one child

The third theme identified was spending time with children engaging in activities that both parents and children could enjoy such as playing, reading and learning new things together. Many parents emphasised the fun aspects of interacting with their child and how much they enjoyed seeing their child happy:

"Spending time with our children - enjoying their personalities/humour/ fun. Seeing bits of our own personalities coming through them."
Parent of two children

"Playing with them and seeing the joy on their face that you take the time to sit down with them. Them laughing is 100% the best thing!"
Parent of one child

"Just spending time with my baby and playing games and stories and lots of cuddles!"
Parent of one child

It is interesting to note that no participants referenced the use of devices or digital technology with their child as an enjoyable aspect of parenting.

Challenging Aspects of Parenting

Participants were also asked about what challenges they experienced with parenting. For parents with children aged 0 – 3 years old, the least enjoyable aspect of parenting was unwanted behaviour. This was commonly referred to as tantrums and held particular challenges when this happened in public:

"When I say No!!!! Tantrums, huffing, you name it, my kids do it!!"
Parent of three children

"The least enjoyable is when my 2 year [old] throws a strop in a shopping centre and everyone's watching you."
Parent of two children

"When you experience behaviour problems especially out in public."
Parent of three children

Second to behavioural issues for parents of infants was lack of sleep and tiredness. This was attributed to a number of factors such as having a new born baby, difficulty establishing a bedtime routine or lack of time generally.

"Lack of predictability in sleeping - establishing and maintaining a routine."
Parent of one child

Disciplining their children also featured highly as a factor that parents did not enjoy. This related to feeling bad about upsetting their child or worries that they are being judged by others:

"I don't enjoy discipline, I don't like to see my children upset."
Parent of two children

"Being a little hard on child as they need to behave or go to sleep, but they do have to learn."
Parent of one child

Other areas of parenting participants did not enjoy included when a child is sick or facing health issues, balancing work with parenting and feeling judged by others in how they parent their child. Only two respondents commented that social media was a negative aspect to parenting.

Five to Thrive Approach

As outlined in Chapter 1, Barnardo's has embedded the Five to Thrive approach when working with parents with babies and young children. The approach encourages parents to incorporate five different types of interaction with their child everyday to encourage secure attachment and good infant mental health.[8]

The majority of respondents were made aware of the Five to Thrive approach during their use of a Barnardo's NI service. This accounted for 87.9% (n = 175) of the sample. Of these participants, the majority of parents agreed that Five to Thrive had raised their awareness regarding child development in the following areas:

98.9%
agreed they had better understanding that early years interactions between infants and parents have a long term impact on their child's development

97.7%
agreed they had a better understanding that they are the main influence on their infant's emotional development

94.9%
agreed they had a better understanding of child brain development

Participants were also asked to evaluate each of the five building blocks in the Five to Thrive approach in terms of how useful it was to raise their awareness of healthy brain development. Overall, participants provided positive feedback about the approach:

> *"Good to have this information and builds on what I currently do. Gives more direction and ideas."*
> Parent of two children

> *"The 'Five to Thrive' approach is an excellent idea - it breaks it down and puts it in easy to understand language that ALL parents from every aspect of life and learning can understand and use."*
> Parent of three children

Respond was rated as the most useful in raising awareness (97.1%) although all components of the approach were rated highly with Play and Cuddle rated at 96.6% and Talk at 95.4%. While Relax rated the lowest response of the five in terms of being useful (92.0%), this aspect of the approach was rated the highest in terms of those who strongly agreed that it was useful. Relax was also found to be regarded by 8.1% of participants as somewhat or not that useful in raising their awareness of child brain development.

[8] See Figure 3 in Chapter 1 for more information about the practical ways to use the Five to Thrive approach

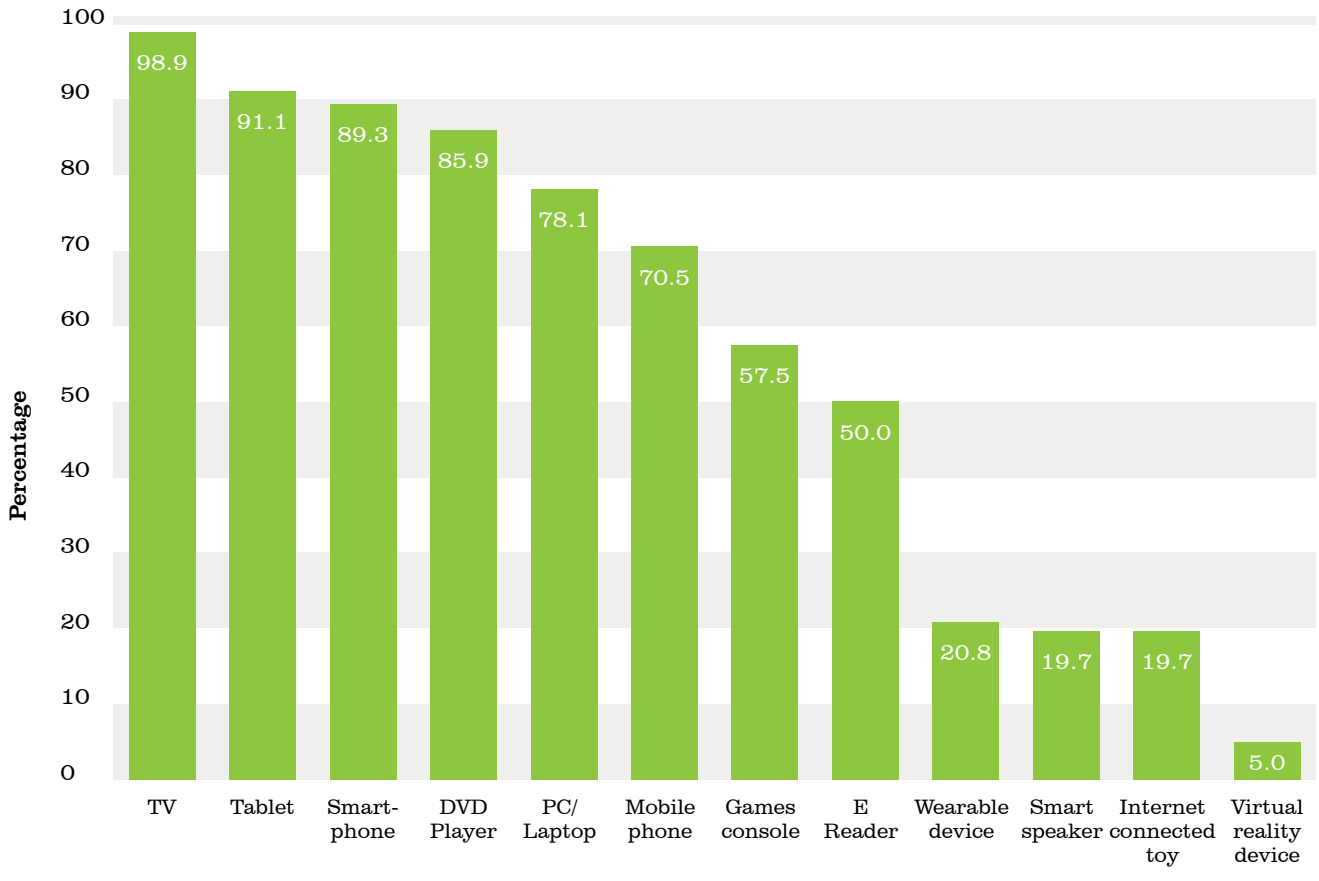
Section 2: Digital Technology in the Home Environment

This section will explore the use of digital technology by both parents and infants in the home environment. This includes results on ways in which digital technology may influence parenting, with reference to 'technoference', and what limits are placed around infants' use.

Digital technology is an integral part of the majority of participants' homes in Northern Ireland. Over ninety seven percent (97.5%) of participants reported having access to the internet with 95.4% reporting that they accessed the internet every day at home. Households had an average of 8.5 devices each. Most common was the television (TV) (98.9%) with the majority of participants having 2 – 3 sets in their home (53.4%). Tablets, such as iPads, were the second most common device in the home (91.1%) with 63.3% owning one and 27.9% owning two or more. Thirdly, smartphones were a popular device amongst participants (89.3%) with the highest percentage (54.7%) of 2 per household compared to all other devices listed. Figure 10 shows the range of devices that parents reported accessing at home.

Reflecting the most common devices in the household, tablets were the number one device owned by infants (26.0%), followed by televisions (16.3%) and DVD players (10.6%). Interestingly, the socioeconomic status of the household did not restrict the range of devices at home but reduced the average number of devices in households of average or below average weekly income. Across all income categories, the most common two devices at home were televisions and tablets. Similarly, the structure of the family did not limit the range of devices found at home but did result in fewer numbers of the same device within the household.

Figure 10:
Most Common Devices in Households

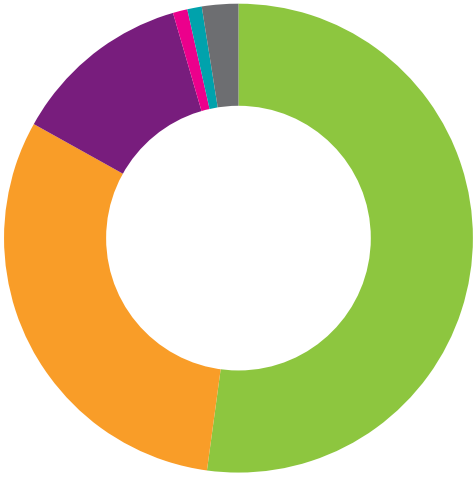


Base N = 199

Parents Use of Digital Technology at Home

As reported previously, over ninety seven percent (97.5%) of participants reported having access to the internet with 95.4% reporting that they accessed the internet every day at home. Participants were asked how often they accessed the internet on any device at home. Results in Figure 11 show the majority of parents went online several times a day (52.1%) or daily (30.9%).

Figure 11:
Frequency Participants Accessed Internet at Home

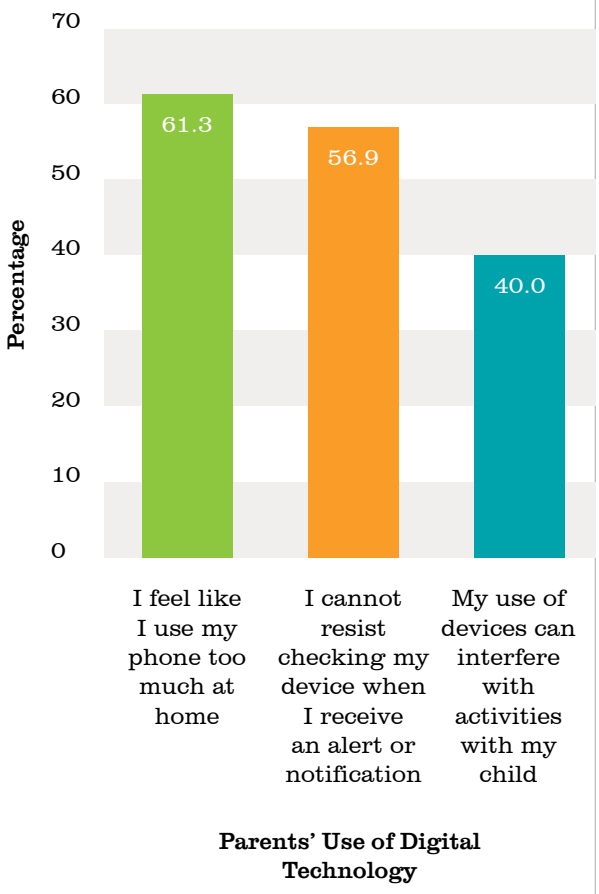


52.1%	Online several times a day
30.9%	Online daily or almost daily
12.4%	Online almost all the time
1.0%	At least weekly
1.0%	Hardly ever
2.5%	Never

Base N = 199

Parents perceived that their own use of digital technology had some influence on interfering with parent-child interactions or distracting them when at home as illustrated in Figure 12. Most participants felt that they used their phone too much at home (61.3%) with over fifty five percent (56.9%) reporting that they could not resist checking their device when they received an alert or notification. Forty percent of parents agreed that their use of devices can interfere with activities with their child.

Figure 12:
Parents Use of Digital Technology at Home



Base N = 199

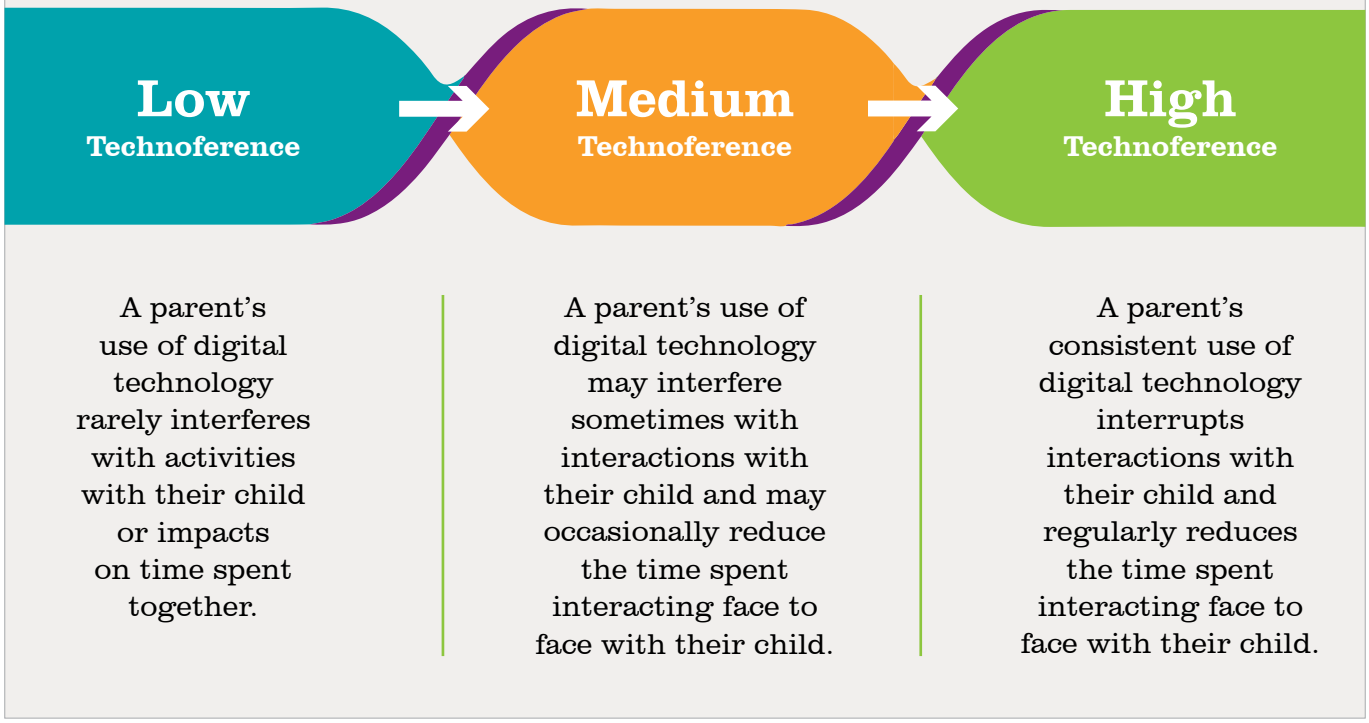
Drawing from McDaniel and Radesky's (2017) work on technoference, three key statements relating to parental use of digital technology at home were formulated as a way to indicate the extent of interruptions in parent-child interactions or time spent together that occur due to digital technology:

1. I cannot resist checking my device when I receive an alert or notification.
2. I feel like I use my phone too much at home.
3. My use of devices can interfere with activities with my child.

These statements were used to create a 'Technoference Measure' to provide an indication of levels of high, medium and low technoference as reported by participants.

Figure 13:

Levels of Technoference Model



Low Levels of Technoference

This accounted for the smallest group of participants with 12.9%. This group disagreed or strongly disagreed with all three technoference indicators. This group was characterised by parents who reported lower than average internet use at home. No participant from this group reported that they used the internet 'almost all the time'. Parents in this group tended to use an authoritarian parenting style around daily routines and limit setting. Most participants with low levels of technoference were drawn from parents with below average incomes (47.1%) in comparison to those with above average incomes (29.4%) or average incomes (23.5%).

Medium Levels of Technoference

This was the largest group consisting of 54.6% of the overall sample. While nearly half this group reported going online several times a day (49.1%) this was slightly less than average (52.1%). Although this group identified mainly with authoritative parenting styles, participants with medium technoference employed the broadest range of parenting styles. Participants presenting medium levels of technoference were most likely drawn from the below average income category (45.1%) compared to those on above average income (38.2%) or those from the average income (16.7%).

High Levels of Technoference

All participants in this group agreed or strongly agreed with all three technoference indictors used in the survey. This accounted for 32.5% of parents. This cohort was characterised by excessive levels of internet use at home with a quarter of parents (25.4%) reporting using the internet almost all the time and 57.1% going online several times a day. This group were more likely to find it difficult to discipline their child (12.7%) compared to the average (9.1%) and adopted a more authoritarian style in terms of daily routine. Those with high levels of

technoference were also more likely to be from the above average income category (49.1%) compared to those on below average income (28.3%) or on average income (22.6%).

Results indicate that parents' use of digital technology at home does interfere with their interactions with children to varying degrees. Drawing from evidence from the literature, this lack of 'serve and return' interactions or reduction of time spent with an infant due to parents use of technology may have consequences on the quality of attachment between a parent – child and restrict the development of good infant mental health. Examples of daily technoference reported by participants included:

44.0%
use phone/tablet when infant is playing under their supervision;

24.7%
send emails, messages or post online during face to face interaction with infant;

21.1%
respond to a call or alert on their phone regardless of what their infant is doing;

13.0%
distracted by television when interacting with their child;

6.7%
spend time on their phone while eating with family.

Figure 14 strikingly confirms that those parents defined in the study as having high levels of technoference are most likely to report involvement in digital technology activities that may interrupt parent-child interactions on a daily basis.

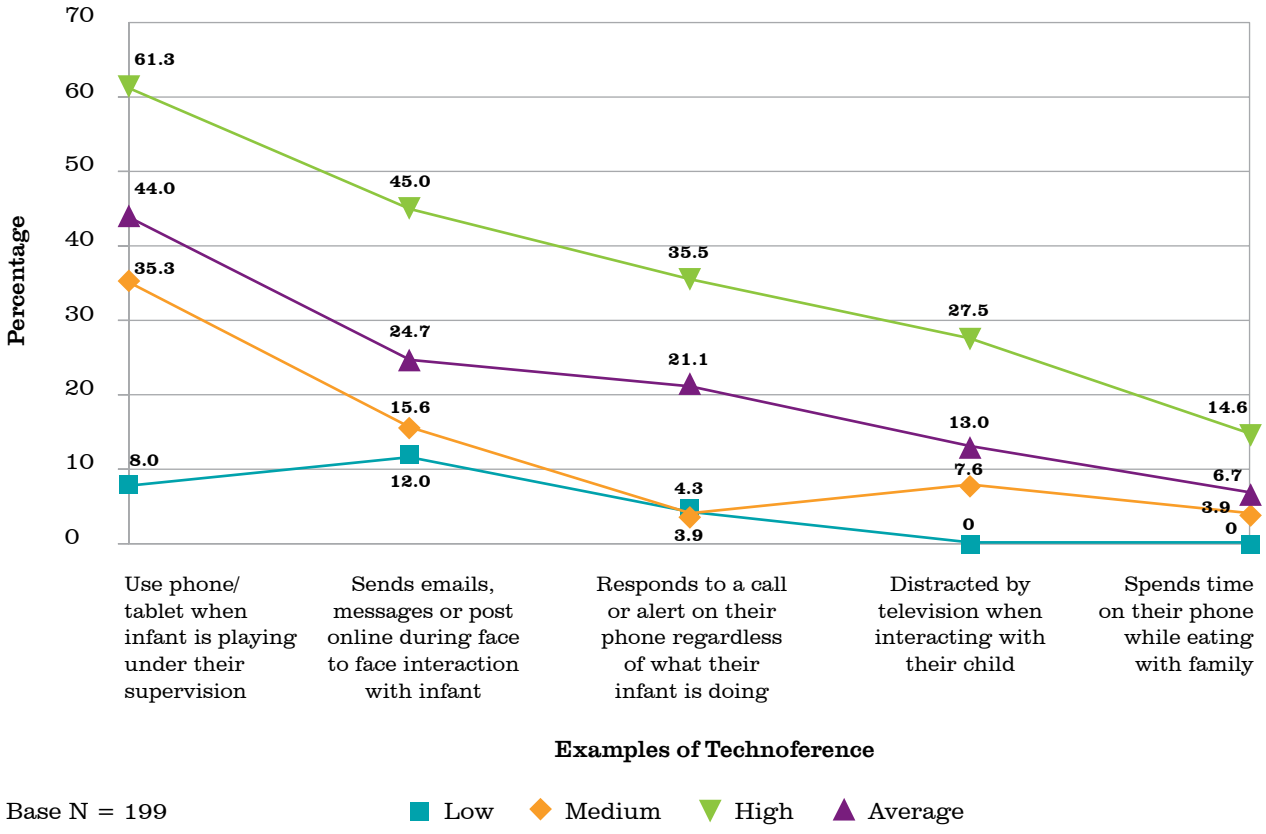
Similarly, those defined as having low levels of technoference were least likely to report participating in daily activities related to technoference.

Parents as Role Models

Parents expressed varied views when asked if they were a good role model they for their child in relation to their own use of digital technology. Nearly fifty percent (47.9%) agreed that they were a good role model while a quarter disagreed that they were a good role model to imitate use of digital technology (25.0%). Over a quarter neither agreed nor disagreed with this statement (27.1%). Figure 15 shows the differences in attitudes between those parents that perceive themselves to be a good role model in terms of their use of digital technology and those that disagree or neither agreed or disagreed.

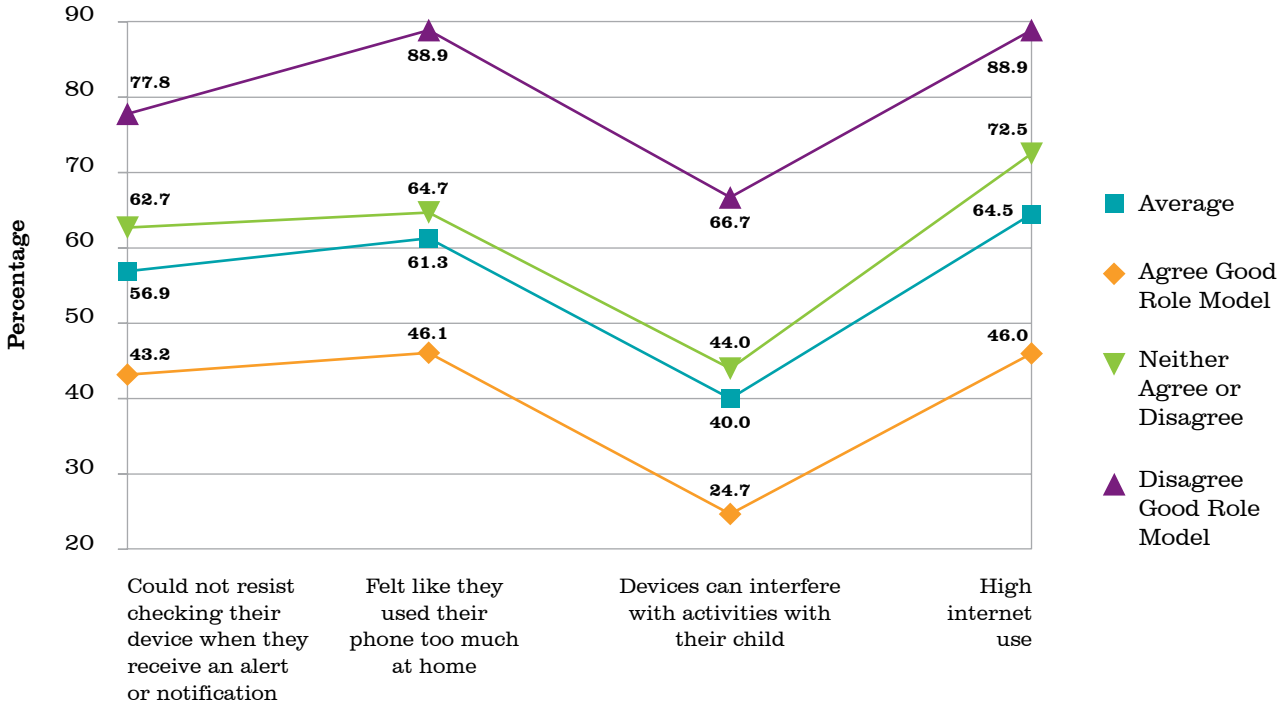
Parents who agreed that they provided a good role model rated themselves lower in the indicators for technoference and were also less likely to be high internet users themselves compared to other groups. In comparison, those parents who disagreed that they were good role models for their children in terms of digital technology, reported higher use of their phones at home, in addition to responding to alerts and phone calls and agreeing that devices can interfere with parent-child interactions. This group were also more likely to be high internet users at home. Results indicate the greater parents' own interaction with devices and the internet at home, the less likely they were to feel they are being a good role model to their child.

Figure 14: Daily Examples of Interference in Parent-Child Interactions by Levels of Technoference



Base N = 199

Figure 15: Comparison of Participants' Perception of Good Role Model by Attitudes and Use of Digital Technology



Base N = 199

Digital Technology as a Parenting Tool

Participants were asked how often in a normal week they would use a digital device as a parenting tool for their child aged 0 – 3 years old in a range of circumstances. Findings show that parents used digital technology in a range of situations as a way to divert or entertain their infants. Table 3 presents how parents reported using digital technology by the different ages of their child.

Across all three age categories, digital technology was used most frequently by parents as a tool to occupy their child when completing tasks on a daily basis. Table 3 shows that parents of infants aged 0 – 1 were more likely to use digital technology as a tool at mealtimes (8.5%) than other age groups, while infants aged 1 – 2 and 2- 3 years old were more likely to be given digital technology as a reward for good behaviour.

Entertainment for Infants: The most common way parents used digital technology was to entertain their infant while they were busy at home doing things like housework. Almost a quarter of participants (24.0%) responded that this was a daily occurrence while 38.8% reported that this happened at least once a week. A further 28.4% never used digital technology as a parenting tool for this reason.

Reward for Good Behaviour: Results indicated that parents find digital technology can be a useful tool to reward infants for good behaviour. The use of digital technology for this purpose tends to increase as a child gets older as shown in Table 3. A quarter of participants (25.5%) reported that digital technology was used to reward good behaviour at least once a week with 14.7% of parents using this technique to reward good behaviour every day. While this was the second highest reason parents used digital technology as a parenting tool, most parents reported that they did not use digital technology in this way (53.1%).

Calming Technique: Some participants reported that they use digital technology to soothe their child when upset. Similar to using digital technology as a reward, participants' use of this as a calming technique tended to be more likely for infants aged 1 – 2 or 2 – 3 years old. Ten percent (10.4%) reported that they used this tool on a daily basis while a further 26.0% used it at least once a week. However, 53.2% of parents never used digital technology as a way to calm their child.

Results show that parents can use digital technology in a range of ways to support their parenting. However, participants also reported that they felt devices such as smartphones and tablets can make parenting more difficult (41.4%) while 38.2% neither agreed or disagreed with this.

Table 3: **Participants' Daily Use of Digital Technology as a Parenting Tool**

Daily Use of Digital Technology for:	Infant Age Categories		
	0 - 1 years (n= 94) %	1 - 2 years (n= 77) %	2 - 3 years (n= 75) %
Bedtimes	6.4	11.7	5.3
Busy at home (e.g. housework)	20.2	29.9	20.0
Busy outside the home (e.g. shopping)	2.1	6.5	4.0
Car/Travelling	6.4	10.4	5.3
Mealtimes	8.5	7.8	6.6
Remove as a consequence of unwanted behaviour	5.3	10.4	9.3
Reward for good behaviour	7.4	14.3	17.3
When child is upset	7.4	11.7	13.3
Use as a distraction from unwanted behaviour	2.1	7.8	10.6

Infants' Use of Digital Technology in the Home

Parents were asked how long their 0 – 3 year old child spent on a range of non-digital and digital activities on a typical day. Results show that infants are involved in a wide variety of activities at home. Bearing in mind the developmental limitations in what activities babies may be involved in, infants aged 2 – 3 years were more likely to participate in each activity. Reflecting the ways in which participants reported enjoying spending time with their children as in Section 1, the three most common activities for infants overall were non digital in nature:

Playing with toys: Infants spent most of their time playing with toys. Thirty percent of participants (29.9%) reported that infants spent three or more hours playing with toys with a further 47.8% playing with toys for 1 to 2.5 hours.

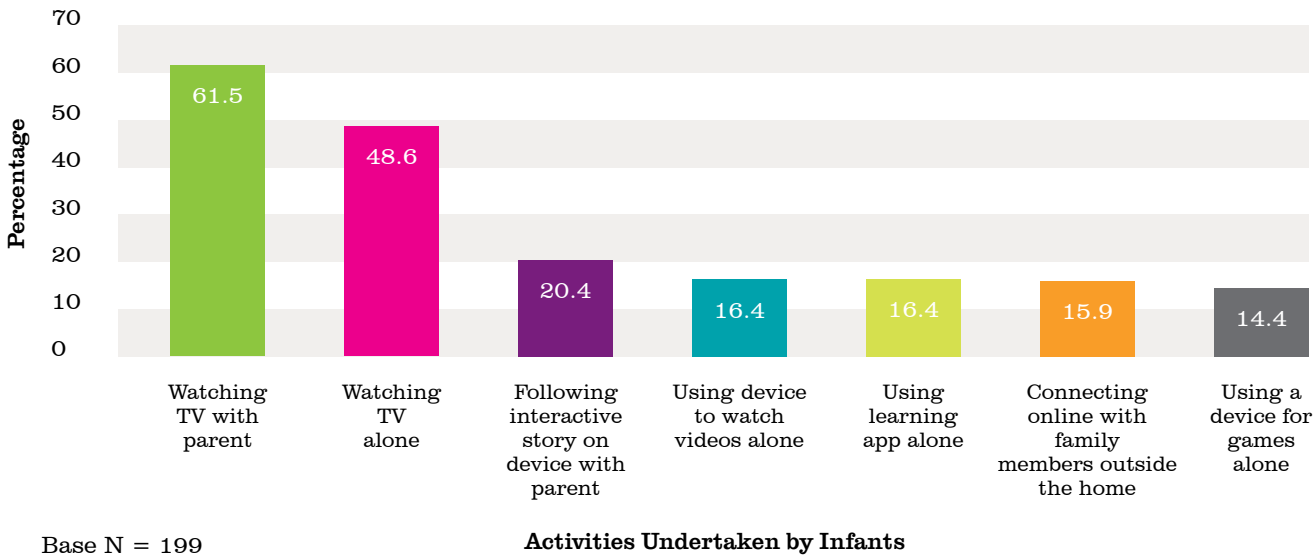
Reading with a parent: Reading a book with a parent was the second most common activity for infants. However, infants did not spend the same amount of time reading with a parent compared to playing with toys. Typically reading a book with a parent lasted for 0 – 30 minutes as reported by most parents (62.3%) with a further 23.0% spending between 30 - 60 minutes a day.

Time outside: Findings show that the third most common activity for infants was time spent outside such as walking or visits to the park. The majority of respondents indicated that they spent up to one hour outside with their infants (55.1%).

Infants also spent time on activities involving digital technology on a typical day. The television was dominant with 61.5% watching TV for up to one hour with a parent and 48.6% watching TV for up to one hour alone. Over a quarter (26.2%) watched TV with a parent for over one hour while 16.1% watched TV for more than one hour alone. Analysis was conducted to explore if parents' level of technoference had an effect on the time infants spent watching TV. Participants classed as having high levels of technoference were more likely to permit their infants to watch TV alone for over two hours a day (10%) compared to those with medium technoference (1.0%). No respondents defined as having low levels of technoference reported that their infant watched more than two hours a day of TV alone. Similarly, findings show that infants of participants with high levels of technoference spent over 2 hours watching TV a day with a parent (9.8%) compared to those with medium (3.1%) and low (4.2%) levels of technoference.

Figure 16 illustrates other activities involving digital technology infants participate in for up to one hour a day included following an interactive story on a device with a parent (20.4%) and connecting online with other family members outside the home (15.9%). It is worthwhile noting that some infants are using digital technology alone regularly to access games, learning apps and videos. Findings indicate that participants with high levels of technoference were more likely to permit their child to use devices to access a range of content alone for longer periods of time.

Figure 16: Digital Activities Infants Participate in for up to an Hour a Day



Base N = 199

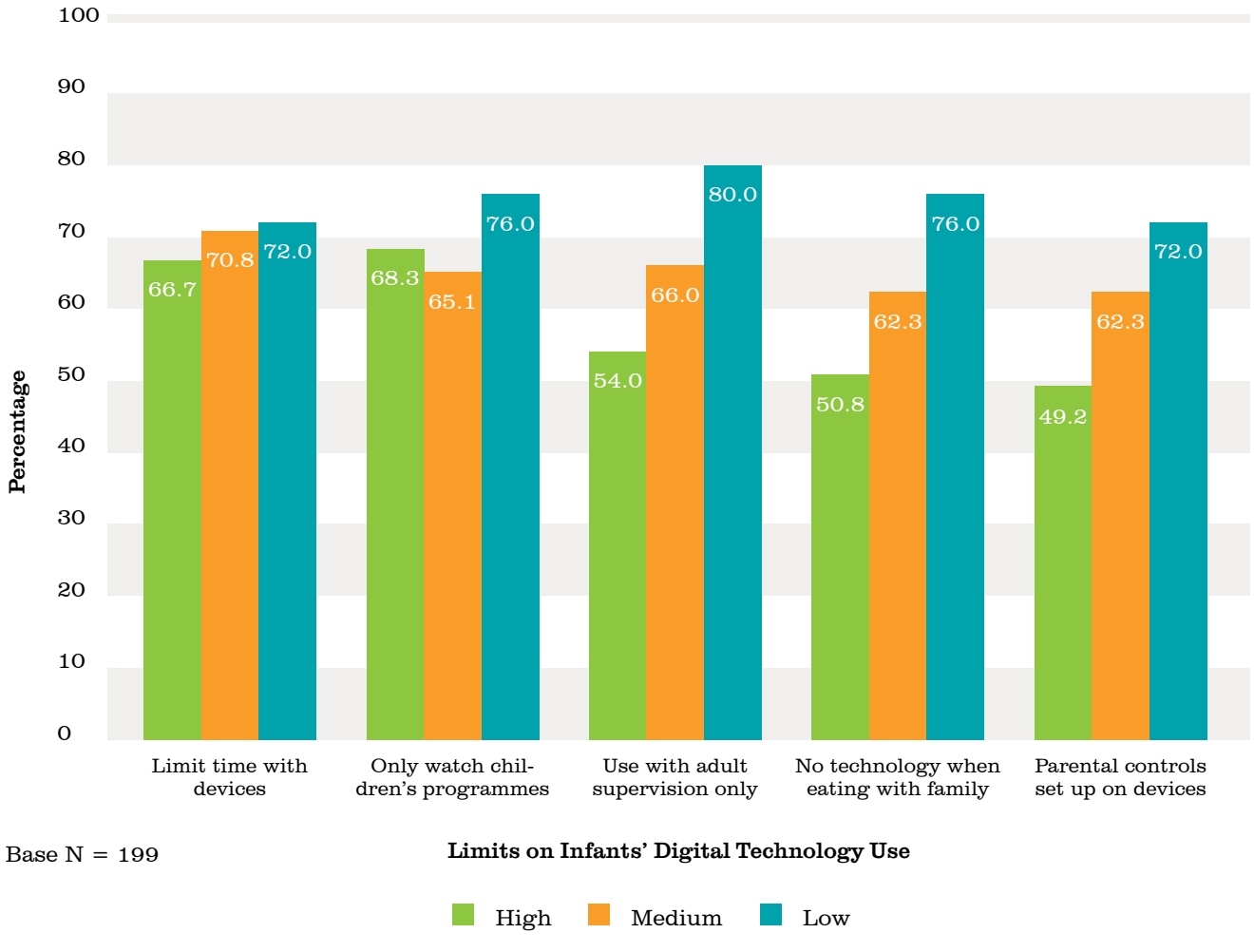
Parents reported that their child uses devices mainly in the living room area at home (63.8%). The portability of many devices is apparent in infants' use as 23.1% use devices when travelling/in the car with 16.1% accessing devices in family members' homes. Overall, parents agreed that their child had a good balance between screen time and doing other things (79.0%). However, participants were also aware that digital technology can reduce interactions within the family (89.2%).

Limits around Digital Technology

The most common restriction parents placed around their infants' use of digital technology related to time spent on devices (68.8%). Other limits placed by most parents included: only watching children's programmes (67.3%), only using devices with adult supervision (64.3%) and not allowing digital technology at family mealtimes (60.3%). Analysis by the three levels of technoference demonstrated differences in parental approaches to mediating digital technology.

As illustrated in Figure 17, participants with low levels of technoference tended to be more restrictive in their mediation of digital technology use with their infants. This is collaborated by earlier findings that suggest that parents with low levels of technoference tend to have an authoritarian parenting style. As a group, parents with high levels of technoference tended to place fewer limitations around their infants' use of digital technology and were less likely to restrict the context in which infants used devices such as at mealtimes (50.8%) or bedtimes (33.3%). Overall, parents with high levels of technoference were more likely to have no rules (11.1%) compared to those with medium (3.8%) or low levels (4.0%) of technoference.

Figure 17: Top 5 Parental Restrictions of Digital Technology by Level of Technoference



Base N = 199

Benefits of Digital Technology for Infants

When asked about the advantages digital technology could bring their child, the majority of comments related to educational benefits. Parents felt that the educational apps, children's television programmes and games available were good ways to promote early literary and numeracy:

"I find my son has got to know his numbers and colours by watching programmes such as Thomas the Tank, he does not play games."
Parent of one child

"My son likes to watch videos on Kids YouTube, and this may have helped with his ability to count to 12 and recognise colours and shapes, however I also spend time looking at numbers, shapes and colours with him."
Parent of one child

"It helps them with some aspects of their counting and alphabet through some of the games and apps."
Parent of two children

Parents also felt that using digital technology was beneficial in enhancing hand and eye coordination and developing skills in how to use different devices. A number of participants identified digital technology as being beneficial in terms of entertaining their infant while they did other things such as chores or caring for other children. Parents also reported the benefit of digital technology providing some space for them to relax:

"If I'm eating out with my child, technology can be great for distracting him as I get peace to enjoy a meal."
Parent of one child

"Keep him occupied allowing me to get stuff done."
Parent of two children

Disadvantages of Digital Technology for Infants

Aside from the educational and entertainment benefits, parents identified a broad range of disadvantages for children of this age group using digital technology. Thematic analysis of responses found most parents struggled with establishing and enforcing time limits for this age group. Comments included:

"They find it difficult switching them off and handing them back when the allocated time is up. Establishing a balance!"
Parent of two children

"Sometimes it turns into a fight to remove device when time is up or it is meal time."
Parent of four children

Parents were also concerned that time spent on digital technology reduced their child's time and interest to do other things. This included social interactions with others and spending time reading or playing. Many participants commented on the "addictive" nature of digital technology and suggested that this could cause negative behaviour change in their infants or cause their child to become distracted from their environmental surroundings:

"Not communicating, answering when on device. Getting mad when he isn't able to complete a game."
Parent of two children

"Bad temper when taken off. Addictive for child. Toxic."
Parent of four children

"I find that technology can hinder my child's interests in other things, and once removed or confiscated, can result in a tantrum."
Parent of one child

Fewer parents identified issues relating to content and commercialism to be problematic for this age group. As shown, parents of infants have specific concerns around different aspects of their infants' use of digital technology while also acknowledging the benefits of how digital technology can be used as a parenting tool and a resource that may hold potential benefits for their child.

Section 3:
Support for Parents

The birth of a new baby connects parents with a wide range of health professionals and statutory agencies. This time is ideal to provide parents with support and guidance about the different aspects of their child's development. The last section of the survey asked participants about how helpful they found the information they received on the birth of their last child across a number of developmental areas. Respondents were also asked what guidance around digital technology they would find helpful.

Sources of Information

Parents were asked what has been the best ways they have learnt about responding to their child to promote healthy emotional development. The three most common sources of learning were:

70.4%
Sure Start services

69.3%
family

59.8%
friends

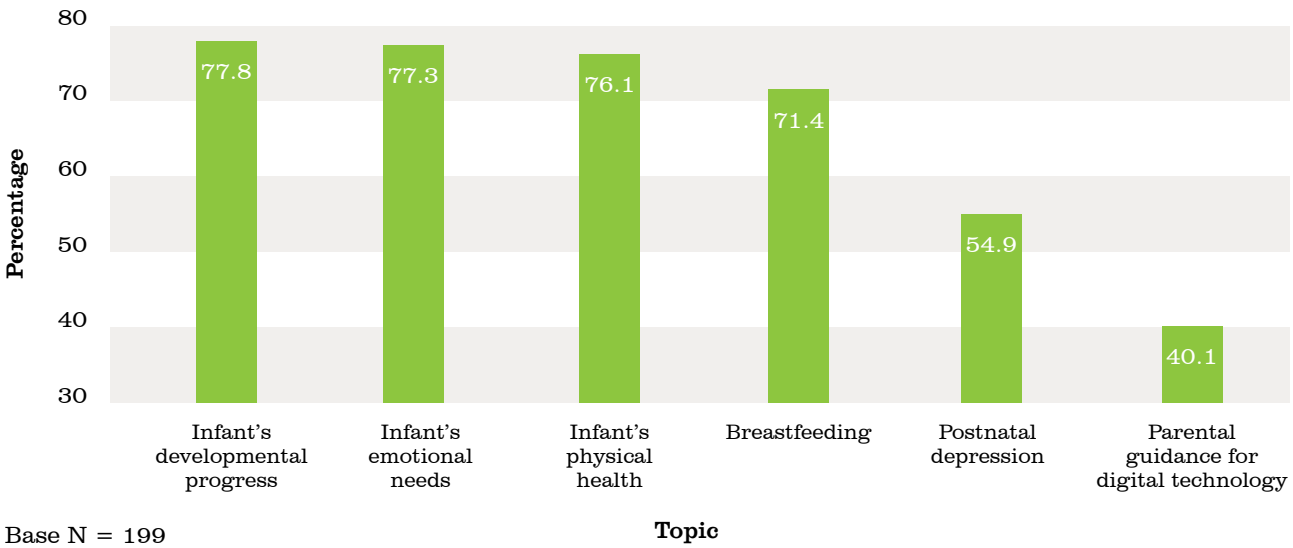
Participants found that interactions in local groups such as mother and toddlers (42.2%) or a community and voluntary group (36.7%) like a Barnardo's NI service were valuable to learn about ways to respond to their child's emotional needs. Other sources of information came from the GP/Health visitor (45.2%) or a NHS website (9.0%). A quarter of parents found they learnt from social media in the form of parenting blogs and forums (25.1%) or from a parenting app (17.6%).

Quality of Information

The majority of parents rated that the information they received around their child's physical, emotional and developmental growth was helpful or very helpful as illustrated in Figure 18. Information about breastfeeding was also found to be helpful by over seventy percent of participants (71.4%).

While most participants acknowledged that they received information on the various aspects of their infant's development, 12.1% reported that they did not receive information from any agency about postnatal depression. A further 25.8% did not receive information from any agency around guidelines that parents should introduce for their child's use of digital technology.

Figure 18:
Information Participants Found Helpful



Base N = 199

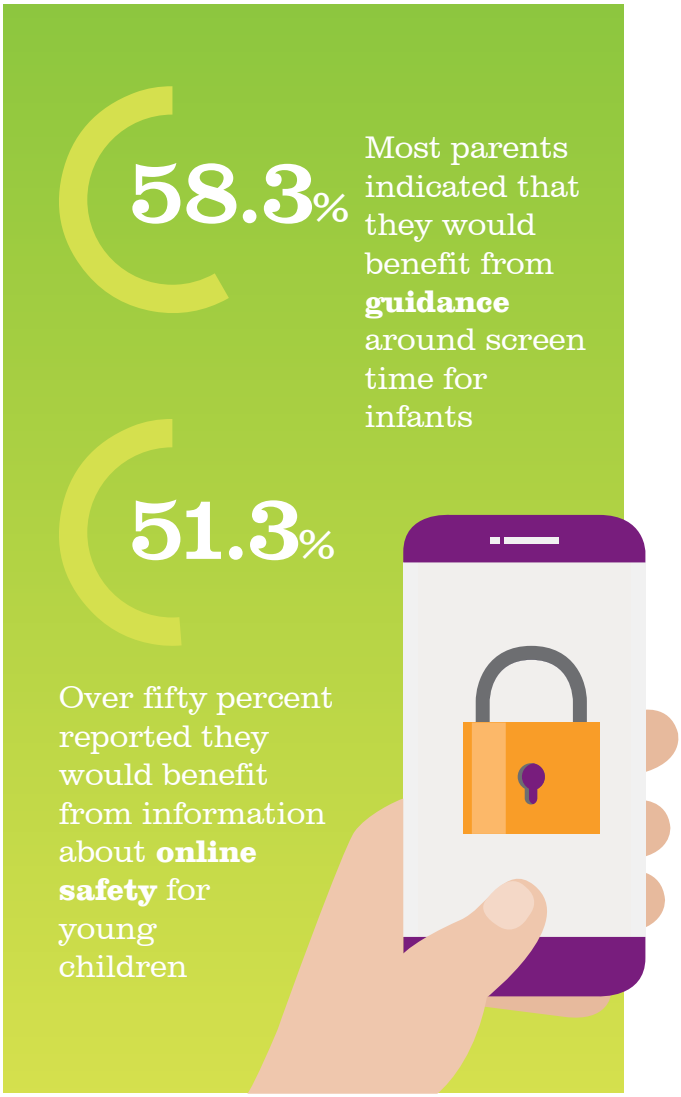
Guidance around Digital Technology

Participants expressed the need for guidance around digital technology use across a number of different areas. Most parents indicated that they would benefit from guidance around screen time for infants (58.3%) and information about online safety for young children (51.3%). Other areas that parents reported would be beneficial included information about young children's use of digital technology (47.2%), educational benefits of online apps (46.2%) and support to keep up to date about digital technology as it evolves (38.7%).

"More courses and workshops would benefit many parents. Not necessarily in regards to digital technology – but how to overcome the 'need' for it and how to effectively parent without the use of it."
Parent of one child

"Parenting Support – no leaflet can tell you every child's emotions. They are all different emotionally."
Parent of one child

"This is a big area of concern to me. There is no way to slow down the use overall in society but I find that info about what apps are informative and good for children is lacking. Parents should be told guidelines about healthy use and sound advice to limit time and strategies to do so."
Parent of two children



Results of the study indicate that there is a gap in guidance provided to new parents around digital technology in comparison to other information they receive about their infant's physical, emotional and developmental progress.

Chapter 4: Discussion and Conclusion

Digital technology is a largely unexplored dimension within the context of infant mental health. The lack of evidence in this area has resulted in little policy development regarding the opportunities and risks for infants' use of digital technology. The purpose of the Connections: Parenting Infants in a Digital World project was to provide a better understanding of how digital technology may influence interactions between parents and infants aged 0 – 3 years old at home. While acknowledging the limitations of this study as outlined in Chapter 2, fresh insights into how parents and infants use technology in the home environment have been gained. Particularly, the new phenomenon of technoference regarding how parental use of digital technology may impact on parent-child interactions has been explored. In addition, challenges and opportunities of infants' everyday use of digital technology have been identified and provide some understanding of parenting in a digital world. These include the following areas outlined below.

New Aspects to Parenting

In this study, most parents identified with an Authoritative parenting style which suggests that they are responsive to their child's needs while also providing fair and firm boundaries. This may be expected from this sample of parents as all had participated in at least one Barnardo's NI parenting programme of which many promoted the Five to Thrive approach. While this is a positive finding, it limited the distinctions that could be made in this study based on traditional parenting typologies. However, it did transpire that the extent to which parents used digital technology has an influence on their parenting practice as some parents regularly used devices to entertain, reward and soothe infants. This use of digital technology as a parenting tool seemed to increase in the older age category of 2 - 3 years old. Further research is required to establish what potential effect parents' use of devices to reward and soothe has on infants' ability to self-regulate. In addition to using digital technology as a tool, parents also reported placing limitations around their infant's use of digital technology particularly regarding time, content and context. This was identified as a new challenge that parents face when balancing their infant's use of digital technology.

Findings show that the majority of parents had medium to high levels of technoference. This indicates that, to some extent, infants' interactions with parents are reduced by either quality or time by parental use of digital technology. This study has shown infants with parents that present high levels of technoference are more likely to use devices alone for longer periods of time and are less likely to have any restrictions placed on their use of digital technology.

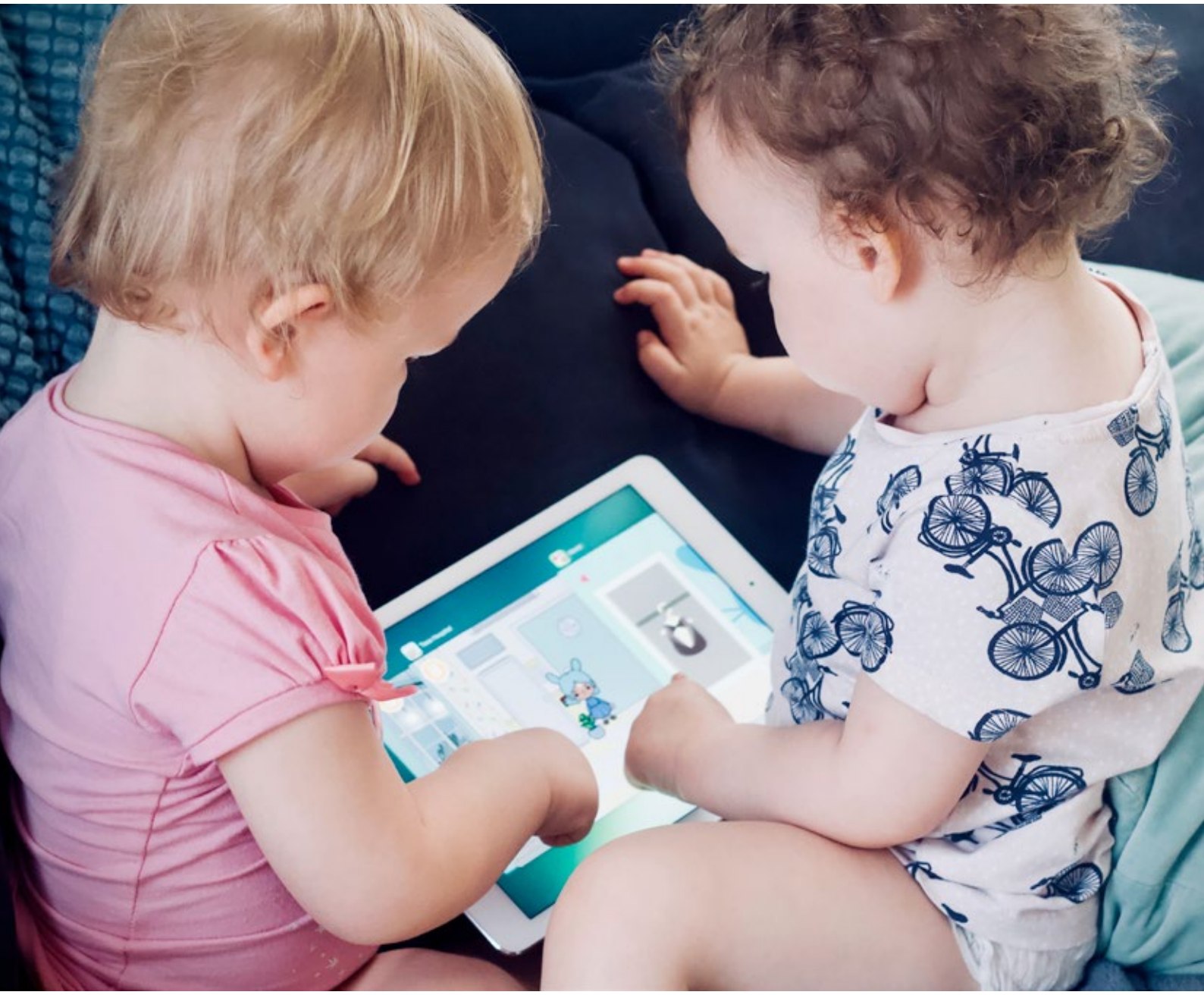
This has potential implications for this age group in terms of mental health. The impact on cognitive development of prolonged use of digital technology by infants is still unknown. Furthermore, decades of research have established that secure attachment and healthy brain development is achieved by warm and consistent care and interactions by parents responsive to their needs. Placed in the context that the vast majority of participants in this study recognised that early years interactions between infants and parents have a long term impact on their child's development and that parents are the main influence on infant's emotional development, additional work with parents is required to highlight the risks of technoference to secure attachment and positive infant mental health.

Infants' Use of Digital Technology at Home

Results show that infants spent most time on non-digital activities such as playing with toys, reading with a parent or playing outside compared to digital activities. However, it is also the case that digital technology is a normal and integral part of infants' everyday lives with over twenty five percent of infants in this study owning a tablet. While many infants co-viewed television or other screens with their parents, some infants did regularly spend time on their own with devices. To date, existing research suggests there is little developmental benefit to this age group using devices on their own. While parents recognise the potential educational benefits for children interacting with digital technology, feedback from qualitative comments suggest that prolonged exposure to accessing devices alone may negatively impact an infant's behaviour and reduce their ability to socially interact. This is an area for further research.

Gaps in Support

The rapid extension of digital technology in the home environment has resulted in a lack of evidence based advice for parents. This study has identified gaps in the support parents receive around digital technology. While most parents rated information they received about their child's developmental progress and physical and emotional needs as helpful, fewer participants found any guidance they received about digital technology as helpful. While not a central focus of the study, findings also suggest that parents could receive more helpful information regarding postnatal depression. This is of note as poor parental mental health has been identified by others as an adverse childhood experience (Felliti et al, 1998; Webb et al, 2014) thus having the potential to impact on secure attachment and infant mental health. Most parents recognised that they would benefit from information around screen time and online safety. Parents were also interested in being informed about the educational benefits of online apps and how to stay up to date with new technological advances that may be beneficial for their child.



Recommendations

Drawing from the findings of the Connections: Parenting Infants in a Digital World research, a number of key areas have been identified as requiring further consideration. Barnardo's NI suggests the following recommendations as the basis for raising awareness of the benefits and risks of parental and infants' use of digital technology on secure attachment and infant mental health:

Recommendation 1

The Public Health Agency's Infant Mental Health Framework for Northern Ireland is well placed to further explore how digital technology may impact infant mental health across its three existing areas of work:

(i) **Evidence and policy:** Additional research is needed to explore how digital technology impacts on the lives of infants, their relationships to others and their social, emotional and cognitive development. It is particularly crucial that a range of methods are used to gather evidence and that the voices of young children including those with disabilities and linguistic diversity are sought. This evidence should be the basis for policy development and consistent and accessible messages to parents to support infant mental health.

(ii) **Workforce development:** Training for practitioners across all relevant disciplines should be developed to raise awareness amongst the workforce of the benefits and risks associated with the use of digital technology by both parents and infants relating to infant mental health. This training should be reviewed at regular intervals to ensure that it remains relevant.

(ii) **Service development:** Consideration should be given to revising and updating service delivery to reflect the ways in which digital technology has changed the home environment and may impact on interactions between parents and children. This may include both universal programmes and the development of targeted interventions for parents who find their use of digital technology is adversely impacting on their interactions with their child.

Recommendation 2

The Department of Education should introduce evidence based guidance for Sure Start services and DE funded pre-school settings regarding how digital technology should be used in these settings and at home to facilitate the maximum educational benefits for infants and preschool children.

Recommendation 3

A cross – departmental campaign and dissemination plan should be developed to raise awareness amongst parents around the specific benefits and risks digital technology offers infants. Messages should focus on:

- Promoting the importance of face to face engagement and consistent parental responses to enhance infants' cognitive, social and emotional development.
- Raising awareness of how parents' use of digital technology at home can interrupt their interactions or reduce the time spent with infants which may have consequences for secure attachment and good infant mental health.
- Widening parents' understanding of 'screen time' to shift the focus from quantity of time spent with digital technology to the quality of time spent with specific reference to the context of use, high quality content and connections with others during use.
- Identifying ways in which parents can use digital technology to benefit their child in terms of learning, play and developing skills including ways parents can assess the educational benefits of apps and programmes.

Dissemination should be at key points during the perinatal period and at the 3+ Health Review. Engagement with a wide range of parents should be sought to ascertain the most effective ways in which to promote messages focused on infant mental health and digital technology.

References

Allen, G. (2011) Early Intervention: The Next Steps An Independent Report to Her Majesty's Government. Available at: http://dera.ioe.ac.uk/14161/7/graham%20allens%20review%20of%20early%20intervention_Redacted.pdf [Accessed 1st May 2018].

Anderson, D. R. and Hanson, K. G. (2013) What Researchers Have Learned about Toddlers and Television *ZERO TO THREE*, Vol 33 (4) pp 4-10.

American Academy of Pediatrics (AAP) Council on Communications and Media (2016) Media and Young Minds. Pediatrics. 2016; 138(5):e20162591 Available at: http://www.apa.org/helpcenter/digital-guidelines.aspx [Accessed 8th May 2018].

Balbernie, R. (2013) The importance of secure attachment for infant mental health *Journal of Health Visiting* Vol 1 (4) pp 210-217.

Baumrind, D. (1967) Child care practices anteceding three patterns of preschool behavior. *Genetic Psychology Monographs*, Vol 75 (1) pp 43-88.

Baumrind, D. (1991) The Influence of Parenting Style on Adolescent Competence and Substance Use *The Journal of Early Adolescence.* Vol 11 (1) pp 56-95.

Billington, C. (2016) How digital technology can support early language and literacy outcomes in early years settings: A review of the literature. London: National Literacy Trust.

Blum-Ross, A. and Livingstone, S. (2016) Families and screen time: Current advice and emerging research. Media Policy Brief 17. Media Policy Project, London: London School of Economics and Political Science.

Bowlby, J. (1969) *Attachment and loss: Vol. 1*. Basic Books: New York.

Bowlby, J. (1988) Attachment, communication, and the therapeutic process in J. Bowlby *A secure base: Parent-child attachment and healthy human development*. London: Routledge.

Bronfenbrenner, U. (1979) *The ecology of human development*. Cambridge, Mass: Harvard University Press.

Burke Harris, N. (2018) *The Deepest Well: Healing the Long-Term Effects of Childhood Adversity*. London: Bluebird Books for Life.

Center on the Developing Child (2009) *Five Numbers to Remember About Early Childhood Development* (Brief). Retrieved from www.developingchild.harvard.edu. Working Paper 3. Updated Edition.

Chan, T. W. and Koo, A., (2011) Parenting Style and Youth Outcomes in the UK https://pdfs.semanticscholar.org/456d/a75d57bc03642dc09fe3c23ed95d3ab62664.pdf *European Sociological Review* Vol 27 (3) pp 385–399.

Chaudron, S. (2015) Young Children (0-8) and digital technology European Commission EUR 27052 EN – Joint Research Centre – Institute for the Protection and Security of the Citizen Publications. Luxembourg: Office of the European Union.

Department of Education (2016) *Draft Children and Young People's Strategy 2017 – 2027*. Bangor: Department of Education Northern Ireland

Felitti, V.J., Anda, R.F., Nordenberg, D., Williamson, D.F., Spitz, A.M., Edwards, V., Koss, M.P., Marks, J.S. (1998) Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The adverse childhood experiences (ACE) study. *Am J Prev Med* 14: pp 245–258.

Galpin, A. and Taylor, G. (2018) Changing Behaviours: Children, Adolescents and Screen Time. Available from: https://www.bps.org.uk/sites/beta.bps.org.uk/files/Policy%20-%20Files/Changing%20behaviour%20-%20children%2C%20adolescents%2C%20and%20screen%20use.pdf [Accessed on 1st May 2018].

Herodotou, C. (2017) Young children and tablets: A systematic review of effects on learning and development Journal of Computer Assisted Learning. Available at: https://onlinelibrary.wiley.com/doi/pdf/10.1111/jcal.12220 [Accessed on 8th May 2018].

Kardefelt-Winther, D. (2017) How does the time children spend using digital technology impact their mental well-being, social relationships and physical activity? An evidence-focused literature review. Innocenti Discussion Paper 2017-02. Florence: UNICEF Office of Research.

Kate Cairns Associates (2015) Five to Thrive: The things we do for each other that build and maintain healthy brains. Available at: "http://www.fivetothrive.org.uk" www.fivetothrive.org.uk [Accessed 8th May 2018].

Kidron, B. and Rudkin, A. (2017) Digital Childhood: Addressing Childhood Development Milestones in the Digital Environment. University of Southampton.

Lerner, C. and Barr, R. (2014) Screen Sense: Setting the Record Straight - Research-Based Guidelines for Screen Use for Children Under 3 Years Old. *ZERO TO THREE White Paper*. Available at: https://nyspep.org/application/files/4015/0005/1044/Screen_Sense_-_White_Paper.pdf [Accessed 1st May 2018].

Lieberman, A.F. and Van Horn, P. (2008) Psychotherapy with Infants and Young Children: Repairing the Effects of Stress and Trauma on Early Attachment. New York: Guildford Press.

Livingstone, S. and Helsper, E. (2008) Parental mediation and children's Internet use. *Journal of Broadcasting & Electronic Media*, 52 (4) pp 581-599.

Livingstone, S., Marsh, J., Plowman, L., Ottovordemgentschenfelde, S. and Fletcher-Watson, B. (2014) Young children (0-8) and digital technology: a qualitative exploratory study - national report - UK. Luxembourg: Joint Research Centre, European Commission.

Maccoby E. and Martin J. (1983) Socialization in the context of the family: Parent-child interaction. In: Mussen PH, editor. *Handbook of Child Psychology*. New York: Wiley. pp 1–101.

Marsh, J., Plowman, L., Yamada-Rice, D., Bishop, J.C., Lahmar, J., Scott, F., Davenport, A., Davis, S., French, K., Piras, M., Thornhill, S., Robinson, P. and Winter, P. (2015) Exploring Play and Creativity in Pre-Schoolers' Use of Apps: Final Project Report. Available at: www.techandplay.org [Accessed on 8th May 2018].

McDaniel, B.T., and Radesky, J.S., (2017) Technoference: Parent Distraction with Technology and Associations with Child Behavior Problems. *Child Development*. Vol 89 (1) pp 100-109.

National Scientific Council on the Developing Child (2005/2014) Excessive Stress Disrupts the Architecture of the Developing Brain: Working Paper No. 3. Updated Edition. Available here: www.developingchild.harvard.edu [Accessed on 1st May 2018].

Nikken, P. and Schols, M. (2015) How and Why Parents Guide the Media Use of Young Children *Journal of Child and Family Studies* Vol 24 (11) pp 3423–3435.

Northern Ireland Executive (2016) Draft Programme for Government Framework 2016-21. Belfast: Northern Ireland Executive.

Ofcom (2017) Adults' Media Use and Attitudes Report 2017. Available here: https://www.ofcom.org.uk/__data/assets/pdf_file/0020/102755/adults-media-use-attitudes-2017.pdf [Accessed on 1st May 2018].

Ofcom (2017) Children and Parents: Media Use and Attitudes Report. Available here: https://www.ofcom.org.uk/__data/assets/pdf_file/0020/108182/children-parents-media-use-attitudes-2017.pdf [Accessed on 1st May 2018].

Paciga, K.A. and Donohue, C. (2017) Technology and Interactive Media for Young Children: A Whole Child Approach Connecting the Vision of Fred Rogers with Research and Practice. Available at: http://www.fredrogerscenter.org/wp-content/uploads/2017/07/Technology-and-Interactive-Media-for-Young-Children.pdf [Accessed 8th May 2018].

Paterson, C. (2011) Parenting Matters: Early Years and Social Mobility. Available at: https://pdfs.semanticscholar.org/0c72/e6d0d8f4158af0b87cca005c540b6731627b.pdf [Accessed 1st May 2018].

Perry, B. D. (2002) *Childhood Experience and the Expression of Genetic Potential: What Childhood Neglect Tells Us About Nature and Nurture* Brain and Mind 3: 79–100 Available at: http://centerforchildwelfare.org/kb/ChronicNeglect/ChildExperience.pdf [Accessed 8th May 2018].

Public Health Agency (2016) *Infant Mental Health Framework for Northern Ireland*. Available at: http://www.publichealth.hscni.net/sites/default/files/IMH%20Plan%20April%202016_0.pdf. [Accessed 8th May 2018].

Radesky, J.S., Kistin C. J., Zuckerman, B., Nitzberg, K., Gross, J., Kaplan-Sanoff, M., Augustyn, M. and Silverstein, M. (2014) Patterns of Mobile Device Use by Caregivers and Children During Meals in Fast Food Restaurants. *Pediatrics* Vol 133 (4) pp 843-849.

Radesky, J. S., Schumacher, J., and Zuckerman, B. (2015) Pediatrics Perspective Mobile and Interactive Media Use by Young Children: The Good, the Bad, and the Unknown. Available at: http://pediatrics.aappublications.org/content/135/1/1 [Accessed 8th May 2018].

RSM McClure Watters (2015) Independent Review of the Sure Start Programme Final Report. Available here: https://www.education-ni.gov.uk/sites/default/files/publications/de/final-report-review-of-sure-start.pdf [Accessed 1st May 2018].

Smahelova, M., Juhová, D., Cermak, I., Smahel, D. (2017) Mediation of young children's digital technology use: The parents' perspective. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace* Vol 11(3) article 4.

Sylva, K., Melhuish, E., Sammons, P., Siraj-Blatchford, I. and Taggart, B. (2004) The Effective Provision of Pre-school Education (EPPE) Project: Findings from pre-school to end of key stage 1. Nottingham: Department for Education and Skills.

Sylva, K., Melhuish, E., Sammons, P., Siraj-Blatchford, I. and Taggart, B. (2008) Effective Pre-school and Primary Education 3-11 Project (EPPE 3-11) - Final report from the primary phase: Pre-school, school and family influences on children's development during key stage 2 (7-11). London: Department for Children Schools and Families.

Webb, M A., Bunting, L., Shannon, R., Kernaghan, D., Cunningham, C. and Geraghty, T. (2014) Living with adversity: a qualitative study of families with multiple and complex needs. Belfast: Barnardo's Northern Ireland.

Believe in children

Barnardo's
Northern Ireland

www.barnardos.org.uk

542-544 Upper Newtownards Road,
Belfast BT4 3HE, Tel 028 9067 2366

Barnardo's Registered Charity Nos.
216250 and SC037605