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Children and Parents Perceptions of Parental Use of Electronic Devices

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Award date:
2020

Awarding institution:
Bangor University

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October 2020

Declaration and Consent

I hereby declare that this thesis is the results of my own investigations, except where otherwise stated. All other sources are acknowledged by bibliographic references. This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree unless, as agreed by the University, for approved dual awards.

Acknowledgements

Firstly, I would like to thank Dr Catherine Sharp, for her endless patience, support and wisdom over the year which I will never forget. I would also like to thank Professor Karen Hughes and Dr Alisha Davies and Professor Mark Bellis for all their contributions to the project, and also to Public Health Wales and KESS 2 for providing me with the opportunity. I would also like to thank the schools who took part in the project over the year.

I would like to thank two of my biggest supporters for always being there ready to help and support in any way they can; Dad and Trace, thanks for everything. Family and friends who have been amazing are endless, I could not have done it without you.

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Thesis Overview

This thesis is organised into seven chapters:

Chapter One: Literature Review

This chapter includes a review of the current literature into parental use of electronic devices, including patterns in previous research, and gaps in the current literature, which leads to the research question investing the potential impact of parental use of devices on children.

Chapter Two: Method: Questionnaire Development

This chapter demonstrates how the parent and child questionnaires used in the study were developed. The chapter describes how and why measures were chosen to be included in the questionnaire.

Chapter Three: Method: Sample Recruitment and Procedures of Data Collection This chapter documents the recruitment procedures undertaken, and includes the procedure behind implementing the parent and child questionnaires.

Chapter Four: Results: Children's Perceptions of their Use and Parental Use of Devices

This chapter reports the findings on children's perceptions of device use. The results include children's perceptions on their own use and parental use of electronic devices across a range of settings, as well as questions on their behaviour.

Chapter Five: Results: Parent and Child's Perceptions of Each Other's Device Use This chapter reports the findings on parental perceptions of device use. This chapter includes questions reflective of parental perceptions on their own device use and their child's device use, across a range of different settings.

Chapter Six: Results: Parents' Perceptions of Electronic Device Use

This chapter describes the findings of the parent-child dyads; the differences and similarities of both the perceptions of parents and children on their own, and each other's device use.

Chapter Seven: Discussion

This chapter provides a reflection and interpretation of the findings of the study, identifying how the study compares to the results of previous studies in the research area, and a contextualisation of the findings of the study.

Abstract

Objectives: This study investigated the impact of parental device use on parent-child relationships, including contrasting reports of electronic device use, attachment, and children's behaviour and feelings.

Design and Measure: A cross-sectional design was employed. A children's questionnaire was developed to gather insight into children's perspectives of their own device use, their parent's device use, as well as the impact of parental technoference on the parent-child relationship. Parental technoference refers to interruptions in interactions between parents and children due to parental use of an electronic device. A parent questionnaire was also developed, mirroring the children's questionnaire, to examine the differences in perspectives of parents and children on device use. Children completed the questionnaire in school, while parent questionnaire were distributed home.

Participants: A total of 173 children aged 8-11 and 91 parents completed the questionnaires across 12 schools in Wrexham and Flintshire, North Wales. Data was collected between March 2019 and June 2019.

Results: Parental technoference was inversely associated with children's perceptions of attachment ($p = 0.031$) and positively associated with children's perceptions of their own internalising ($p = 0.006$) and externalising behaviour ($p < 0.001$). Both parents and children did not deem meal times, times doing activities, or times walking together as being problematic times for device use. Both parents and children agreed that they were both most likely to use devices independently when at home together. Out of four listed occasions children reported that parents were most likely to use a device when together during their conversations, as compared to when being picked up from school, doing activities and when eating meals together.

Conclusion: This evidence provides support that parent's use of devices have been found to interfere with parent-child interactions during middle childhood. The findings of this study contribute to the emerging evidence base of the impact of parental use of electronic devices, and could inform public health policy makers and professionals in developing more specific guidelines for parents on their device use in the presence of their children.

Chapter One: Literature Review

1.1. Background

Electronic devices are widely used by adults and children (Ofcom, 2019a). The term electronic devices is often considered as devices that connect to the internet, including mobile phones, computers, laptops, tablets and games consoles, but this is not an exclusive list. Children have been referred to as "digital natives" due to the presence of digital devices from birth (Prensky, 2001). As electronic devices continue to develop, their presence is likely to continue to increase, and become a bigger part of daily life (McCrindle, 2017). The everchanging nature of electronic devices and the consistent increase in the types of electronic devices available means the impact of their integration into society in the long-term is unknown.

Electronic devices are accessible to children in many forms (Siu & Lam, 2005) and in many settings such as home (Fish et al., 2008) and school environments (Dhir, Gahwaji & Nyman, 2013; Domingo & Gargante, 2016). Children are growing up in an era where electronic devices can be used for most activities, from communicating with others (Subrahmanyam & Greenfield, 2008) to online shopping (Lissitsa & Kol, 2016). Ofcom (2019b) reported that 35% of children aged 8-11 in the United Kingdom have their own smartphone, and 47% have their own tablet. They also found that 93% of 8-11 year olds are online for at least 13.5 hours a week. Not only is children's use of electronic devices increasing, adults device use is also on the rise; but this receives less attention. Nearly all adults (96%) in the UK use a smartphone (Ofcom, 2019b) and the amount of data fixed on mobile connections (data used to use internet based activities on portable devices) purchased per month has increased by 25% since 2018. The growing use of devices and the increased portability of devices has resulted in more frequent opportunities for disruptions in daily life (Harmon & Mazmanian, 2013), and the potential impact of excessive device use on health has become a public health concern (Bell, Bishop & Przybylski, 2015).

1.2. Children's Electronic Device Use and Physical Health

Research investigating parental use of electronic devices remains limited. Much of the focus of the public health literature around the use of electronic devices has been on the health risks of children's use of electronic devices, and how much time they spend in front of screens (see Saunders & Vallance, 2016). One of the concerns of health professionals is the impact of device use on children's weight status. LeBlanc et al. (2015) asked 5,844 children (aged 9-11 years) in 12 countries about how much time they spend watching television,

playing video games, or using a computer per day, and found higher levels of screen time to be associated with poor weight status, as well as failing to reach recommended physical activity guidelines. Physical activity is negatively associated with childhood obesity (Tremblay & Willms, 2003) therefore if screen time is associated with a decrease in children's physical activity (Le Blanc et al. 2015), this raises concerns around the contribution of device use to the increased prevalence in childhood obesity (Andersen, Crespo, Bartlett, Cheskin & Pratt, 1998). Moreover, the researchers did not include other portable devices such as mobile phones or tablets, therefore the screen time scores are likely to have been underestimated. Similar associations have been found between excessive electronic device use and somatic pains such as back aches and headaches among teenagers (Torsheim et al., 2010).

A further public health concern is the impact of electronic device use on children's quality and quantity of sleep (Guerrero, Barnes, Chaput & Tremblay, 2019) given how crucial sleep is to children's development (Gangwisch et al., 2010). Children who have access to an electronic device during bedtime, and who use devices before bedtime, have been found to experience higher levels of sleep deficiency, take longer to get to sleep, and sleep for shorter periods of time compared to those who use devices less during those times (Hysing et al., 2015). This suggests that the risks associated with electronic device use are broader than simply how much time is spent using them, and context (e.g. before bedtime) should also be considered. This meaning both should be considered when developing guidance.

1.3. Children's Device Use and Emotional Health and Behaviour

As well as physical health, concerns have also been raised about the effects of electronic device use on mental health. A recent systematic review (Stiglic and Viner, 2019) found strong evidence for an association between children's increased use of electronic devices and higher levels of depressive symptoms. Higher levels of engagement with electronic devices for children has also been linked to lower levels of self-esteem, poorer levels of mental health such as anxiety and depression, as well as poorer academic outcomes (Trinh, Wong & Faulkner, 2015). In terms of behaviour, children who spend more time using electronic devices have been reported by their parents to be more likely to exhibit externalising behaviour, such as inattention or aggressiveness, than other children (Tamana et al., 2019).

Electronic devices can be used for a number of tasks, therefore it may be difficult to identify what part of device use may be resulting in negative effects. A systematic review found that adolescents' use of social media was associated with anxiety, depression and general psychological distress (Keles, McCrae & Grealish, 2019). An additional threat associated with social media use is the potential for cyberbullying and harassment through social media platforms (O'Keeffe & Clarke-Pearson, 2011). While the relationship between children's use of devices and their health and development is well documented (LeBlanc et al., 2015; Stiglic & Viner, 2019), less is known about the effects of parental use of electronic devices on children.

1.4. The Importance of Family Relationships

A child's home environment is a key part of their development and plays an important role in shaping their identity (Bronfenbrenner, 1979). Family relationships support the development of children and can strengthen children's resilience (Masten & Shaffer, 2006). Stronger family relationships at home, strengthens a child's ability to deal with adjustment (Collishaw et al., 2007). More specifically, greater occurrences of parental warmth displayed by parents has been linked to higher levels of emotional well-being for children (Egeland, Kalkoske, Gottesman & Erickson, 1990). As children grow older, healthy relationships with parents may protect them against engaging in health-harming behaviours such as tobacco and alcohol use (Chaplin et al., 2012).

The importance of the parent-child relationship can be described using Bowlby's theory of attachment (Bowlby, 1958; Bowlby, 1979). Bowlby defined attachment as "*a lasting psychological connectedness between human beings*". Bowlby's theory of attachment originated from research demonstrating children's reactions to being separated from their primary caregiver (Bowlby, 1969). Attachment theory highlights the importance of sensitive, and warm parent-child interactions, particularly during the early years, and demonstrates how these early experiences have a key role in shaping children, including behaviour in later life (Allen, Porter, McFarland, McElhaney & Marsh, 2007).

Bowlby (1958) described attachment as being *secure* or *insecure.* When parents demonstrate sensitive, caring and consistent behaviour during childhood, a stronger bond and relationship is formed between the parent and child, and the child forms a secure attachment style, which is believed to influence different types of relationships they may have in the future (Tran & Simpson, 2009). From their early relationships with their parents, children begin to gather ideas and form an internal working model of what relationships represent,

how relationships are formed, how others should treat them, and how they should be treated by others (Bretherton & Munholland, 2008). In essence, the type of attachment children form with their parents influence the relationships they form with others throughout their lives.

Children who form insecure attachments with their parents during childhood are less likely to report relationship satisfaction (Diamond, Brimhall & Elliott, 2017) and are more likely to report mental health problems such as anxiety and substance abuse (Caspers, Cadoret, Langbehn, Yucuis & Troutman, 2005; Lam, Rai & Lam, 2019) and physical health problems (Fagundes, Jaremka, Malarkey, Kiecolt-Glaser, 2014; Gick & Sirois, 2010). Effects of parenting behaviours can also be seen in early childhood. Ackard, Neumark-Sztainer, Story and Perry (2006) found that girls and boys who felt lower levels of parental caring and communication reported engaging in more health-harming behaviours such as substance use as well as having lower levels of emotional health as demonstrated through; suicide attempts, low self-esteem, unhealthy weight control, body dissatisfaction and depression.

Interactions with parents are key in shaping a child's social, cognitive and emotional development (Denham, Mitchell-Copeland, Strandberg, Auerbach & Blair, 1997; Ginsburg, 2007). Parental behaviours such as eye contact towards their children are integral in developing such relationships and demonstrating their emotional availability (Farran & Kasari, 1990). It is clear that fostering strong relationships and developing healthy attachments between parents and children is a central part of child well-being (Lawler, Shaver & Goodman, 2011). Such relationships are formed through developmental parenting which involves behaviours such as affection, responsiveness, encouragement, and teaching (Roggman, Boyce & Innocenti, 2008), as well as parental engagement (Newland, 2015).

Whilst, several studies have investigated the importance of parent-child interactions and parental responsivity during infancy and early childhood (Chiang, Lin, Lee & Lee, 2015; Pederson, Gleason, Moran & Bento, 1998), children still demonstrate a need for their attachment figure beyond these early years, through to middle childhood, as well as adolescence (Bowlby 1969, 1979). While children are no longer fully dependent on their parents during middle childhood (6-12 years), they still require significant input from their parents, and to maintain a secure attachment with their parents to continue to scaffold a healthy development (Bowlby, 1969; 1979). For example, rather than proximity, children require emotional availability from their parent; that the parent is responsive to them when they require support or actively bid to communicate with them. Emotional availability of a parent plays a role in a child's attachment security throughout childhood and adolescence (Lieberman, Doyle & Markiewicz, 1999). Middle childhood is also a period where children

require an attachment figure (Bowlby 1969; 1979), and this study aims to contribute to the gap in the research on attachment in middle childhood, by investigating the perspectives of children aged 8-11 on their parent's device use.

Several factors can contribute to the development of parental responsivity and attentiveness such as lower levels of education in mothers (Hooper, Burchinal, Roberts, Zeisel & Neebe, 1998) and poorer mental health (Rutter & Quinton, 1984). A more recent threat to the responsivity of parents is electronic devices. It can be argued that due to their ever increasing use (Ofcom, 2019a; Ofcom, 2019b), they are a potential disruptor in parentchild interactions. Kildare and Middlemiss (2017) conducted a review including 27 studies across four countries and found that parents who used electronic devices when interacting with their children demonstrated lower levels of responsivity and sensitivity towards their children both verbally and non-verbally. A point to consider is that only one out of 27 studies in the review captured children's perspectives, the remaining were from parents' perspective (Hiniker, Schoenebeck & Kientz, 2016), thus suggesting a prominent gap in the literature.

From a wider public health context, a study in Israel found that children of parents who were using their mobile phones during a developmental screening session, were more likely to have a developmental delay compared to children of parents who were not distracted by their mobile device during the screening (Davidovitch, Shrem, Golovaty, Assaf & Koren, 2018). This highlights that parental device use could lead to further indirect consequences for children, although longitudinal research would be needed to further explore this.

1.5. The Displacement Hypothesis

Neuman (1988) suggested that the risks associated with the use of electronic devices could be explained using the displacement hypothesis. The displacement hypothesis originates from the idea that the introduction of a new activity reduces the frequency of another activity. For example, children who spend more time using the internet, spend less time engaging with their family (Lee & Chae, 2007) and have lower quality family relationships (Sanders, Field, Diego & Kaplan, 2000).

Nevertheless, the parent-child relationship is reciprocal and the displacement hypothesis could also be applied to parental use of electronic devices. Whilst research has identified that children's increased use of devices is associated with lower levels of social interactions with their parents (Moawad & Ebrahem, 2016) and lower levels of perceived

attachment towards their parents (Richards, McGee, Williams, Welch & Hancox, 2010), less is known about the role of parents' device use on such interactions.

1.6. The Goldilocks Hypothesis

While the displacement hypothesis implies that the more time spent using electronic devices, the more damaging it is in terms of how it displaces other activities that may be important to child development, in some instances, the link between children's use of devices and negative health effects has been weak (Stiglic & Viner, 2019), and negative effects have been found to be evident after specific types of exposure (Etchells, Gage, Rutherford & Munafo, 2016). Electronic device use for parents and children has not always been found to be a negative concept. In moderation, the use of devices can be beneficial for children, and may contribute to developing social skills such as forming their first friendships (Parkes, Sweeting, Wight & Henderson, 2013; Lenhart, Ling & Campbell, 2010). It therefore may be harmful to assume that the use of electronic devices is entirely a negative concept.

Przybylski and Weinstein (2017) suggested an alternative explanation termed "the digital goldilocks hypothesis". They found that the relationships between the device use of 15 year olds and harmful effects was not linear, and that in moderation electronic devices may not prompt negative health outcomes for children. Leading researchers in the area of the impact of electronic devices have argued that the context in which devices are used should also be taken into consideration (Przybylski and Weinstein, 2017), rather than focusing solely on the time children spend using screens (Livingstone & Franklin, 2018).It can be argued that the same can be applied to parental use of electronic devices.

1.7. Moderation and Mediating Factors

In moderation, parental use of devices may not be harmful to parent-child interactions. For example, an observational study of 55 caregivers and their children in the United States found that whilst caregiver use of electronic devices alone led to children engaging in increased bids for attention, when children and caregivers co-used a device together, parents and children showed shared enjoyment (Radesky et al., 2014). Co-use referrers to a parent and child's joint use of the same media device (Livingstone, Hadden, Gorzig & Olafsson, 2011). In fact, when children and parents use electronic devices, this has been found to not only mitigate negative effects of parental use of electronic devices but also to have positive effects such as increasing family connectedness (Padilla-Walker, Coyne & Fraser, 2012).

Research on parent and child co-viewing has largely focused on television use (e.g. Lemish & Rice, 1986), although positive effects have also been found for co-viewing electronic books (Lauricella, Barr & Calvert, 2014). Helping children read using e-books is a way of scaffolding between parents and children (Vygotsky, 1979) and these interactions can increase children's literacy skills (Lauricella, Barr & Calvert, 2014). There is also evidence that the co-use of video games may be beneficial for wider family relationships, with the couse of video games being found to be effective in bridging the intergenerational gap, for example, by increasing the shared feelings of connectedness between grandchildren and their grandparents (Aarsand, 2007).Whist it is clear that co-viewing of television, and co-using video games may have positive effects for parent-child relationships, less is known about the co-use of newer, more portable devices (Coyne, Padilla-Walker, Stockdale & Day, 2011), which will be further investigated in the current study.

1.7.1 Passive and Active Screen Time

This benefits of co-viewing could be explained in terms of "passive" and "active" screen time, that when children and parents are cognitively engaging in a screen based task (active screen time) in comparison to passively viewing information on screens (passive screen time) there may be benefits (Sweetser, Johnson, Ozdowska & Wyeth, 2012). Similarly, parents often report using their device to be beneficial in terms of setting up family tasks, such as where to visit for a family picnic (Oduor et al., 2016). While the relationship between parental use of electronic devices and its effects on child development may not be linear, it seems there are some benefits in moderation (Przybylski & Weinstein, 2017).

1.7.2 Family Rules on Screen Time

While co-use is recognised as a means of mediating the negative effects of electronic device use for children themselves, introducing rules for children regarding their use of electronic devices is also recognised as a method of mediation classed as restrictive mediation (Haddon, Mante-Meijert & Loos, 2016; Livingstone et al., 2017) which may restrict and safeguard children from issues such as cyberbullying (Chng, Li, Liau & Khoo, 2015). Hiniker, Schoenebeck and Kientz (2016) conducted a survey in the United States with parent-child dyads with children being between the ages of 10 and 17 and found 94% of children reported having some type of rules regarding their use of electronic devices. In terms of their parent's use of electronic devices, 83% of children reported believing that their parent should also have some sort of rules regarding their use of electronic devices, and parents also

tended to agree with their children, with only 2% of parents stating they should not be held to any expectations around their device use. One explanation for children's use of devices is parenting styles, is that those who have permissive parenting styles may place little or no rules on their children around their use of electronic devices, leading to an increased use of devices for children (Dias et al., 2016). It can be put forward that a benefit of parents placing restrictions on their own device use may also affect their child's use of electronic devices. A prevalent concern associated with parental use of electronic devices is the concept of role modelling.

1.7.3 Role Modelling

Bandura (1978) introduced the social learning theory and explained that behaviour is a learnt process, and that children often observe the behaviour of those around them, and later imitate that behaviour themselves; thus, behaviour is learnt through observation and modelling. Parents are often the most prominent role models in the lives of children, as children spend most of their time with them during the early years (Fryling, Johnston & Hayes, 2011), when early behaviours are being established.

It is a reasonable concern that children may observe and later imitate the behaviour of using electronic devices if modelled to them by their parents, which parents have expressed is a concern to them (Hiniker et al., 2015). Children themselves have acknowledged that they view parents as role models in their use of electronic devices, with children describing that through being present in the moment, their parents serve as a role model in terms of their own use of electronic devices (Hiniker, Schoenebeck & Kientz, 2016).

Several studies have found a link between the time parents spend watching television and the time their children spent watching television (Jago, Fox, Page & Brockman, 2010; Jago et al., 2012; Lauricella, Wartella & Rideout, 2015). Furthermore, problematic parental mobile phone use has been associated with child problematic mobile phone use (Hefner, Knop, Schmitt & Vorderer, 2018). Studies have found a link between higher levels of device use by parents and higher levels of device use for their children (Lauricella, Wartella & Rideout, 2015; Hefner, Knop, Schmitt & Vorderer, 2018), although further research is needed into the relationship between newer and more portable devices, and parent-child role modelling.

1.8. Technoference

Disruptions due to electronic devices are not an unknown phenomenon. Several definitions have been put forward to describe the use of devices in the company of others. Originally, the phenomenon was termed "absent presence" and described as being physically present with others, whilst also being mentally distant due to being engaged in digital communication or content (Gergen, 2002). The concept of "phubbing" was later introduced and described as "snubbing" another person in a social setting due to mobile phone use, when directly in their company (Chotpitayasunondh & Douglas, 2016). The effects of phubbing were researched in romantic relationships, with phubbing being linked to increased arguments (Roberts & David, 2016) as well as poorer marital satisfaction (Wang, Zhao & Lei, 2019). More recently the term "technoference" was coined and defined as *"everyday intrusions or interruptions in couple interactions or time spent together that occur due to electronic devices"* (McDaniel & Coyne, 2016, pg. 4). Since its initial application to romantic couples, the term has now been applied in the context of parent-child interactions, from the perspective of the parent (McDaniel & Radesky, 2018) and the child (Stockdale, Coyne & Padilla-Walker, 2018), as the perpretrator of the technoference.

1.9. Parental Technoference

Much of the earlier research into the effects of electronic devices on parent-child interactions focused on television viewing (Kirkorian, Pempek, Murphy, Schmidt & Anderson, 2009). Parents have been found to be less responsive to their children's attempts to get their attention and be less engaged with their children when they are watching television (Kirkorian et al., 2009; Pempek, Kirkorian & Anderson, 2014). In addition to this, parents provide fewer opportunities for scaffolding children's learning when they are watching television in the presence of their children, with a fewer number of new words being introduced to children during those times (Pempek et al. 2014), which suggests parental use of television could potentially disrupt learning opportunities for children. However, devices are now portable, therefore it is important to expand on the research on television viewing and how it affects parent-child interactions (e.g. parental responsiveness) and relationships, by investigating the effects of other portable devices (e.g. mobile phones, tablets and laptops).

McDaniel and Radesky (2018) investigated the effects of parental technoference on children's internalising and externalising behaviours from the perspective of parents.

Internalising behaviours are classed as a child's internal environment; their psychological experience, rather than the behaviour they demonstrate externally, for example, feelings of anxiety or depression (Liu, Chen & Lewis, 2011). Externalising behaviours are behavioural/conduct problems that children express towards their external environment, with externalising symptoms manifested through behaviours such as aggression, hyperactivity or disruption (Hinshaw, 1987).

Problematic use of electronic devices for parents with children under the age of five was associated with greater levels of technoference in parent-child activities for both mothers and fathers (McDaniel & Radesky, 2018). McDaniel and Radesky conducted survey research with 183 couples in the United States and found that instances of parental technoference by mothers were also associated with higher levels of internalising and externalising behaviour in children, while there was no such effects on either internalising or externalising behaviours for parental technoference in father-child interactions.

As the findings from McDaniel and Radesky (2018) were derived from questionnaires, causation cannot be ascertained that there is a causal relationship between parental technoference and the internalising and externalising behaviour of children. A possible alternative explanation of this association is that parents who have children who demonstrate dysregulated behaviour may be more likely to use their devices as a means of withdrawing from the parent-child interactions (Nakamura, 2015), as parents have reported using devices as a means of stress-relief during times of frustration (Radesky et al., 2016). The current study aims to further investigate the relationship between parental use of electronic devices and children's internalising and externalising behaviours, through children's reports of parental technoference and children's reports of their own behaviour.

Kushlev and Dunn (2018) explored the effects of parental technoference at the museum. One group of parents were tasked with frequently using their phone during the trip with their children, while the other group were tasked with infrequently using their phones. Parents who used their phones during the trip described feeling less attentive towards their children, as well as reporting lower levels of emotional meaning towards the trip and lower levels of connectedness towards their child. In this study, one group of parents were asked to consciously use their phones as much as possible, whereas in more naturalistic situations, parents report using their phones for brief bursts of time (Harmon & Mazmanian, 2013; Hiniker et al., 2015; Hiniker, Schoenebeck & Kientz, 2016), which highlights the issue of the ecological validity of the research. The relevance of this point, is that when parents divide their attention between their child and their device, such as by using their device in short

bursts of time, there seems to be lesser effects on the parent-child interaction, compared to parents who become solely absorbed in their device (Lemish, Elias & Floegel, 2019).

Children have also reported feeling negative emotions, such as “lonely” or “sad” when their parents use devices, and as a result when spending time together in general, children report feeling dissatisfied with the time their parents (Steiner-Adair & Barker, 2013). It seems that even when children are not directly in the care of the parent, the children are still aware of the actions of their parents. This raises the question of how parents can have time to themselves, but also be readily available to the children, and perhaps what role parenting styles may have in influencing parental use of devices (Özgür, 2016). Understanding in depth the drivers of parental use how it affects children through children’s perspectives using quantitative and qualitative research could be a next step.

1.9.1. Meal Times

One family setting which has been a focus of the research on the impact of parental use of electronic devices is meal times (Hiniker, Schoenebeck & Kientz, 2016; Kellershohn, Walley, West & Vriesekoop, 2018; Radesky et al., 2014). Such time promotes structure, security, and feelings of safety and connectedness (Wolin and Bennett, 1984). Both parents and children often view family meal times as important (Neumark-Sztainer, Story, Ackard & Perry, 2000). Family meal times have also been associated with health benefits such as higher levels of nutrition (Gillman et al., 2000) and healthier eating patterns such as not skipping breakfast (Videon & Manning, 2003).

Radesky et al. (2014) conducted non-participant observations across 55 fast food restaurants in America, and observed groups of caregivers with a child who appeared to be under 10 years of age eating together. Children appeared to often notice their caregiver’s absorption with their devices, which led them to be less interactive with them. Caregiver absorption included a lack of eye contact with children, with eye contact instead being focused on the device; taking longer to respond to children’s bids for attention; and in some cases not responding at all. Children’s responses to caregiver device absorption varied; some children did not change their behaviour in response to the caregiver’s use, while others would increasingly try to gain their attention, with some resorting to provocative behaviour which was often met with negative caregiver reactions such as shouting at the child, after a period of not responding to them. This suggests that some children may increasingly escalate their behaviours in order to disengage their caregivers from electronic devices and obtain their attention.

In terms of the effects of devices during meal times on parents, the most enjoyable aspect parents report about meal times as a family are the conversations and feelings of togetherness they experience through laughing, talking, and engaging as a family (Fulkerson, Story, Neumark-Sztainer & Rydell, 2008). This suggests that distractions from electronic devices may also impact the well-being of parents. More research is needed to draw robust conclusions on this.

Kellershohn, Walley, West and Vriesekoop (2018) found that in Canadian fast food restaurants, 70% and 40% of parents and children, respectively, were using an electronic device at the table, however, it is unknown who instigated the behaviour. Conversely, Radesky et al. (2014) found that when mothers used their mobile devices during meal times, mothers and children (< 6 years) experienced lower levels of both verbal and non-verbal interactions. To our knowledge, the relationship between parental device use and parent-child interaction has not been explored with fathers, but the research suggests that electronic device use could also impact language through limiting learning opportunities for children. Further to this, parents also displayed less encouragement towards their child when eating unfamiliar foods. Technoference during meal times has also been associated with a decrease in children's ability to respond to cues of satiety and fullness (Gramm, Vollmer, Harpel, McDaniel & Schumacher, 2019), suggesting that not only may parental use of devices affect a child's feeling of attachment towards the parent, but in accumulation with other environmental and genetic factors, parental use of electronic devices may inadvertently have implications for children's weight status and overall health.

1.9.2. At the Playground

Recent studies have begun to consider parental use of electronic devices at the playground (Hiniker et al., 2015; Lemish, Elias & Floegel, 2019; Mangan, Leavy and Jancey, 2018). Children learn and develop many developmental skills at the playground, such as turntaking, courtesy and social skills (Sluckin, 1981). Vygotsky (1979) described the term "scaffolding" and explained that children are able to develop new skills with guidance of a parent or teacher that they would not otherwise be able to develop on their own. Vygotsky (1979) identified these skills as being in a "zone of proximal development". Being at the playground provides children with opportunities for new learning. It can be argued that the presence and responsivity of a parent towards their child may increase scaffolding opportunities.

Hiniker et al. (2015) conducted a mixed methods study, targeting caregivers of children who appeared to be 10 years old or younger. They found that when caregivers were absorbed in their mobile phones, it affected the way in which they responded to their children. During observations, when children tried to gain their caregiver's attention (e.g. through talking to them) when their caregiver was using a mobile phone, more than half (56%) of those attempts were faced with no response; this meaning caregivers did not respond verbally, or take their gaze away from their mobile device. Whilst an argument to be considered is the potential of other life distractions, such as talking to other people, moreover, during such times only a small proportion (11%) of children's bids for attention were met with no response. In fact, parents tended to acknowledge the difficulty of fully attending to their child when using a device, with 80% of caregivers reporting finding it more difficult to pay attention to their child when using their mobile phone. This suggesting an awareness, but once engaged in the device, the conscious mind finds it difficult to disengage. It should be noted that Hiniker et al. (2015) reported that during a park visit with their children, two thirds of caregivers used their phones for less than 5% of their time there, and of those, 41% spent no time at all using a phone. Nevertheless, it is reasonable to assume that the times caregivers were absorbed with the mobile phones, resulted in lower levels of attentiveness and responsivity towards the children, and it is unclear what emotions this could have elicited within the children.

Mangan, Leavy and Jancey (2018) investigated parental use of mobile phones at the playground in Australia using a mixed methods approach of interviews and observations, and found that 76% of parents with a child aged up to five used their device whilst at the playground. The time parents spent on their mobile phones varied between 0 and 17.5 minutes; with the average being 4 minutes. Mangan et al. found that typing/texting activities were the most common reason reported for use (70%) followed by voice related activities (24%). In an earlier study, Hiniker et al. (2015) reported that 59% of parents had used their mobile phone in the playground, while a more recent study reported that 79% of parents had used their mobile phone (Lemish et al. 2019). This suggests that the prevalence of device use at the playground could be increasing, which may result in greater opportunity for disruption in parent-child interactions due to devices. It should be taken into consideration that while two studies were conducted in Australia (Mangan et al., 2018; Lemish et al., 2019) others have been conducted in the United States (Hiniker et al., 2015), therefore the potential difference may be cultural, and it may be argued that usage across both cannot be compared. However, the research demonstrating an increase in general device use is also consistent with

trends in popularities across other countries such as the United Kingdom (Ofcom, 2019a; Ofcom, 2019b).

Lemish et al. (2019) investigated the use of mobile devices at the playground of parents of children aged two to three, and four to six using observations. They categorised the observations of parents using their devices into three categories; high engagement (27%), when parents were actively engaging with their children by responding to their emotions and playing with them; divided engagement (48%), when parents were using an electronic device but also responding to their child's emotions and playing with them at times; and disengagement (25%), when parents were not engaging with their children, were not demonstrating eye contact, and appearing distant to their child both physically, and emotionally. When looking at emotional availability, 52% of families in the study were inattentive to the emotional needs of their child when using a mobile phone and only 12% of parents were able to provide emotional support to their children whilst using their mobile phone compared to 55% of parents who were not using their mobile phone. When parents were disengaged with children and not responding to their emotions, this was predominantly followed by children appearing expressing negative emotions such as being frustrated, disappointed, or sad. These findings suggest that parental distraction through electronic devices may elicit negative behaviours in younger children as previously found with teenagers (Oduor et al., 2016).

Physical safety was also seen as a potential risk of parental mobile use, where 25% of families were not aware of safety concerns that arose during observations of parental mobile phone use at the playground such as children falling or trying dangerous tricks (Lemish et al., 2019). There were 53 incidences of safety concerns during the study. It is unrealistic to assume that all parental distraction is caused by electronic devices, as parental distraction could also be caused by other non-electronic things such as talking to another parent, reading a book. However, devices are often viewed as addictive (Salehan & Negahban, 2013) and some applications run on devices are designed to be addictive (Ding, Xu, Chen & Xu, 2016). Despite a number of other potential factors that could have caused a lack of awareness towards their child's safety, 70% of the safety concerns arose while parents were using a mobile phone in comparison to 30% of which occurred due to other distractions (Lemish et al., 2019). Given the concern, it raises the question on whether parents should be discouraged from using devices in the playground, however, as nearly half of parents were able to share their engagement between their child and their device with seemingly no negative effects on parent-child interaction, perhaps parents could be provided with guidance on how to find a

balance between both whilst at the playground, recognising that the playground may provide a break for the parent.

In a similar context to playgrounds, parental use of electronic devices has also been found to influence the sporting performance of children. Stupica (2016) found during observations of 50 children (3-12 years) and their parents, children ran around a softball diamond significantly faster when parents were not engrossed in their mobile phones. In contrast, when parents were visibly engaged in their mobile devices, and did not engage in any interaction with their children due to mobile phone use, the children were significantly more likely to have a false start, trip, or fall during the run. In addition to this, children were significantly less likely to try to interact with their parent when their parent was using their device compared to not using it. It is clear that parental device use is evident in a range of different contexts.

1.10. Parent and Child Perceptions of Device Use

Parents are faced with a wide range of pressures to balance, with people facing longer hours at work and greater work pressures (Litchfield, Cooper, Hancock & Watt, 2016). With workloads increasing, and parents increasingly working from home, this impacts the time parents feel able to spend with their children (Peters, den Dulk & Van der Lippe, 2009). The presence of electronic devices in family settings is associated with mixed feelings, parents reported feeling stuck between positive and negative feelings around their access to electronic devices in the company of their children (Radesky et al., 2016). Interviews were conducted with parents based on their device use and found that one of the main themes discussed were cognitive tensions. Parents were consciously making an effort not to use devices for work purposes around their children, but were also concerned about how this may leave them at a disadvantage in their working lives compared to co-workers who may be doing additional work at home.

Derks, van Duin, Tims and Bakker (2014) described how electronic device use at home for work purposes affects the home environment through the term “negative spill overs”. They proposed that receiving emails from work that are emotionally charged, such as a business deal not going through, may affect a parent’s mood at home. On the other hand, it can be argued, that parents may also be able to experience “positive spillovers” such as finding out a business deal has gone through whilst at home, boosting their mood in the family environment. Moreover, an underlying theme reported by Radesky et al. (2016) was how parents reported an internal conflict; a part of them that felt guilt, and felt a need to pull

away from devices to engage with their child, whilst a part of them wanted to use a device . The introduction of electronic devices are viewed by some as emotionally distancing families from each other, while still physically being in their presence (Turkle, 2011). Nevertheless, not all perceptions from parents have been negative and some parents have reported feeling benefits of their device use for them and their children. Some parents report benefits in terms of using their own social media accounts to monitor their children's accounts (Devitt & Roker, 2009), as well as to seek social support and parenting advice (Baker, Sanders & Morawska, 2016).

In terms of children's perceptions of device use, both parents and children share similar expectations of each other's device use. While children and parents have acknowledged that there are advantages to using electronic devices such as for convenience in communicating with each other, and for children to feel safer, they have also reported that the interruptions caused by electronic devices can be irritating (Lenhart, Ling, Campbell & Purcell, 2010). Hiniker, Schoenebeck and Kientz (2016) conducted interviews with children and parents aged 10-17 on rules about electronic devices use and found that the largest theme identified in the rules by both parents and children was that they were both stating that they wanted each other to 'be present' emotionally during family meal times, and that they both wanted each other to be engaged in the moment, rather than just being physically present. A part of this theme identified was that both adults and children acknowledged that they should put electronic devices down when eating with children, and should not be on social media when spending time with family. Children reported that they wanted their parent to be responsive, initiate spending time with the family, as well as follow the same rules as children on their own electronic device use.

As previously mentioned, the impact of electronic devices on the parent-child interaction is reciprocal for both parents and children, and the disruption can arise from either side of the relationship, and the negative effects of disruption have been found to derive from both sides. Stockdale, Coyne and Padilla-Walker (2018) asked adolescents (10-20 years) to report on technoference caused within their parent-child interaction, in which the technoference stemmed from them and by their parents. Stockdale et al. reported that 86% of adolescents identified that technoference occurred due to their part at least some of the time, and 78% reported that technoference occurred due to their parents. Both adolescent technoference as well as perceived parental technoference was associated with adolescent feelings of anxiety and depression. Adolescents perceived parental technoference was also associated with parental warmth, therefore it may be that parental technoference is linked to

less warm parental interactions, but it could also be that parents who may not be as responsive and warm towards their children due to their parenting style, may use electronic devices more often. There is currently more research on parental perceptions of their own use of devices and children's use of devices (Radesky et al., 2016; Hiniker et al., 2015) compared to children's perceptions of parental use and of their own use (Stockdale, Coyne & Padilla-Walker, 2018). This study aims to contribute to the research on children's perceptions of parental use of electronic devices, exploring children's perceptions of parental technoference, to investigate the impact of device use on the parent-child relationship.

1.11. Guidelines on Device Use

Historically, guidelines for parents and professionals have focused on how long children should be spending on devices. For example, early guidelines provided by the American Association of Paediatrics recommended that caregivers ensure that children do not spend more than two hours using digital devices per day (Strasburger, Jordan & Donnerstein, 2010) across all ages, while recommending no use of electronic devices for children under the age of two. These guidelines have since been updated and recommend that parents look at media use as a whole family, and put a plan in place about their family media use and have an awareness of the importance of this for their child as well as the whole family (American Association of Paediatrics, 2016).

As previously mentioned, it was argued that there was a lack of evidence base as to whether time limits were effective in mitigating the risks of electronic device use for children (Przybylski and Weinstein, 2017), and the Royal College of Paediatrics and Child Health (2019) acknowledged that there is no safe amount of time for children to spend using devices and instead focused their guidelines for parents and clinicians based on four questions; "Is screen time in your house controlled?", "Does screen use interfere with what your family want to do?", "Does screen use interfere with sleep?" and "are you able to control snacking during screen time?". There is a substantial focus in the RCPCH guidelines on the family as a whole and recommends that adults also consider their own use of devices, encouraging regular conversation and screen free times together. In addition to monitoring their children's use, parents are also encouraged to monitor their own use, during times such as meal times and bedtime.

Similarly, "Early Childhood Australia" published their statement on electronic devices and proposed based practice guidelines (Early Childhood Australia, 2019) for professionals. They based their guidelines on four topics: relationships, health and wellbeing, citizenship, and play and pedagogy. One aspect of their practical advice given was for

families to recognise the importance of interaction between adults and children and that devices are used in a way that promotes social interaction between adults and children. This guidance is based on research that found children can share positive experiences with their parents through co-using devices, for example, to play a game or to talk about media content (Takeuchi & Stevens, 2011).

Seemingly, there are a number of factors to consider in terms of the effects of parental use of electronic devices; the effects on parent-child interactions, effects on behaviour, as well as the benefits of use, therefore evidence based guidelines may be beneficial in providing parents and families with the right resources to find a balance.

1.12. The Current Study

Whilst public health professionals are now beginning to adapt existing approaches towards limiting electronic devices use to focus on the family as whole rather than just children, more research on parental use of electronic devices is needed. In addition to health risks (LeBlanc et al., 2015; Stiglic & Viner, 2019), children's use of electronic device use has also been found to have an impact on the parent-child relationship such as feelings of connectedness and attachment (Sanders, Field, Diego & Kaplan, 2000; Richards, McGee & Williams, 2010). However, parent-child interactions are reciprocal, and less is known about the influence of parental use of electronic devices on parent-child interactions and more broadly the parent child relationship (McDaniel, 2019).

Research into the effects of parental use of devices and more specifically parental technoference is in its infancy, although research has emerged that suggests effects on children's feelings (Steiner-Adair & Barker, 2013) children's levels of internalising and externalising behaviour (McDaniel and Radesky, 2018) as well as parental responsivity towards their children (Kushlev & Dunn, 2018; Lemish, Elias & Floegel, 2019). Despite this, further research is needed to investigate the effects of parental technoference on the parentchild relationship, and more specifically the attachment between parents and their children (McDaniel, 2019).

Most research around parental use of electronic device use has focused on the early years (Pempek, Kirkorian & Anderson, 2014; McDaniel & Radesky. 2018) and adolescence (Stockdale, Coyne & Padilla-Walker, 2018) with a gap in the research for middle childhood, therefore we aim to fill the gap in the research and investigate parent and child device use from the perspective of children aged 8-11 and their parents. In addition, previous research has mainly used qualitative and observational methods, from the perspectives of parents

(Radesky et al., 2014; Hiniker, Schoenebeck & Kientz, 2016), whereas this study will focus on a questionnaire method

To summarise, the current study aims to investigate the following:

- Child and parent perspectives on their own and each other's device use
- Child and parent perspectives on parental technoference
- Child and parent perspectives on the effects of parental device use on parent-child attachment
- Children's perspectives on parental device use and children's internalising and externalising behaviour

Chapter Two – Method: Questionnaire Development

2.1. Introduction

A questionnaire design was chosen with questionnaires developed for both children aged 8-11 and their parents. The use of questionnaires with children from the age of seven years onwards is considered appropriate (Borgers, de Leeuw & Hox, 2000). Questionnaire research is an established method used to collect a large amount of data in a short amount of time, collecting information on respondents' perceptions and behaviours at a specific point in time (Kelley, Clark, Brown & Sitzia, 2003). Piaget (1936) theorised that children aged 8 to 11 years are in the concrete-operational phase of development during which they acquire reading and writing skills, and develop an awareness of different viewpoints. During this age period, self-administered tests are often introduced into a school curriciulum (Bell, 2007), meaning children are cognitively able to complete questionnaires, although it must be ensured that the language used is age-appropriate.

Previous studies have used questionnaire designs with children within this age range to explore their views on a variety of topics. For example, Hadzipasic-Nazdrajic (2012) used questionnaires with children aged 8-10 and Muris, Meesters, Eijkelenboom and Vincken (2004) also used questionnaires with children aged 8-11. The current study aimed to obtain the perspective of children in the developmental stage of middle childhood, as general attachment research in this developmental stage is limited. Given the evidence provided that questionnaires are developmentally appropriate for children of this age range (Piaget,1936; Hadzipasic-Nazdrajic, 2012), questionnaires were considered appropriate to capture children's perceptions of their parents' use of electronic devices as opposed to obtaining proxy measures only from parents.

Whilst the perceptions of parents on their own use of electronic devices has been captured (Radesky et al., 2016; Radesky et al., 2018), relying on the reports of parents only may cause issues such as social desirability bias (Bornstein et al., 2014), and parents report more favourable perceptions of their own behaviour (Schwarz, Barton-Henry & Pruzinski, 1985). Therefore, it has been recommended that to gain an extensive understanding of parent behaviour, both child and parent reports should be obtained (Tein, Roosa & Michaels, 1994; Rebholz et al., 2014). Research has begun to seek the perspectives of children on their parent's use of electronic devices (Barrance, 2019). This study aimed to further investigate children's perceptions.

A children's questionnaire and a parent's questionnaire was created to investigate the impact of parental use of electronic devices from the perspectives of both children and parents (see Appendix 2.1 & 2.2). The questionnaires focused on four literature informed themes: (1) parental technoference, (2) children's internalising behaviour, (3) children's externalising behaviour and (4) attachment. Increased parental use of devices has been associated with increased levels of parental technoference (McDaniel & Radesky, 2018). Parental technoference refers to interruptions to parent-child interactions that happen due to parental use of devices. Parental technoference has been associated with greater internalising and externalising behaviours in children (McDaniel & Radesky, 2018). Internalising behaviours represent a child's psychological environment such as feelings or anxiety or depression (Liu, Chen & Lewis,2011). Externalising behaviours represent children's outward behaviour such as aggression or conduct problems (Hinshaw, 1987). A gap exists in the literature on the effects of parental technoference on the parent-child attachment (McDaniel, 2019). Attachment refers to a deep emotional bond between two people, usually the primary caregiver (Bowlby, 1969). This concludes the themes that were chosen in response to the literature.

2.2. The Six Stage Process of Designing the Questionnaires

A paper questionnaire method was used in place of a web-based questionnaire as paper questionnaires have been found to yield higher response rates (Hohwu et al., 2013). For logistical reasons with undertaking research in schools, paper questionnaires were thought to have minimal impact on the school day as it did not require consideration of the computer provision in the schools during recruitment. A six step process was undertaken to develop the questionnaires (Figure 2.1).

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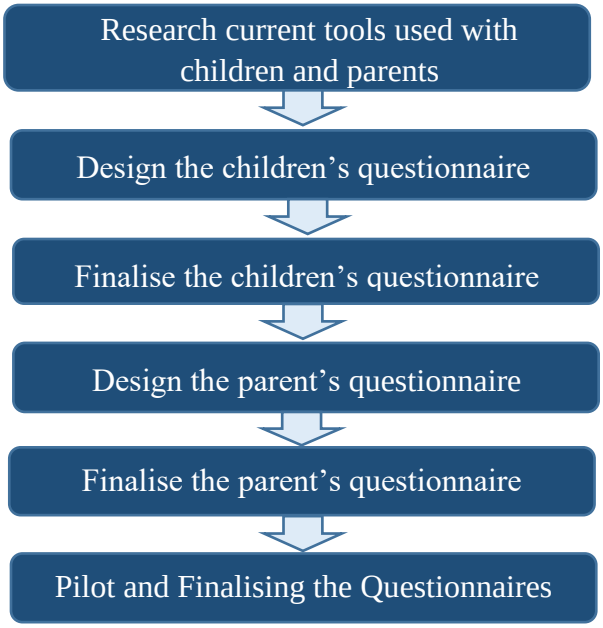

Figure 2.1. Flowchart illustrating the six-step process to develop the questionnaires.

2.2.1. Research Current Tools used with Children and Parents (Step 1)

The first step of developing the questionnaires was to identify validated measures. When selecting which measures to use, the age appropriateness, reliability and validity, and length of the measures were taken into consideration. When children are faced with measures that may not be appropriate for their developmental stage, this can lead to the misinterpretation of questions (Amato and Ochiltree, 1987), which was taken into consideration when researching with tools to include in the children's questionnaire.

Validity, reliability and length were considered as children aged 8 to 11 have shown lower response effort in questionnaires of excessive length and complexity (Borgers, De Leeuw & Hox, 2000). In terms of measuring children's perceptions of parental use of devices, measures were limited due to the infancy of the literature (McDaniel, 2019). Existing tools were available for measuring children's internalising and externalising behaviour, and attachment (see section 2.2.2.1). A tool existed for technoference, but the tool has only previously been used with adults and adolescents (Stockdale, Coyne and Padilla-Walker, 2018). In addition to these constructs, we also wanted to investigate children's feelings about their parent's use of devices, children's positive and negative affect, and their perceptions of parental warmth.

2.2.2. Design the Children's Questionnaire (Step 2)

Step two involved designing the questionnaire using the measures that were identified during step one. Where possible, validated tools were used, moreover, adaptions were made in order to tailor the questions for the target age, and to answer the desired research questions. To put the term "electronic devices" into context for the questionnaire, a definition was provided at the beginning of the questionnaire which read "devices such as mobile phones, computers, laptops, tablets (e.g iPad) and gaming consoles (e.g Playstation, Xbox, Wii)". The questionnaire started with demographic questions including, children's age, sex, as well as which parent/caregiver looked after them after school the day before. To obtain an insight into the time children and parents spend using devices, and which devices they use, children were initially asked to revisit their device use and their parent's device use the evening before. The evening before was revisited as it was perceived that screen time would be more comparable as children are usually at school during the day, which gives more opportunity for screen time during the evening (Fletcher, Whitaker, Marino & Anderson, 2013). The themes investigated in the questionnaire were (1) parent and children's device use the evening before, including time spent and devices used, (2) parental technoference, (3) children's internalising behaviour, (4) children's externalising behaviour, and (5) attachment.

2.2.2.1. The Main Themes

Parental technoference

To measure technoference in parent-child interactions, three items were selected and modified from Stockdale, Coyne and Padilla- Walker (2018). Stockdale et al. presented adolescents with three statements which were modified for the purpose of this questionnaire. Statements were modified to include all electronic devices rather than solely mobile phones and tablets. The original questionnaire asked adolescents to rate the statements on a five point Likert scale from one (not at all) to five (a great deal). To maintain the consistency of the Likert scales in this questionnaire study, the Likert scale was adapted to match the rest of the children's questionnaire, to '*never*', '*not often*', *'most of the time' and 'all of the time'.*

Parental technoference scores were based on an overall score using average. Each point of the Likert scale was represented by a value, and the values of each statement were added and divided by three to calculate an average score of technoference. Higher scores represent greater levels of parental technoference. Stockdale et al. (2018) demonstrated a good level of reliability of the three items (a = 0.85). Table 2.1 outlines a summary of the changes.

Table 2.1.

Adaptions made to previous questions investigating technoference; modifications are underlined.

Item	Original version	Modified version
1.	My parents ignore me when they are on their tablet/cell phone	I struggle to get my parent/caregiver to talk to me when using their electronic device
2.	I struggle to get my parents attention when they are on their tablet/cell phone	I struggle to get my parent/caregiver's attention when they are using their electronic device
3.	My parents use their cell phone/tablet even if I am right in the middle of a conversation with them.	My parent/caregiver uses their electronic device even when I am right in the middle of a conversation with them

Given the lack of available instruments to measure parental technoference, a further question on parental technoference was added. Children were asked whether parental use of devices distracted their parent across four settings; (1) when eating meals with their parent, (2) when doing activities with their parent, (3) when talking to their parent, and (4) when they are being picked up from school by their parent. Children gave a response on a four point Likert scale of; '*never'*, '*not often*', *most of the time'*, and '*all of the time'*. Children were also given the option of '*we do not do this activity together'* (see Appendix 2.3).

Internalising and externalising behaviour

To measure children's internalising and externalising behaviour the Strengths and Difficulties questionnaire was used (SDQ; Goodman, Ford, Simmons, Gatward & Meltzer, 2000). The SDQ is a 25-item measure covering a range of psychopathological domains: emotional problems, conduct problems, hyperactivity-attention problems, and peer problems. The scales were split into three categories; internalising behaviour, externalising behaviour, and the prosocial scale. It is recommended in non-clinical, community samples that the measure is interpreted using these three alternative scales (Goodman, Lamping & Ploubidis, 2010), which were deemed suitable for the questionnaire as we were specifically looking to investigate internalising and externalising behaviour. The version used in this questionnaire was the SDQ self-report version (11-17). The questionnaire demonstrated reliability and validity in a non-clinical sample of children aged 8 to 13 in the Netherlands (Muris, Meesters, Eijkelenboom & Vincken, 2004) as well as with children aged six to ten in the United

Kingdom (Curvis, McNulty & Qualter, 2013) which demonstrated its suitability for the target age group of the participants in this study.

Children's levels of internalising behaviour were based on the sum of their scores on the emotional problems and peer problems scale (10 items); their levels of externalising behaviour were based on the sum of their scores on the conduct and hyperactivity scales (10 items); and the last five items were categorised as the prosocial scale (Goodman, Lamping & Ploubidis, 2010). Within each domain, higher scores represented higher levels of internalising, externalising and prosocial behaviour.

The SDQ was adapted for the purpose of this study. Minor revisions were made to the language of the original SDQ to simplify the items to make it shorter for the children to read (Table 2.2). Key constructs of the measure remained the same. The Likert scale was modified from being a three-point scale of; '*not true'*, '*somewhat true'* and *'certainly true'* to a three-point scale of '*not true'*, '*somewhat true'*, and '*always true'*.

Table 2.2.

Modifications made to the original SDQ for use in this study. Modifications are underlined.

Item	Original version	Modified version
2.	I am restless, I cannot stay still for long	I cannot stay still for long
6.	I am usually on my own. I generally play alone or keep to myself	I am usually on my own, I usually play alone
10.	I am constantly fidgeting or squirming	I cannot sit still
13.	I am often unhappy, down-hearted, or tearful	I am often sad or tearful
20.	I often volunteer to help others (parents, teachers, children)	I often help others (teachers, parents, children)
22.	I take things that are not mine from home, school, or elsewhere	I take things that are not mine
23.	I get on better with adults than with people my own age	I get on better with adults than children
24.	I have many fears, I am easily scared	I am easily scared
25.	I finish the work I am doing, my attention is good	I finish the work I am doing

Attachment

This 10-item measure was used to measure the level of attachment children feel towards their parents (Smith & Krohn, 1991). The measure demonstrated a good level of reliability ($\alpha = 0.87$). The item was originally used with adolescents aged 12-14, therefore modifications were made to make it more suitable for children aged 8-11. The measure was reduced from 18 items to 10 items. Some items were removed due to potential ethical boundaries such as '*you feel violent towards your parent?*' and '*you wish your parent was more like others you know?'*. The wording was also changed to make it more appropriate to the target age group. Children responded to the 10 statements on a four-point Likert scale of frequency ranging from (1) *'never'*, (2) '*not often'*, (3) *'most of the time'* and (4) *'all of the time'*. This was adapted from the original Likert scale of '*never*' *'seldom'*, *'sometimes'*, and '*often*'. This was changed due to the complexity of the world *'seldom'* for the target age group. Other minor modifications were made as outlined in Table 2.3.

Table 2.3.

Modifications to the parent-child attachment measure used in the questionnaire underlined.

Item	Original version	Modified version
2.	You feel that you can really trust your parent?	You trust your parent/caregiver?
3.	Your parent does not understand you?	Your parent/caregiver understands you?
4.	Your parent is too demanding?	Your parent/caregiver is demanding?
5.	You really enjoy your parent?	You like your parent/caregiver?
7.	Your parent interferes with your activities?	Your parent/caregiver interferes with what you are doing?

Items four, seven, and nine in the adapted measure were reverse coded as previously advised (Centers for Disease Control and Prevention & National Center for Injury Prevention and Control, 2005). Using the 10-items, a mean score was calculated through summing the items and dividing them by 10. The scores for each item ranged between one and four. The higher the mean score, the higher the perceived level of attachment children had towards their parent.

Positive and negative affect

The short form of the Positive and Negative Affect Schedule for Children (PANASC-SF) was used as a measure of positive and negative affect in children, and has previously been validated with children ages 8-11 (Ebesutani et al., 2012). The measure includes 10 items, compared to the original 20 items measure (Laurent et al., 1999). The measure includes five items measuring negative affect: '*miserable*', '*mad', 'afraid'*, '*scared*', and *'sad',* and five items measuring positive affect: *'joyful'*, '*cheerful*', '*happy*', *'lively',* and '*proud*'. Children were asked to rate the extent to which they had felt the feelings in the preceding week. Answers were measured on a five-point Likert scale, ranging from (1) '*very slightly'*, (2) '*a little'*, (3) *'moderately'*, (4) '*quite a bit'*, and (5) '*extremely'.* For both positive and negative affect scales, higher scores represent higher levels of affect.

Parental warmth

Three items from the Parenting Styles and Dimensions questionnaire-short version (Robinson, Mandleco, Olsen, & Hart, 2001) were included to measure children's perceptions of parental warmth. These items were chosen, as they had been used previously by Stockdale, Coyne and Padilla-Walker (2018) and had demonstrated moderate reliability ($\alpha = 0.87$). Minor modifications were made to this measure (Table 2.4). Items were changed from statements to questions, and changes were made to simplify the wording. The Likert scale was adapted from being a five-point scale ranging from 'never'" to 'always' to a four point scale of; (1) *'never',* (2) '*not often',* (3) '*most of the time'*, and (4) '*all of the time'*. Scores were then totalled. Higher scores represent higher levels of parental warmth.

Table 2.4.

Table to show adaptions to measure of parental warmth. Modifications are underlined.

Item	Original version	Modified version
1.	My parents give comfort and understanding when I am upset	Does your parent/caregiver give you comfort and understanding when you are upset?
2.	My parents are responsive to my feelings and needs	Is your parent/caregiver responsive to your feelings and needs?
3.	My parents have warm and loving times together with me."	Does your parent/caregiver have warm and loving times with you?

Family rules on the use of electronic devices

To measure the level of restriction placed on children on their use of electronic devices by their parents, we included a modified version of the activity support scale for multiple groups (Davison et al., 2011) to measure the restrictions from the perspective of children. The original measure asked parents to rate how often they restricted their child's use of devices with statements such as "I limit how long my child plays video games" and "I limit how much time my child can spend on the phone". The questions were also adapted to be measured from the perspectives of children. For example, one statement was "My parent/caregiver limits how long I spend using a games console per day". There was an identical statement shown to children for; a mobile phone, tablet, and computer/laptop.

Scenario based questions

Visual questions in questionnaires with children have been considered a successful approach, particularly in reducing reading skills as a barrier (Zhang, Smith, Lam, Brimer & Rodriquez, 2002). Similarly, methods such as photo elicitation have been found to evoke richer responses in interviews with children (Epstein, Stevens, McKeever & Baruchel, 2006). Therefore, we designed a section in the questionnaire which asked the children to choose which image most reflected their engagement with their parent across four different settings: (1) at home, (2) meal times, (3) at the park, and (4) walking.

Scenario A was set as a scene in the home with a parent and child sitting on a sofa, using four images to illustrate four potential situations. The images were: a parent only using a device, both using a device separately, a child only using a device, and a co-viewing image of both using a device together. This scenario was selected as the literature on electronic devices suggested this a place where families spend most of their time, and where electronic device use seems to be prominent (Currie & Eveline, 2010; Derks, van Duin, Times & Bakker, 2014; Kirkorian et al., 2009). Figure 2.2 illustrates the 'at home' scenario.

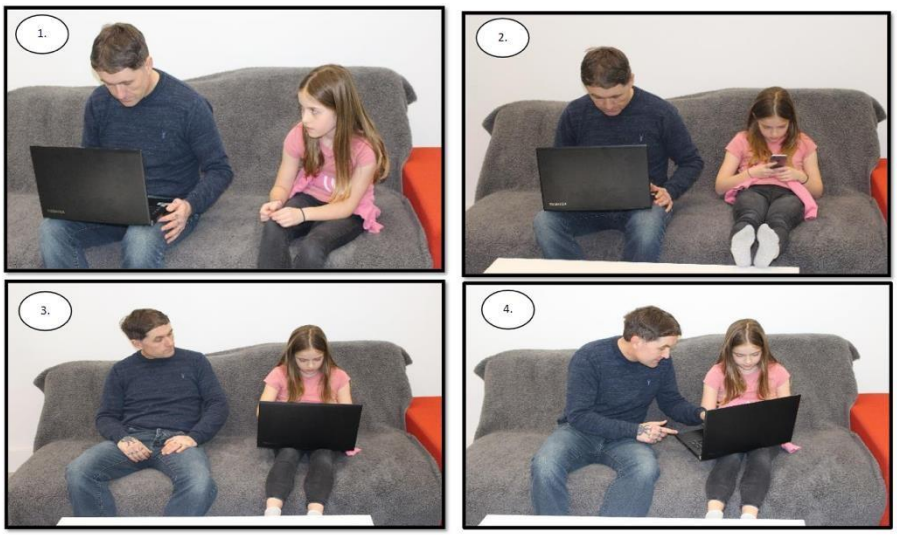

Figure 2.2. Images presented to children for the '*at home'* scenario.

In Scenario B, children were asked to imagine it is meal time with their parent. Research has found meal times to be p terms of family device use (Radesky et al., 2014; Kellershohn, Walley, West & Vriesekoop, 2018), and a time where children and parents would like each other to be present (Hiniker, Schoenebeck & Kientz, 2016). Children were presented with four images, which featured: a device free image where neither were using a device, an image where both were using a device, an image where only the child was using a device, and an image where the parent only was using a device (see Figure 2.3).

Figure 2.3. Images presented to children for the '*meal time'* scenario.

In scenario C, children were asked to imagine they are doing an activity with their parent at the park. Parents often report using devices like a mobile phone at the playground due to factors such as boredom, to take pictures, or communicating with others (Hiniker et al., 2015), and use has been associated with feelings of parental guilt, and concerns around children's safety, and parental responsivity (Lemish et al., 2019). Two images were presented in this scenario: an image of the parent and child playing football together, and an image of a child playing with a football whilst the parent was using a device (see Figure 2.4).

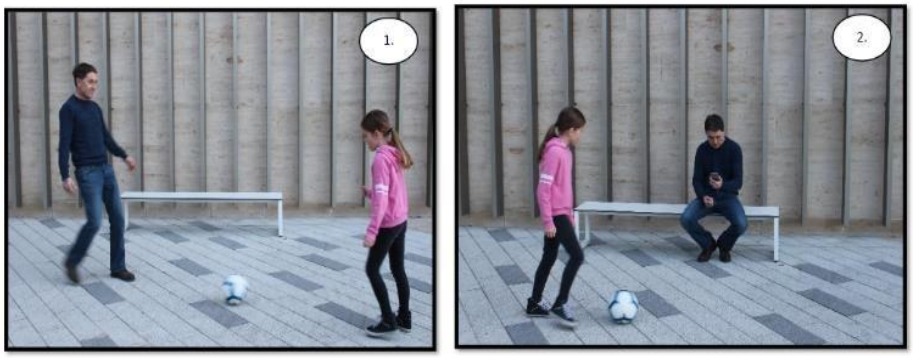

Figure 2.4. Images presented to children for the '*at the park'* scenario.

The final scenario, scenario D, presented asked children to imagine they were walking with their parent. The walking scenario was selected, as more family leisure time together has been linked to higher levels of family satisfaction, family satisfaction, and family relationships (Orthner & Mancini, 1990; Craig & Mullan, 2012). Four images were presented which included: an image of both the parent and child using a device, a device free image where neither were using a device, an image of the child only using a device, and an image of the parent only using a device (see Figure 2.5).

Figure 2.5. Images children were shown during 'walking together' scenario.

For each scenario, the images were numbered, and children were asked to circle which number matched the image they felt most reflected the time they spent with their parent. In each scenario, children were also asked to rate how this made them feel using a happiness scale (Donath, 2018) of faces (see Figure 2.6).

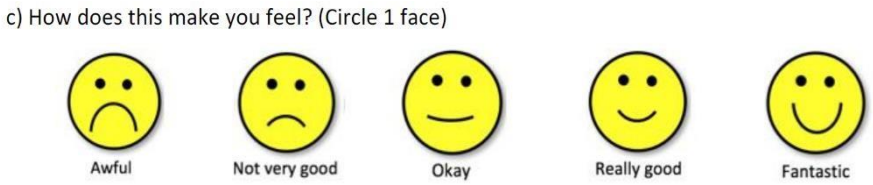

*Figure 2.*6. The 5-point happiness Likert scale used for children to rate how the image they had chosen for the scenario had made them feel.

Children were asked to circle one face in their response. Children have been found to prefer response options such as the happiness scale than other methods, such as the visual analogue scale (Haadad, King, Osmond & Heidari, 2012). Children were also given the opportunity note any other feelings they experience when the scenario happens.

Creating the Scenario's

In order to develop the scenario photos for the questionnaire, two models were recruited to represent the child and the parent/caregiver. The two participants were recruited through opportunity sampling (male adult, girl child). The parent was given an information sheet and consent form (see Appendix 2.4) that explained the purpose of the photos, and to consent for themselves and their child to take part. Child assent was also obtained. The consent form informed the participants that they had the right to withdraw their photos from being used at any time and that their participation was voluntary. The photographs were taken at various locations at Bangor University using a CANON EOS 400D camera. A total of 14 photos were used in the final questionnaire.

2.2.3. Finalise the Children's Questionnaire

Part One: child and parent/caregiver use the day before

The demographic questions of age, sex and parent that looked after them yesterday started this section. Children were asked how much time they spent using electronic device during that time, how much time their parent who was caring for them spent using electronic devices during that time, and also how much time they spent using electronic devices together. Time was measured using hourly categories; '*less than one hour'*, '*two hours*', '*three hours'*, '*four or more hours'*. Time was measured hourly as hourly measures on school days had already been used for with children aged 8-11 (Ofcom, 2019a). In addition to this, 24 hour recall has been used as a valid method to capture general health behaviours of children over eight years old (McPherson, Hoelscher, Alexander, Scanlon & Serdula, 2000). Children were also asked which devices they used, and which devices their parent used yesterday. Other questions included how much time they spent talking to their parent after school yesterday.

Part Two: general parent and child device use

Children were asked to think about when they normally use electronic devices. Children were asked what activities they use electronic devices for such as: playing games, watching videos, or listening to music; the questions on technoference were included in this section. Children were given the opportunity to write down any other times their parent/caregiver uses electronic devices when they are together. Children were asked how it makes them feel when their parent uses electronic devices without them whilst in the company of their children, and also how it makes them feel when their parent uses electronic devices when they are trying to talk to them. Children were also asked whether they feel their parent spends: '*too much'*, '*not enough*' or '*about right'* amount of time using electronic devices. Children were also asked what they thought their parents perceptions would be of their device use as children.

Part Three: family rules on electronic device use

Children were asked about any family rules they had related to the use of electronic device use, such as where and when they use them, and whether they had rules about how much time they spend using devices. Children were also asked their opinion on whether they

believed they should have these rules, and whether they felt their parents should also have family rules about the time they spend using electronic devices.

Part Four: relationship with parent/caregiver

Children's perception of their relationship with their specified parent was measured. This section included the parental warmth (Robinson, Mandleco, Olsen & Hart, 2001) and attachment (Smith and Krohn, 1991) measures.

Part Five: PANAS-C and SDQ

This part measured children's self-reported levels of internalising and externalising behaviours using the Strengths and Difficulties Questionnaire (Goodman et al., 2000), as well as positive and negative affect using the PANAS-C (Ebesutani et al., 2012). See section 2.2. 2.1 for more details.

Part Six: Scenario based questions

Part six consisted of the four scenario based questions which asked children which of the presented scenario's was most reflected of their home environment, and they were asked how the scenario makes them feel. See section 2.1.2.1 for more details.

2.2.4. Design the Parent's Questionnaire

The content of the parent questionnaire was reflective of the content of the child's questionnaire, as the purpose was to obtain the parental perspective to compare against the child's perspective. The SDQ (Goodman et al., 2000) and PANAS-C (Ebesutani et al., 2012) were not included in the parent's questionnaire as they were measures used for children. Moreover, additional questions were included, focusing on whether parents have tried to reduce their device use, whether they think electronic devices are effecting their child's skills, and how they think they and their child would feel during a day without electronic devices.

2.2.4.1. Additional Questions in the Parent Questionnaire

Reducing device use

Parents were asked how often they try to cut back on the amount of time they spend using electronic devices when they are with their child. Parents were also asked if they have tried, how often they succeed in doing so. Focus in this question was based on mobile

devices, as previous research has maintained a focus on non-mobile devices such as televisions, and mobile devices are now the most commonly used (Kirkorian, Pempek, Murphy, Schmidt & Anderson, 2009; Ofcom,2018).

Robb, Bay and Vennegaard (2018) originally used these measures with parents, and found that 40% of parents had occasionally tried to cut back on the amount of time they spent using electronic devices, and when they had tried to cut back on usage 39% reported that they were occasionally successful. The question was replicated with slight modifications for the purpose of the current study, with the added focus of reducing device use '*when with their child'*.

The Likert scale was also changed from a five-point Likert scale of; "never", "rarely", "occasionally", "very often" and "always" to *'never'*, '*not often'*, '*sometimes*', and '*often'* to maintain consistency with the Likert scale of the questions in the parent questionnaire. See Table 2.5 for changes.

Table 2.5.

Modifications made to parent's question on reducing device use. Modifications are underlined.

Item	Original version	Modified version
1	How often do you try to cut back the amount of time you spend <u>on mobile devices?</u>	How often do you try to cut back <u>on</u> the amount of time you spend using electronic devices <u>when you are with your child?</u>
2	<u>When you try to cut back the amount of time you spend on mobile devices</u>, how often do you <u>actually</u> succeed?	<u>If you have tried, how often do you succeed?</u>

Effect of electronic devices on children's skills

Parents were asked how much they perceive electronic devices to be impacting their child in terms of: reading, speaking, maths, social skills, physical activity, attention, creativity, behaviour, and sleep. Lauricella, Wartella and Rideout (2015) used this measure and found that when parents held more positive attitudes towards the effects of electronic devices on their children, children were more likely to spend more time using electronic devices. This measure was used in the current study to further investigate what perceptions parents have on electronic device use. The response options were modified from "very negative", "somewhat negative", "neutral", "somewhat positive" and" very positive" to '*very*

negative', '*neutral*', '*positive*' and '*very positive'*. For analysis, due to low numbers in some categories, categories were changed to *'negative'*, *'neutral'* or '*positive'*.

A day without electronic devices

Parents were asked how they thought they and their child would feel if they had to go a day without using electronic devices. Robb, Bay and Vennegaard (2018) have previously asked adolescents "if you had to go a day without access to mobile devices, to what extent would you feel the following emotions?" Parent's often report mixed feelings around their device use such as: the positive effects of socialising through their device, as well as the stress of notifications which lead to feelings of guilt around their child (Radesky et al. 2016).

The measure used by Robb, Bay, and Vennegaard (2018) was included in the parent questionnaire to further investigate parent's feelings and parental perceptions of their child's feelings surrounding the idea of a day without electronic devices. The original Likert scale was removed from the measure in the questionnaire as the extent to which they felt the emotions were not relevant for the purpose of the study. Parent's in the current study were asked '*Imagine you and your child had to go a day without using electronic devices, how do you think you both would feel?'*. Parents were then asked to tick all emotions that applied. The response options remained the same: *'anxiety'* '*happiness', 'loneliness', 'relief*', *'boredom'*, and *'freedom'* (Robb, Bay & Vennegaard, 2018).

Parental views on guidance

As previously mentioned, both children and parents reported in a study that they would like to "be present" in each other's company rather than using electronic devices, and both parents and children agreed that parents should also have rules about their use of electronic devices (Hiniker, Schoenebeck and Kientz, 2016). Therefore, parents were asked in this study whether they thought parents should be given guidance on their use of electronic devices, as well as their child's use of devices, parents were given a binary response option of *'yes'*, or *'no'*.

2.2.5. Finalise the Parent's Questionnaire

The parent questionnaire was also structured into six parts that reflected the six parts in the children's questionnaire.

Part one: child and parent/caregiver use the day before

During this section parents were asked to think about the time period of after their child came home from school the day before the questionnaire session, up until the time their child went to sleep the day before. Parents were asked to identify what their parent/caregiver role was, and what day it was the day before. Parents were asked how much time they spent using electronic devices during that time, and how much time their child spent using devices during that time. Parents were also asked how much time they and their child spent using electronic devices together during that time. Additionally, parents were asked which electronic devices they had used that evening.

Part two: general parent and child device use

Parents were asked to think about when they normally use electronic devices, and asked whether they used electronic devices when doing the following functions with their children: eating meals, doing activities, talking to them, or when picking them up from school. They were also given the option to write any other time they felt they get distracted by electronic devices. This section also included asking the parents what activities they used their electronic devices for, although their response options differed from those given to the children. Part two also included asking parents if they thought their child spends; '*too much'* time, '*not enough'* time or the '*about right'* amount of time using electronic devices, as well as what they thought their child's opinion is on the time their parent spends using devices. Parents were also asked if they had ever tried reducing the time they spent using electronic device use, and their perceived effects of children's device use on various children's skills. Parents were also asked about their feelings and their child's feelings if they had to spend a day without using electronic devices (see section 2.2.4.1).

Part three: family rules on the use of electronic devices

Part three included questions on family rules on the use of electronic devices. Parents were asked whether they limit the time their child spends using specific devices, as well as asking parents whether they limit the time they spend using electronic devices. This section also asked parents if they use devices as a reward for their child's good behaviour, and asked if they believed parents should be given advice or guidance on their use of electronic devices in the company of children.

Part four: relationship with their child

Part four included the attachment measure from the adult perspective; thus measuring their feelings of attachment towards their child (Smith and Krohn, 1991).

Part five: scenario based questions

Part five included the same scenario questions from part six of the children's questionnaire. The sole difference in the scenario based questions was that parents were not given the happiness scale (Donarth, 2018) or asked how it made them feel. Parents were asked to choose which image was most applicable, and then asked how often this happens with either '*most of the time*' or '*all of the time'*.

Part Six: demographic questions

Part six included demographic questions such as: gender, age, ethnicity, and qualification level, and employment status. A measure (Short Warwick–Edinburgh Mental Well-being Scale; Stewart-Brown et al., 2007) was used capture parents' mental wellbeing. In order to obtain a measure of socioeconomic status, parents were asked to report their postcode and were informed they would be deleted.

2.2.6. Piloting and Finalising the Questionnaires

Both questionnaires were piloted in a primary school in North Wales. The aim of piloting the children's questionnaire was to assess how children responded to the length of the questionnaire, the complexity of the words, and whether they were able to understand the questions, as well as the time it took children to complete the questionnaire. The researcher did this by recording the start and finish time that the last child completed the questionnaire, and documented any words children asked the researcher to explain during the pilot, as well as any other general comments children made during the pilot session. The parent questionnaire was also distributed during the pilot study. The aim of piloting the parent questionnaire was to assess the response rate of the questionnaire, to see whether asking the parents of children to bring in the questionnaires was an effective way of attaining responses.

The school was recruited through convenient sampling. Consent letters were issued to children and parents (n > 20 dyads) in a year five and six classroom; six consent forms were returned. Four were boys, and four were 9 years old and two were 10 years old and their respective parents were recruited to participate. Moreover, only four parents (50%)

completed the parent questionnaire and returned their questionnaires to the school to be collected by the researcher.

In order to ensure the parents received their questionnaire with an identical ID code to their child's questionnaire, the questionnaire were personally addressed to the parent of each child, and given to their child to take home. To ensure that the questionnaires were anonymous when being returned to the schools, names were written on a disposable note that could be removed from the envelope prior to the questionnaires being returned to the school.

Following analyses and researcher observations made during the pilot phase, the following changes were made to the questionnaire and procedure:

Changes to Children's questionnaire

- One question was removed as it was questioned by children during the pilot study as being identical to a previous question in the questionnaire which caused some confusion. One asked "*How does it make you feel when your parent/caregiver uses an electronic device when you are with them*?" and the second question asked "*How does it make you feel when your parent/caregiver uses an electronic device without you when you are with them?*" The second question was kept in the final version of the questionnaire and the first was removed, as parental device use in the first question could also include instances of co-viewing.
- Children were given a more in depth explanation on how to complete the scenario questions in part six of the questionnaire
- Teachers were informed that the questionnaire would take a maximum of 25 minutes to complete based on the timings of the pilot phase.
- Due to missing data in the questionnaires during the pilot study, an edit was made to the protocol of data collection. During every possible instance, the researcher would quickly review the questionnaires following completion by the children to minimise any missing data (i.e. pages) through questions children may have missed.

Changes to parent questionnaire

- The response method for the parent questionnaire was adapted from being returned to the school to being posted back to the researcher. Through using this method, there was no risk of schools identifying parent questionnaires, and also postal questionnaires have been

found to have higher response rates in comparison to other methods such as web-based invitations (Ebert, Huibers, Christensen & Christensen., 2018).

Changes applicable to both

- In the questionnaire where children were asked whether their parent used electronic devices when eating, talking, playing with them, or picking them up from school,
- "pla*ying with them (including sports)"* was changed to "*doing activities with them (including sports)"* as the children verbally stated during the pilot phase that they do not *play* with their parents. The change was also made to the respective scenario question in the parent questionnaire.

Chapter Three: Method – Sample Recruitment and Procedures of Data Collection

3.1. Ethical Approval

Ethical approval for this research was received from Bangor University Healthcare and Medical Sciences Academic Ethics Committee (Ref no. 2017-16076)

3.2. Sample Recruitment

Following ethical approval, a database using publicly available information of all the primary schools in the Wrexham County was created. Demographic details such as socioeconomic status of the school area, number of pupils, and details of Estyn inspections were included in the database. Schools with less than 100 pupils were excluded, in order to recruit as many participants as possible within the time frame. In order to obtain a sample of varying socioeconomic status, schools were then separated into two categories (1) 50% most deprived quantile and (2) 50% least deprived quantile using the Welsh Index of Multiple Deprivation 2014 (Welsh Government, 2014) interactive online tool (see Appendix 2.5).

A target was set to recruit an equal amount of schools from each deprivation category in order to have a balanced sample in terms of socioeconomic status of the school areas. To randomly select the schools for each deprivation category, each school was randomly assigned a number using the random assignment tool in Excel. The database was then arranged in ascending order using the numbers, and schools were contacted in that order.

The researcher then began contacting schools and requested to speak to the head teacher[1] to introduce the project. Contact was initially made over the phone, and failing this, an email was sent to schools (see Appendix 2.6). A total of 32 schools in Wrexham were contacted including Welsh medium schools. Of the 32 schools, 26 schools that reported not being able to participate in the study gave reasons such as: a busy schedule or having recently participated in research projects. There were also difficulties in getting in contact with the head teacher in certain schools, therefore a decision was not able to be reached by some schools within the time frame of the study.

The target sample for the study in line with the finances and time frame of the study was 150. Due to such difficulties in recruiting schools in the Wrexham area, Flintshire was identified as the bordering county and the same recruitment process was then carried out with

[1] If the head teacher was not available, the researcher spoke with a member of staff who had permission able to authorise participation.

primary schools in Flintshire, North Wales. Of the 15 schools that were contacted in Flintshire, 10 schools did not take part due to having a busy schedule, or due to difficulties in making contact with the head teacher. Five additional schools from Flintshire were deemed sufficient for the purpose of the study.

Once the head teacher in the schools had been given the opportunity to ask further questions, and they had consented for their school to take part, consent forms (Appendix 2.7) were provided to the school. The head teacher was made aware that the consent forms were for distribution to children in year's four to six (age 8-11 years) to take home to their parents. The consent forms had a return date of a week later. Parents were asked to give consent for themselves to take part in the parent questionnaire, and also to give assent for their children to take part in the children's questionnaire session.

3.3. Children's Procedure

A total of 173 children aged 8-11 completed the questionnaire session in a classroom setting during school hours, with some sessions being held in the morning and some sessions held in the afternoon, dependent on the availability of the school. Children gave their assent to take part through completing the questionnaire when distributed in the classroom. Children completed the questionnaires in groups of varying sizes. The groups ranged in sizes from 5 to 34 depending on the recruited sample in each school. Each child was provided with a copy of the questionnaire with their designated identification (ID) code noted by the researcher. The ID codes were used to be match the children's data to their parent's data to analyse the data as parent-child dyads.

At the beginning of the children's questionnaire session, the researcher introduced themselves to the children and gave a brief introduction to the questionnaire, in which the children were told their answers would be anonymous. It was explained that the questionnaire would take approximately 25 minutes to complete, and the children were asked to raise their hand if they had any questions regarding the questionnaire. To minimise any potential researcher bias or priming during questionnaire sessions, the researcher ensured that participants in each school were given a scripted verbal introduction to the questionnaire. It was ensured that no child was in any distress during the questionnaire or leaving the questionnaire session.

During the questionnaire session, the researcher assisted the children when asked, although ensured questions were only repeated rather than rephrased to minimise any difference in interpretation across the sample. Furthermore, teachers were asked to avoid

giving interpretation on questions when asked for assistance, and asked to repeat the questions to assist the children.

Children were asked to raise their hand once the questionnaire had been completed, and the researcher would collect their questionnaires. The researcher then went through the questionnaire to check that the child had answered all the questions they felt comfortable answering (e.g. to ensure several pages had not accidentally been missed). Following completion, the children were thanked for their participation and given a personalised certificate to say thank you for their participation (see Appendix 2.8), which was to be sent home along with a parent questionnaire. The children then resumed their school day and the parent questionnaire was sent home with the children that day.

3.4. Parents Procedure

A total of 173 children received a parent's questionnaire to distribute to their parents on the day of the questionnaire session inside "parent-packs". The name of the parents that the child identified as having looked after them the day before was on the front of the parent packs, and parents were also asked to identify their parent/caregiving role. Parents were asked to complete the questionnaire the same day as the child had completed their questionnaire, the date of the children's questionnaire session was also on the front of the questionnaire. Parents were asked to return the questionnaire by post to the University within a week of the date of the children's questionnaire session. A total of 91 parents returned the questionnaires.

3.5. Parent-child Dyads Procedure

The parent-child dyads were pairs arisen from the research made up of a child (aged 8-11) who completed the questionnaire, as well as their parent who had completed the parent's questionnaire.

3.6. Data Analysis

Data analysis was conducted using version 25 of the statistical package for social sciences (SPSS). Questionnaire data was manually entered into SPSS, and the data input was quality assured by another researcher. Non parametric chi-square tests were carried out on descriptive data to investigate bivariate correlations in responses by children and parents across children's sex and deprivation level. Variables investigated using chi-square tests

were: perceptions of the time children and parents spent using devices, and perceptions of responses to technoference across different settings.

Further, spearman's rank order correlations were carried out to investigate the relationship of parental technoference on the continuous variables investigated; attachment, time children spent using devices, parental technoference, internalising behaviour, externalising behaviour, parental warmth, and both positive and negative affect. Multiple linear regressions were conducted to further investigate the impact of parental technoference.. Four models were carried out with attachment, internalising behaviour, externalising behaviour, and parental warmth serving as dependent variables in four individual regression models. For each regression model, parental technoference was the independent variable and the following were entered into the model as confounding variables; time child spent using devices the day before, deprivation and child's sex. Outcomes were deemed significant If $p < 0.05$.

For parent-child dyads, Wilcoxon signed-rank tests were carried out to investigate the differences in responses across matched pairs made up of parents and children. The effect size used was 'r', and effect sizes were interpreted as: < 0.30 as being a small effect size, 0.30 - < 0.50 being moderate, and > 0.50 being interpreted as a large effect (Tomczak & Tomczak, 2014).

Chapter Four – Results: Children's Perceptions of their Use and Parental Use of Devices

4.1. Introduction

This chapter reports children's perceptions of their use of electronic devices, and their perception of parental use of electronic devices. Section 4.2 refers to questions children were asked about electronic device use between finishing school and going to sleep the evening before the questionnaire session. Section 4.3 onwards refers to general use of devices, and not use within a specified time frame. The measure of deprivation used in this chapter was relative to the school deprivation quintile of the children[2]. As a reminder ahead of this results chapter, the key aims/objectives of this study were:

- Child and parent perspectives on their own and each other's device use
- Child and parent perspectives on parental technoference
- Child and parent perspectives on the effects of parental device use on parent-child attachment
- Children's perspectives on parental device use and children's internalising and externalising behaviour

4.1.1. Schools Sample

A total of 32 schools and 15 schools in the Wrexham and Flintshire areas, respectively, were contacted to take part in the study. Conversely, 11 schools agreed to take part (6 Wrexham, 5 Flintshire), of which five schools were located in the 50% less deprived areas (referred to from here onwards as least deprived) and the six schools were located in the 50% most deprived areas in Wales (referred to from here onwards as most deprived; (Welsh Government, 2014).

4.1.2. Sample of Children

Parental consent was obtained for the participation of 183 children; child assent was also obtained on the day data collection was undertaken. The total number of completed children's questionnaires was 173; 10 children were not in school on the data collection day. Moreover, children were excluded from the analysis if they did not complete the following questions: age, sex, or the time they spent using electronic devices after finishing school the

[2] In the succeeding chapters, home deprivation quintiles derived from WIMD (Welsh Government, 2014) were used as the measure of deprivation as parents were asked to provide post codes.

day before. This provided a final analysis sample of 170 children (Table 4.1). Unless specified, this is the sample that was used for all analyses.

Table 4.1.

Table to illustrate the characteristics of the 170 children in the children's sample put forward for final analysis.

Demographics	**%**
Sex (%)	
Boy	40.4
Girl	57.6
Age (%)	
8 years	5.9
9 years	28.8
10 years	41.2
11 years	24.1
School area deprivation status	
50% most deprived areas	44.4%
50% least deprived areas	55.6%

4.2. Children's Use of Electronic Devices the Evening Before

4.2.1. Electronic devices used

Only 6.5% of children reported using no devices at all. The largest proportion of children reported using one electronic device (38.2%) followed by two devices (35.9%) and three devices (16.5%), whereas only a minority reported using four devices (2.4%) or five devices (0.6%). Boys reported using a greater number of devices than girls (X^2 (5) = 14.885, p = 0.011). No significant differences for the number of devices used were found by school deprivation areas (X^2 (5) = 3.987, p = 0.551).

The most commonly reported device used was a mobile phone (58.8%), followed by a games console (45.3%). The games console was used most commonly by boys (72.2%) and significantly more so than by girls (26.0%; X^2 (1) = 36.550, $p < 0.001$). No further significant differences in children's responses were found by sexes or school deprivation for any of the

other devices (Appendix 4.1). Children were also asked about the devices that their parent had used,, and 86.5% reported that parents predominantly used a mobile phone (Table 4.2).

Table 4.2.

Percentage of parents and children that used various electronic devices during the previous evening according to children's reports.

Device	**Children**			**Parent**
	All	**Boys**	**Girls**	
Mobile phone	58.8%	58.3%	59.2%	86.5%
Laptop	18.2%	18.1%	18.4%	31.8%
Tablet	41.2%	40.3%	41.8%	19.4%
Computer	8.2%	9.7%	9.7%	19.4%
Games console	45.3%	72.2%	25.5%	8.2%

4.2.2. Time Spent Using Electronic Devices

The majority of children (69.9%) reported spending two hours or less using devices between finishing school and going to sleep the evening before the questionnaire (see Figure 4.1).

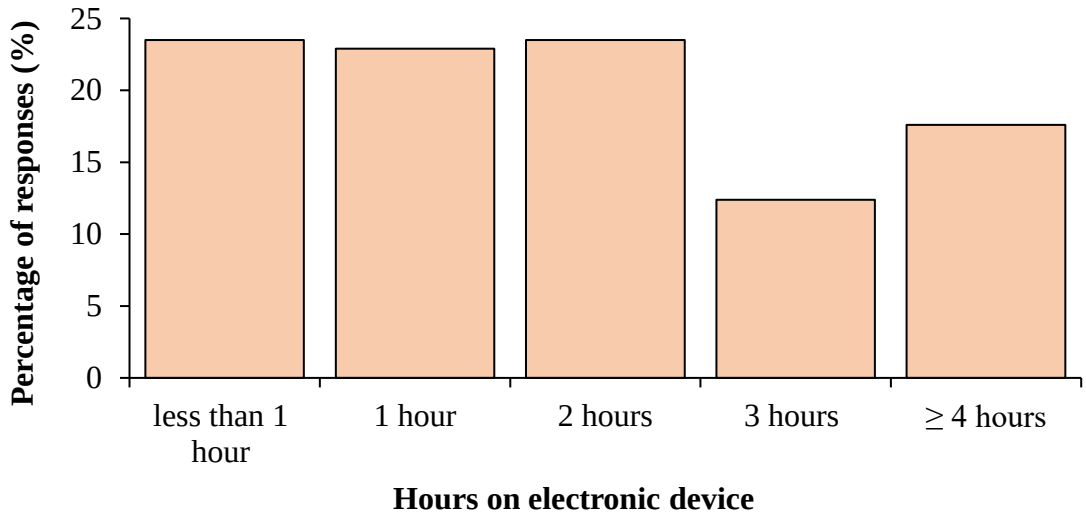

Figure 4.1. Time children spent using devices between finishing school and going to sleep.

A significantly larger proportion of boys reported spending more time on devices (0-2 hours: 61.1%; 3+ hours: 38.9%) than girls (0-2 hours: 76.5%; 3+ hours: 23.5%; X^2 (1) = 4.699, p = 0.030). No significant difference was found between school deprivation areas on the time children spend using devices (X^2 (1) = 1.290, p = 0.256). 4.699, p = 0.030). No significant difference was found between school deprivation areas on the time children spend using devices (X^2 (1) = 1.290, p = 0.256).

4.3. The Perceptions of Children of Devices Use Generally

4.3.1. Activities Children Use Devices for

Children (n=153) reported often they use electronic devices for a list of activities. Watching videos was the most common activity with 62.7% children reporting doing this '*often'*. This was followed by searching the internet (51.0%) and equally talking to friends and playing games (47.1%). Despite the children in this sample being younger than the required age of 13 years or older to have an account on most social media accounts (e.g. Facebook, Twitter), 35.5% of children reported using social media '*often'* (Table 4.3).

Table 4.3.

Percentage of children that reported using devices for nine activities.

Activity	Frequency		
	Never	**Sometimes**	**Often**
Playing games	9.8%	43.1%	47.1%
Watching videos	2.6%	34.6%	62.7%
Homework	26.8%	57.5%	15.7%
Listening to music	10.5%	43.1%	46.4%
Social media	35.9%	28.8%	35.3%
Searching the internet	8.5%	40.5%	51.0%
Reading	53.6%	35.9%	10.5%
Talking to friends	21.6%	31.4%	47.1%
Talking to family	28.8%	36.6%	34.6%

A significantly greater proportion of boys (60.3%) reported using devices to play games than girls (51.1%; X^2 (2) = 9.893, p = 0.007). Whilst a higher proportion of girls

reported using devices *'often'* to talk to their friends (51.1%) than boys (41.3%), a higher proportion of boys reported using devices for this purpose *'sometimes'* (46.0%) compared to girls (21.1%) and the difference between sexes on talking to their friends was significant X^2 (2) = 12.006, p = 0.002). Girls (43.3%) reported using electronic devices for social media significantly more *'often'* than boys (25.4%; X^2(2) = 6.817, p = 0.033). There were no further differences across both sexes, and there were no significant differences across deprivation for any of the activities (Appendix 4.2).

4.3.2. Parental Distraction by Electronic Devices

Children (n=164) reported on how often their parents use electronic devices during four specified occasions (see Figure 4.2). The occasion most commonly reported as a time in which parents were most likely to be distracted by their devices was during conversations with their children. A total of 27.4% of children reported that this happens '*most of the time'*, and 24.4% '*all of the time'.* Meal times with their children was the occasion where parents were most commonly *'never'* distracted by devices (39.6%). A significantly larger proportion of girls (36.5%) than boys (14.7%) reported that their parent '*never'* uses a device whilst doing activities with them (X^2 (4) = 9.661, p = 0.047). There were no significant school deprivation differences for any of the occasions (Appendix 4.3).

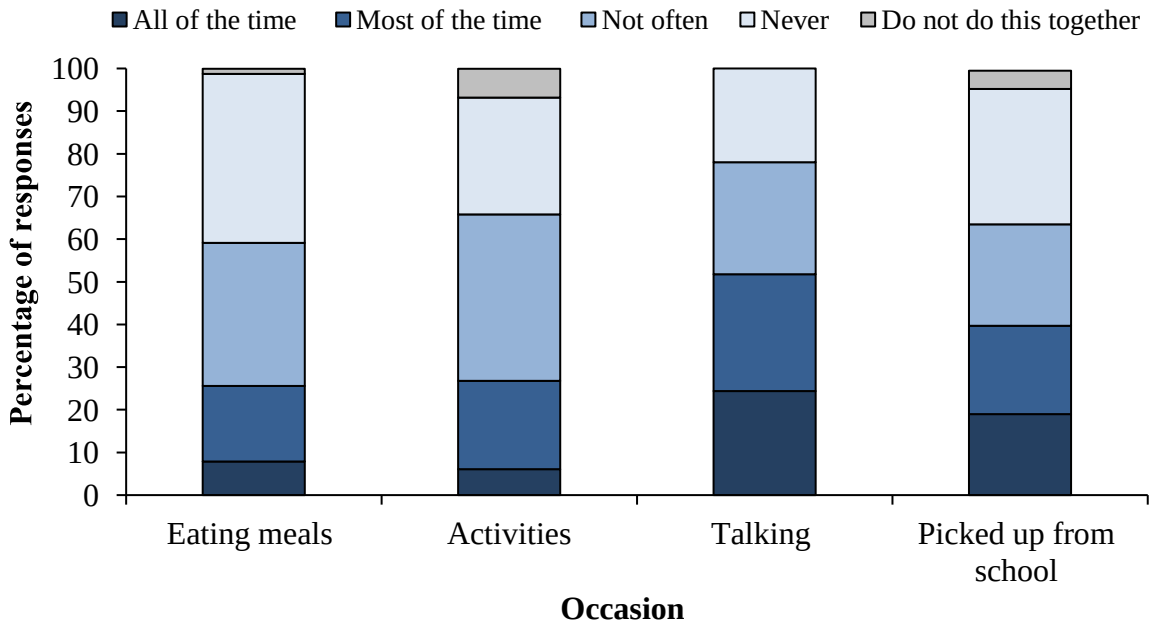

Figure 4.2. Percentage of children's responses to their parent's use of electronic devices on four different occasions.

4.3.3. Children's Feelings on Parental Use of Electronic Devices

Children were asked how they felt across three different situations: (1) when their parent uses a device when they are trying to talk to them; (2) when their parent uses a device without them when they are with them; and (3) when they are co-using an electronic device with their parent.

Over three times as many children reported feeling positive emotions when co-using a device with their parent (55.0%) compared to when a parent uses a device alone when in their company (15.6%). Moreover, 18.0% of the children reported feeling negative emotions when their parent uses a device alone but in their company compared to 5.0% when their parent couses a device with them (5.0%). A total of 56.0% of children reported feeling negative emotions when their parent uses an electronic device when they are trying to talk to their parent (*not very good*: 49.1%; *awful*: 6.9%) whereas less than a tenth reported positive emotions (*really good*: 1.9%; *fantastic*: 4.4%) about those occasions (Figure 4.3). There were no significant sex or deprivation differences in children's responses for either of the three questions on children's feelings on parental device use (Appendix 4.4).

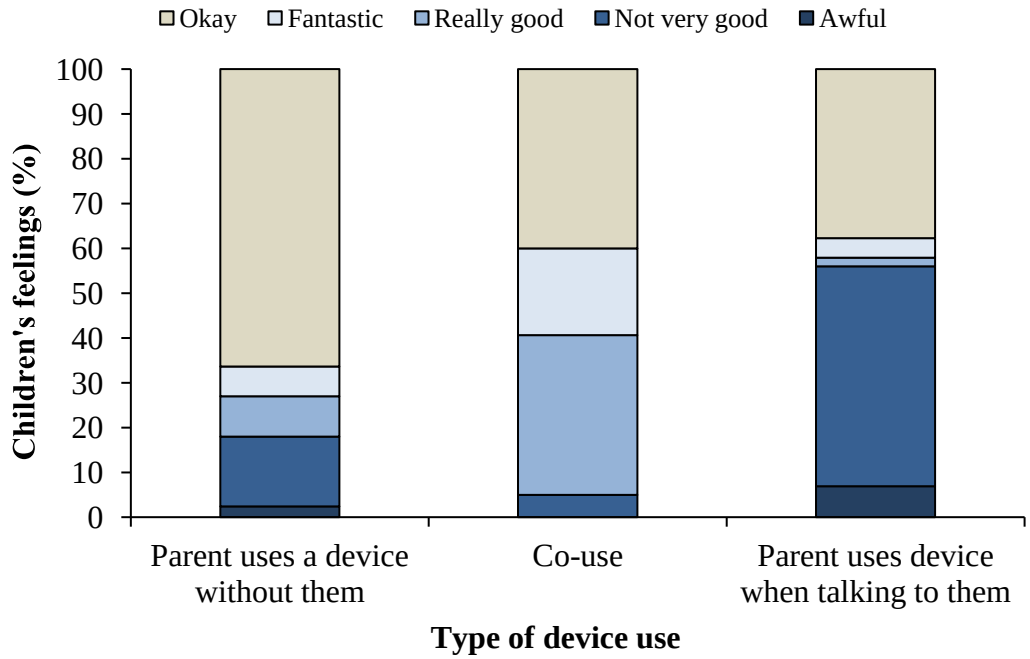

Figure 4.3. Feelings children associated with parents using a device alone when in their company, co-using a device with their parent, and their parent using a device when talking to them.

4.4. Parental Technoference

For the purpose of this section focused solely on the impact of parental technoference, the data was cleaned and narrowed down to a sample of children who had responded to the questions on the following: parental technoference, internalising and externalising behaviour, attachment, parental warmth, positive and negative affect, and time spent using devices the day before. The data of 151 children were used for the correlation and regression analysis.

4.4.1. Children's Perceptions of Parental Technoference

Children were provided with three statements about parental technoference and asked to rate them on a four-point Likert scale ranging from *'never'* to *'all of the time'* as shown in Section 2.1.2.1.. The higher the mean score, the higher the instances of parental technoference .Around half of the children reported '*never*' struggling to talk to their parents whilst their parent uses a device (50.3%) and a similar amount reported their parent *'never'* uses a device in the middle of a conversation with them (49.7%). Struggling to obtain parental attention from devices was most problematic, with 2 in 10 children reporting experiencing this (*most of the time*: 15.9%; *all of the time*: 3.3%). Similar experiences were found with the other two statements, with over a tenth reporting experiencing struggling to get parents to talk to them when using a device (*most of the time*: 12.2%; *all of the time:* 0.7%) or when in the middle of conversations with them (*most of the time*: 13.9%; *all of the time*: 3.3%; Table 4.4).

Table 4.4.

Children's responses to questions on their perception of parental technoference.

Statement	Never (%)	Not Often (%)	Most of the time (%)	All of the Time (%)
Struggle to get parent's attention when parent is using a device	40.4	40.4	15.9	3.3
Struggle to get parents to talk to them when using a device	50.3	35.8	12.2	0.7
Parent uses device in the middle of conversations with them	49.7	33.1	13.9	3.3

4.4.2. Parental Technoference: Correlation Analysis

The relationship between parental technoference and seven other variables informed by the literature including attachment and internalising and externalising behaviour were investigated. Means, standard deviations, and correlations for each of the variables can be found in Table 4.5.

Table 4.5.

Means, standard deviations, and spearman's rank order correlation values for continuous variables.

Variable	2	3	4	5	6	7	8	M (SD)
1.Attachment	.240**	.063	-.064	.167*	-.003	.426**	-.080	3.10 (0.28)
2.Technoference		.191*	.280**	-.110	.132	-.481**	-.032	1.72 (0.64)
3.Internalising behaviour			.466**	-.057	.466**	.028	.143	19.11 (2.87)
4.Externalising behaviour				-.067	.350**	-.075	.257**	18.77 (2.38)
5.Positive affect					-.139	.179*	.006	18.84 (4.24)
6.Negative affect						-.030	.098	8.65 (4.10)
7.Parental warmth							-.030	10.27 (1.57)
8.Time on device evening before								1.29 (0.46)

*correlation is significant at the 0.05 level.

**correlation is significant at the 0.01 level.

Results of the spearman's rank-order correlations found that there was an inverse correlation between technoference and attachment (r_s (149) = -.240, p = 0.003). There was also a significant positive relationship between technoference and internalising behaviour (r_s

(149) = 0.191 p = 0.019) as well as a positive relationship between technoference and externalising behaviour (r_s (149) = .280, p < 0.001. A significant inverse relationship was also found between technoference and parental warmth (r_s (149) = -.481, p < 0.001)

4.4.3. Parental Technoference: Regression Analysis

As a result of the significant correlations between technoference and attachment, internalising behaviour, externalising behaviour, and parental warmth, four multiple linear regressions were carried out to further explore these associations. All regression models included; technoference score, gender, school deprivation, and time children spent using device evening before.

Attachment

Results indicated that the model was a significant predictor of attachment (F (4,145) = 2.748, p = 0 .031) and that the model explains 4.5% of the variance in attachment. Technoference contributed significantly to the model (β = - 0.107, p = 0.003) which implies that technoference is inversely associated with attachment. Higher attachment scores represented higher levels of attachment, and lower technoference scores indicated fewer instances of technoference. The inverse relationship suggests that as technoference increased, attachment decreased. Gender (β = -0.026, p = 0.584) deprivation (β = -0.030, p = 0.517) and time children spent using devices the evening before (β = -0.017, p = 0.309) did not contribute significantly to the model.

Internalising Behaviour

Results indicated that the model was a significant predictor of internalising behaviour (F (4, 145) = 3.733, p = 0.006) and that 6.8% of the variance was explained using the model. Technoference contributed significantly to the model (β = 0.929, p = 0.010) which implies a positive relationship between technoference and internalising behaviour. Higher scores on the internalising behaviour scale suggest higher levels of internalising behaviour, which suggests that as technoference increased so did children's levels of internalising behaviour. Gender also significantly contributed to the model (β = -1.032, p = 0.030). For sex, girls were coded as 'one' and boys coded as 'two' which suggests that girls demonstrate higher levels of internalising behaviour than boys. The time children spent using devices the evening before

(β = 0.402, p = 0.018) also significantly contributed to the model; as children's use increased, their levels of internalising behaviour also increased. Deprivation did not significantly contribute to the model (β = 0.232, p = 0.614).

Externalising Behaviour

The model significantly predicted externalising behaviour (F (4, 145) = 6.265, p < 0.001) and accounted for 12.4% of the variance. Technoference significantly contributed to the model **(**β = 1.071, p < 0.001) suggesting a positive relationship between technoference and externalising behaviour. The higher the externalising behaviour score, the higher the level of externalising behaviour the child demonstrated, and the higher the technoference scores, the higher the instances of technoference, which suggests that technoference and externalising behaviour scores increased together. Time spent using devices the evening before also significantly contributed to the model (β = 0.445, p = 0.001) as time children spent using devices increased, so did the externalising behaviour scores. Gender and deprivation did not significantly contribute to the model (β = 0.132, p = 0.729; β = - 0.066, p = 0.858).

Parental Warmth

Results for parental warmth suggest that the model predicted 22.1% of the variance and that the model was a significant predictor of parental warmth (F (4,145) = 11.577, p < 0.001). Technoference was a significant contributor to the model (β = -1.173, p < 0.001) and results suggest an inverse relationship between technoference and parental warmth which implies as technoference increases, parental warmth decreases. Gender, deprivation, and time children spent using devices the evening before did not contribute significantly to the model (β = -0.174, p = 0.460; β = - 0.097, p = 0.671).

4.5. Family Rules on Electronic Devices

Of the children who completed these questions (n = 160), the highest proportion of children reported having rules about when they use electronic devices (Figure 4.4). A significantly higher proportion of children who attended schools in the less deprived areas (64.4%) reported having rules about the time they spend using devices than those attending schools in the more deprived areas (42.9%; X^2 (1) = 7.414, p = 0.006). Whether children have rules about the time they spend did not significantly differ across sexes (X^2 (1) = 2.221, p = 0.136). There were no significant sex differences

as to whether children have rules about when (X^2 (1) = 0.278, p = 0.598) or where (X^2 (1) = 0.453, p = 0.501) electronic devices are used. There were also no significant deprivation differences on whether they have rules for when (X^2 (1) = 2.091, p = 0.148) and where (X^2 (1) = 0.307, p = 0.580) they use devices.

Table 4.6.

Table demonstrating children's responses to the type of rules they have surrounding electronic device use.

Family Rule Type	**Percentage of child reports**
Time children spend using devices	55
Where children used devices	38.1
When children use devices	67.5

A small proportion of children (14.1%) believed that their parents had self-imposed rules about the time they spend using electronic devices (see Figure 4.5) Responses for perceptions of parents rules did not significantly differ across sex (X^2 (1) = 5.593, p = 0.061) or school deprivation (X^2 (2) = 4.286, p = 0.117).

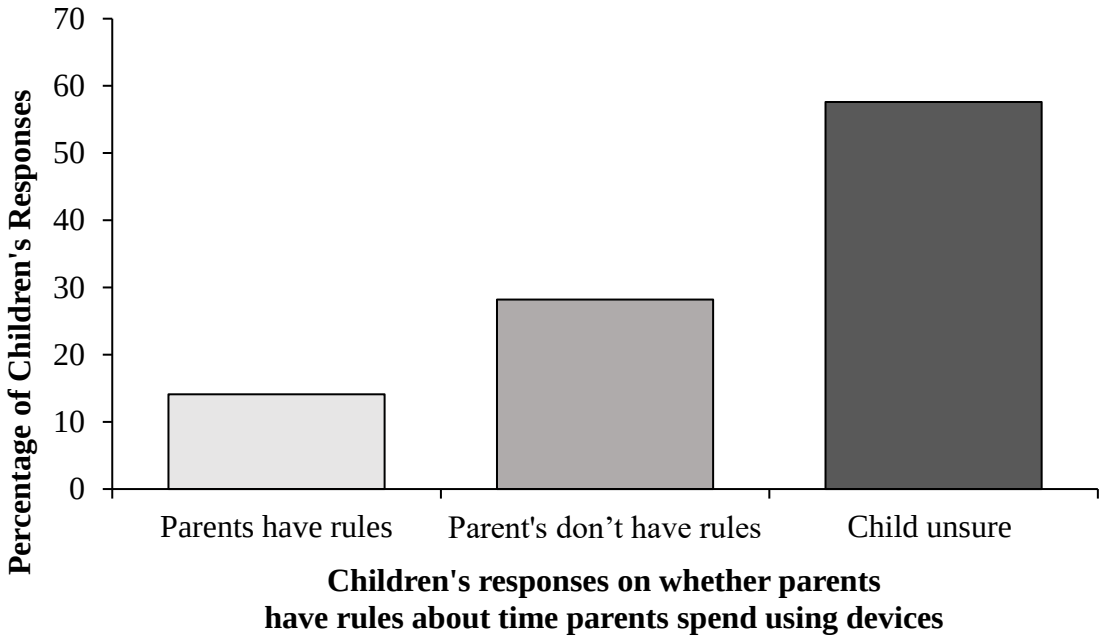

Figure 4.4. Bar graph to demonstrate children's perceptions of the rules their parents have surrounding parent's device use.

A similar percentage of children thought families should have rules for parents and should have rules for children about the amount of time they spend using devices (rules for children: 61.9%; rules for parents: 61.3%). A higher number of children attending schools in the less deprived areas reported that children should have rules (68.9%) compared to those attending schools in more deprived areas (52.9%), and this difference was significant (X^2 (1) = 4.290, p = 0.038). There were no significant differences between sexes as to whether or not children thought families should have rules for children (X^2 (1) = 1.759, p = 0.185). Children's responses on whether parents should have rules did not significantly differ across sex (X^2 (1) = 0.278, p = 0.598) or school deprivation (X^2 (1) = 2.543, p = 0.111).

4.6. Children's Perceptions of Time Spent Using Devices

A sample of 164 children gave their perception on the time their parent spends using electronic devices. Three quarters of children (76.8%) reported that they thought the amount of time their parent spends using electronic devices was '*about right'*, with 18.3% reporting '*too much'* and 4.9% reporting *'not enough'*. Children's perceptions of their parents use did not differ significantly across sexes (X^2 (2) = 3.417, p = 0.181) or school deprivation (X^2 (2) = 1.545, p = 0.462).

4.7. Children's Perceptions and Feelings on Four Device-based Scenarios

Children were asked to think of four scenarios with their parent: (a) being at home, (b) being at the park, (c) eating meals with them, and (d) walking with them. Children were presented with photos for each scenario and asked which photo was most applicable to them and their parent during those times. The photos used for the scenarios varied. Some of the photos used for different scenarios included: (a) neither the parent nor child using a device (device free), (b) both parent and child using a device, (c) just the parent using a device, and (d) just the child using a device. Where appropriate, the photos also included a co-viewing image, where both parent and child were using a device together. For each scenario, children were asked how often this happened, and also how this made them feel using a five-point Likert scale of faces of different degrees of happiness, ranging from "*awful*" to "*fantastic*" (Donarth, 2018). A valid response was given to all four scenarios by 151 children.

4.7.1. (a) At Home

The image of both a parent and child using an electronic device individually was chosen most often for this scenario (46.4%). Most of the children who chose this image stated that it happens '*most of the time'* (84.3%) rather than '*all of the time'* (15.7%). Of the children who chose this image, 58.6% said it makes them feel '*okay',* and 38.6% reported feeling positive emotions (*really good*: 25.7%; *fantastic*: 12.9%). A small proportion reported negative feelings (*not very good*: 2.9%). No children reported feeling *'awful'* about the scenario.

The second most chosen image was the co-viewing image (26.5%). Nearly half of children who chose the image reported feeling positive about the scenario, with 42.5% saying it makes them feel '*really good'* and 30.0% saying it makes them feel '*fantastic'*. The third most applicable image was the image of the parent only using a device (14.6%). The largest proportion of children (45.5%) said this makes them feel '*not very good'*, while 31.8% makes them feel '*okay'* (31.8%). Only a minority reported feeling 'a*wful*' (13.6%) and '*fantastic*' (9.1%), but no children reported '*really good*'.. The child only image was rated as least applicable for the scenario (12.6%). Over half of children (59.1%) who chose the image said this makes them feel '*awful'* or '*not very good'* ('*awful'*: 13.6%; '*not very good'*: 45.5%). Choice of image for this scenario did not significantly differ across children's sex (X^2 (3) = 4.067, p = 0.254) or school deprivation (X^2 (3) = 2.479, p = 0.479) for the *'at home'* scenario (Figure 4.5).

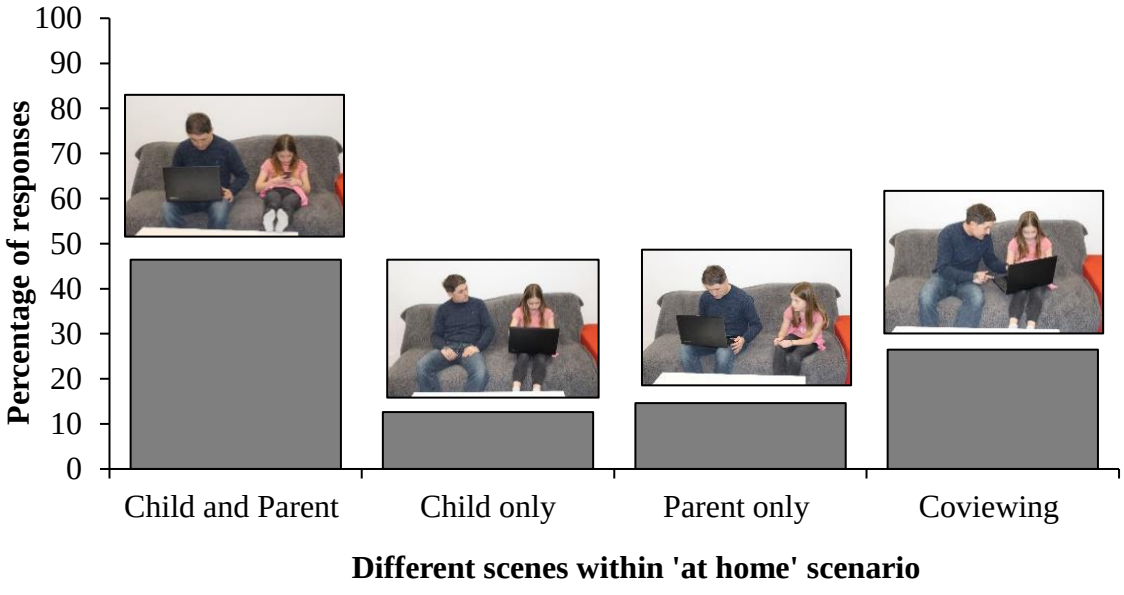

Figure 4.5. Children's responses in percentages of which image they chose as most applicable to them and their parent when '*at home'* together.

4.7.2. (b) At the Park

The device free image (neither child nor parent on a device) at the park was most commonly selected by the children (68.9%). Of those who chose this image, 45.6% reported this scenario reflected '*all of the time'*, and 54.4% reported it reflected '*most of the time'*. These children reflected positively on the scenario with 88.5% reporting it makes them feel '*really good'* or '*fantastic'* (Figure 4.6).

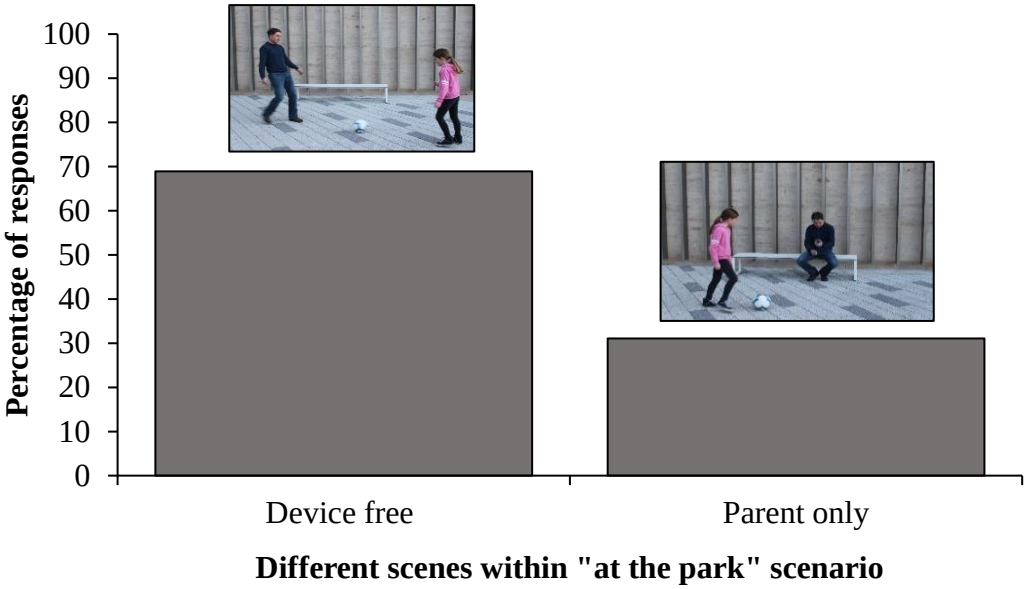

Figure 4.6. Children's responses in percentages of which image they chose as being most applicable to them when "*at the park"* with their parent.

Of the remaining 31.1% of children who opted for the image of the parent using an electronic device, 38.3% said the scenario makes them feel '*awful'* or '*not very good'*, 38.3% said it makes them feel '*okay'*, while 23.4% reported that positive feelings. The image selected did not significantly differ across the children's sex (X^2 (1) = 1.944, p = 0.163) or school deprivation (X^2 (1) = 0.907, p = 0.341) for the '*at the park'* scenario.

4.7.3. (c) Meal Times

The device free image (74.8%) was most commonly selected by the children. Of these children, the majority reported that this happens '*all of the time*' (65.2%) rather than *'most of the time'* (34.8%). The majority of children who chose this image (90.3%) said this made them feel '*really good'* or '*fantastic*', while 8.8% reported that this makes them feel '*okay',* and 0.9% reported '*not very good'*(Figure 4.7).

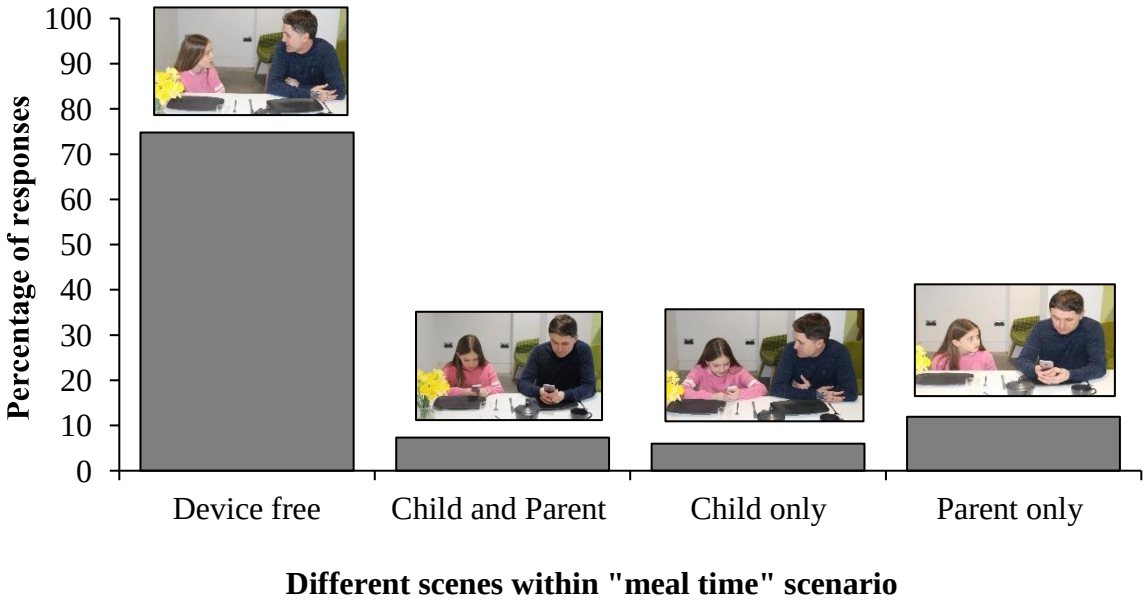

Figure 4.7. Children's responses in percentages of which image they chose as being most applicable to them when "*eating meals"* with their parent.

The second most chosen image for this scenario was the parent on the device only image (11.9%). Over half of these children (52.9%) said it makes them feel '*not very good*', while 23.5% said it makes them feel '*okay*' and 17.6% said it makes them feel '*fantastic*' (17.6%). Conversely, 5.9% and no children reported 'awful' and 'really good', respectively. The third most chosen image was the image of the child and parent using a device (7.3%). The feelings children associated most with this image were '*okay'* (54.5%) and '*really good'* (27.3%). A smaller proportion of children reported that it makes them feel *'fantastic'* (18.2%) and no children reported that it makes them feel '*awful*' or '*not very good*'. The image of the child only using a device was least applicable (6.0%). Over a third of these children (33.3%) reported it makes them feel '*okay',* while over half reported this makes them feel '*really good'* or '*fantastic'* (55.5%). The responses of children did not significantly differ across children's sex (X^2 (3) = 0.149, p = 0.985) or school deprivation (X^2 (3) = 0.651, p = 0.885) for the '*meal time'* scenario.

4.7.4. (d) Walks

The device free image was most commonly selected by children (74.2%). Of those who chose the device free image, 56.8% said it happens '*all of the time'* and 43.2% said '*most of the time'*. Positive feelings were reported towards the image (91.9%; '*really good'*:

40.5%; '*fantastic'*: 51.4%) and the remaining 8.1% said they felt '*okay*' (Figure 4.8).

F*igure 4.8.* Children's responses in percentages of which image they chose as being most applicable to them when "*walking"* with their parent.

The second most chosen image was the image of the parent only using an electronic device with 15.2% choosing this image as most applicable. The feelings children associated most with this image were '*not very good'* and '*okay'* equally (39.1%). Over a tenth reported this makes them feel '*fantastic'* (13.0%) and an equal amount of children who chose this image said this makes them feel '*awful*' or '*really good'* (4.3%). The third most chosen image for the scenario was the image of the child only using a device (6.0%). The majority of children who chose this image for the scenario said it makes them feel '*okay'* (88.9%). A minority of those who chose the image said it makes them feel '*really good'* (11.1%) and no children who chose the image said it made them feel '*awful'*, '*not very good'* or '*fantastic*'. Moreover, only 4.6% of children opted for the image of both the child and parent using a device. Those who chose this image, 100% of those children reported this happens '*most of the time*'. Generally positive responses was given to how the image makes them feel (*okay:* 42.9%; *really good*: 14.3%; *fantastic*: 28.6%). Children's choice of picture did not significantly differ according to children's sex (X^2 (3) = 2.353, p = 0.503) or school deprivation (X^2 (3) = 3.315, p = 0.346) for the '*walking'* scenario.

4.8. Summary of Key Findings of Children's Perceptions of Device Use

- The most popular responses by children on the time they reported spending using devices the evening before were less than one hour or two hours (23.5%)
- Children reported mobile phones to be the most used device by children and parents (children: 58.8%; parents: 86.5%)
- Watching videos was the more prevalent reason for children's device use (97.3%)
- Parental technoference was reported most often during conversations (51.8%)
- Parental technoference was associated with: attachment ($p = 0.031$), internalising behaviour ($p = 0.006$), externalising behaviour ($p = 0.001$) and parental warmth ($p < 0.001$)

Chapter Five – Results: Parent and Child's Perceptions of Each Other's Device Use

5.1. Introduction

This chapter describes the findings of the parent-child dyads: matched pairs of both a parent and their child who had both completed the questionnaire. This chapter compares the answers of both parents and children**.** Throughout this section, when "evening" is mentioned, this refers to the time between when the child finished school and went to sleep the evening before the questionnaire session. Further for this chapter, "deprivation" is based on parents' postcodes for both cohorts. As a reminder ahead of this results chapter, the key aims/objectives of this study were:

- Child and parent perspectives on their own and each other's device use
- Child and parent perspectives on parental technoference
- Child and parent perspectives on the effects of parental device use on parent-child attachment
- Children's perspectives on parental device use and children's internalising and externalising behaviour

5.2. Dyads Sample

A total of 173 children and their parents had consented to take part to complete their respective questionnaires. The total number of matched pairs in which both the parent and child had completed their respective questionnaires was 91. Following data cleaning in which parents and child who had not completed the questions of; age, gender and the time they spent using devices the evening before were removed from the sample, the total sample of parent-child dyads came to 86.

The majority of children in the sample were female (86%) and the majority of the parents in the sample were the children's mothers (79.1%). The other 4.7% of the sample included caregiving roles such as; Grandmother or aunt. The majority of the sample were also between the ages of 30 and 49 (91.8%). Over half of the children's sample were girls (60.5%) and the mean age of the children was 10. Parents were also asked to give their postcode to identify the deprivation status of their area. Nearly seven in ten people reported living in areas considered to be amongst the 50% least deprived areas (69.0%) and the remaining 31% lived in the 50% most deprived areas (Table 5.1).

Table 5.1.

Table to illustrate the characteristics of the 86 parent-child dyads parents and children in the parent-child dyads.

Demographics	**%**	
	Parent	**Child**
Gender (%)		
Male/Boy	14	39.5
Female/Girl	86	60.5
Age (%)		
8 years	-	5.8
9 years	-	31.4
10 years	-	44.2
11 years	-	18.6
18-29 years	4.7	-
30-39 years	45.3	-
40-49 years	46.5	-
50 + years	3.5	-

5.3. Parent's Use of Electronic Devices the Evening Before

5.3.1. Time Spent Using Devices

Twice as many children than parents reported that parents spent more than two hours using a device the evening before (children: 46.5%; parents: 22.1; Figure 5.1) and the difference between parent and child responses was statistically significant ($Z = - 4.591$, $p < 0.001$, $r = -.50$).

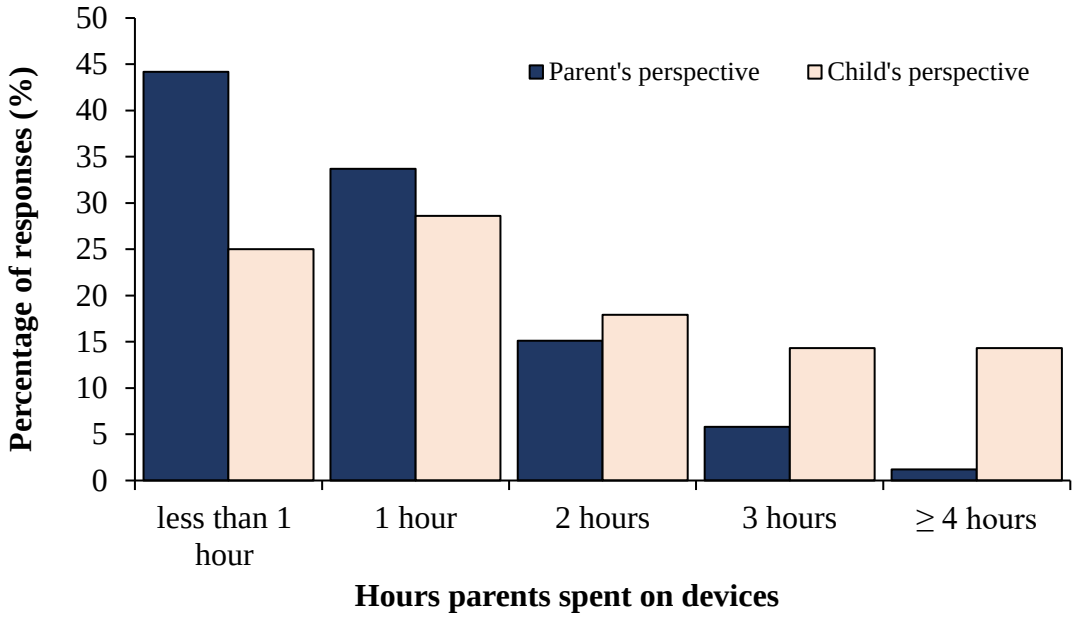

Figure 5.1. Child and parent perceptions of the time parents spent using devices the evening before the questionnaire session, in percentage.

A significantly higher proportion of parents who lived in the less deprived areas reported spending less than two hours on devices (86.2%) than those living in the more deprived areas (61.6%; X^2 (4) = 10.560, p = 0.032). Children's responses to this question did not significantly differ across deprivation level or sex, and parent's responses did not significantly differ across the sex of their child for how much time parents spent using electronic devices the evening before (see Appendix 5.1).

5.3.2. Devices Used

More parents than children reported that parents had used one device or less during the evening (parents: 70.9%; children: 45.4%), whereas nearly twice as many children than parents reported that their parent had used two or more devices (parents: 29.1%; children: 54.7%). e difference between parental and child responses for the number of devices used by parents was significant (Z = - 4.260, p < 0.001, r = -.46). Moreover, all parents (100.0%) reported using a mobile phone the evening before. Children were predominantly in agreement with parents (90.7%) that mobile phones were most commonly used by their parents (Figure 5.2).

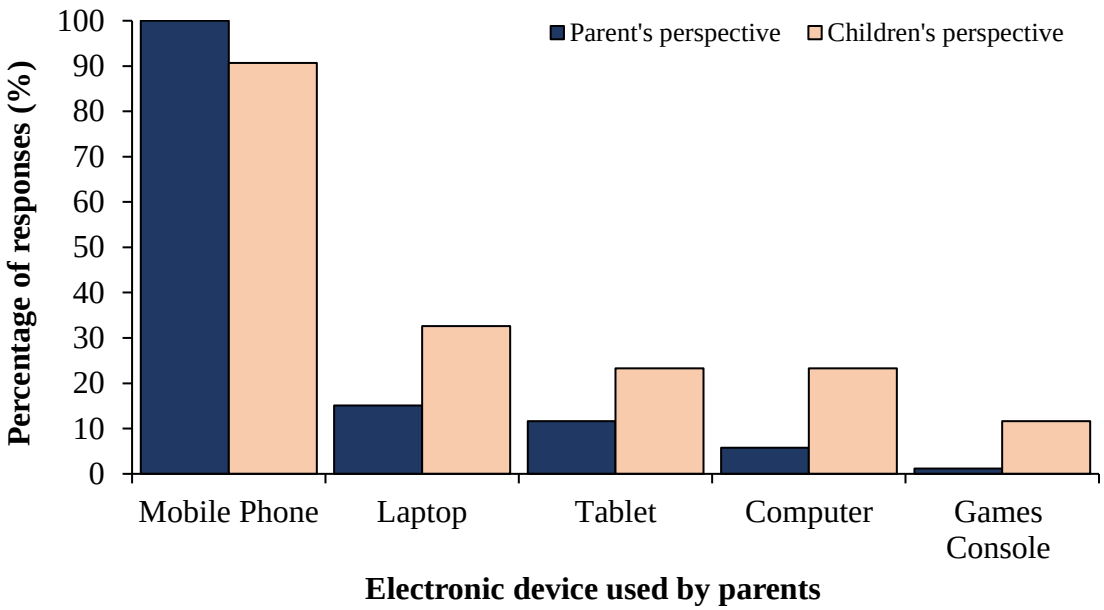

Figure 5.2. Child and parent responses to which devices parents had used the evening before the questionnaire session, in percentage.

A significantly larger proportion of parents in the less deprived areas reported using a tablet (17.2%) compared to those living in the more deprived areas (0.0%; X^2 (1) = 5.089, p = 0.024). There was also a significant difference by deprivation across children's perspectives of parents tablet use, as more children with parents living in less deprived areas reported that their parent had used a tablet the day before (32.8%) compared to those with parents living in the more deprived areas (3.8%; X^2 (1) = 8.273, p = 0.004). There were no significant deprivation differences for the use of any other device other than the tablet for children's reports, and there were also no significant differences between children's sexes (Appendix 5.2). There were also no statistically significant differences in parent's reports of the devices they had used according to their child's sex or deprivation (Appendix 5.3).

5.4. Children's Use of Electronic Devices the Evening Before

5.4.1. Time Spent Using Devices

Figure 5.3 illustrates that a similar proportion of parents and children reported that children had spent less than two hours using a device the evening before (parents: 57.7%; children: 53.5%). The relationship between parent and child reports on children's device use was not statistically significant (Z = -1.758, p = 0.079, r = -.19). No significant differences

were found across parent or children's reports on children's device use across child's sex or deprivation level (Appendix 5.4).

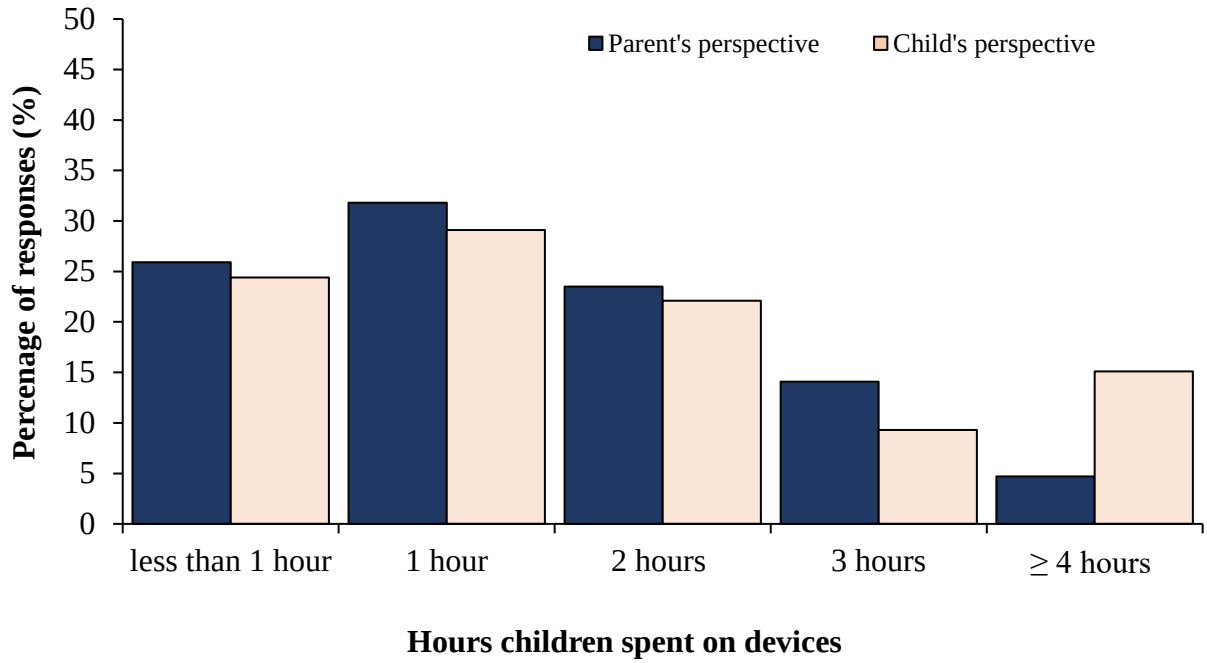

Figure 5.3. Child and parent perceptions of children's device use the evening before.

5.4.2. Devices Used

A larger proportion of children than parents reported that children had used two or more devices the evening before (children: 57.1%; parents: 36.1%). Parents were more of the perception that their child had used one device or less that evening (parents: 64.0%; children: 43.1%). The difference between parent and child perceptions on number of devices children had used was statistically significant (Z = - 3.919, p <.001, r = -.42).

A higher number of parents of girls reported that their child had used two or more devices (96.1%) than parents of boys (55.8%; X^2 (4) = 15.753, p = 0.003). However, boys reported using more devices than girls with 47.1% of boys having reported using two devices and 23.5% having reported using three, whilst 38.5% of girls reported using two devices and 5.8% of girls having reported using three devices (X^2 (5) = 12.434, p = 0.029). There were no significant differences by deprivation level in the number of devices used by children as reported by either parents (X^2 (4) = 2.387, p = 0.665) or children (X^2 (5) = 3.885, p = 0.057).

Parents and children agreed that the device children used most was a mobile phone (parents: 55.8; children: 61.6%). Parents and children also agreed that a computer was the device that children used the least (parents: 3.5%; children 7.0%; Figure 5.4).

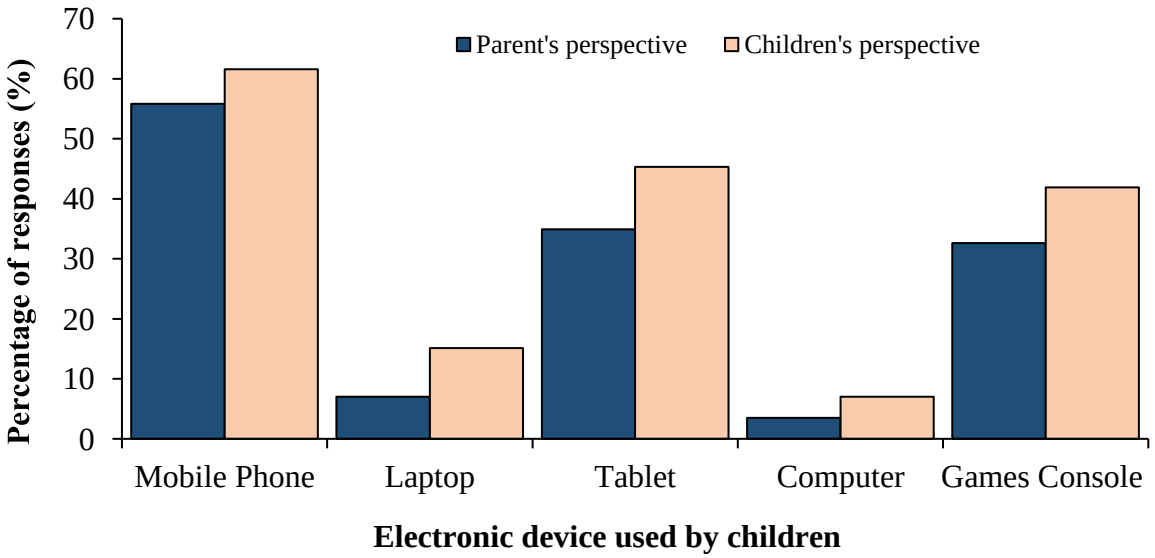

Figure 5.4. Percentage of parent's and children's perspectives of devices used by children the evening before.

A significantly higher proportion of parents of girls reported that their child had used a mobile phone (65.4%) compared to parents of boys (41.2%; X^2 (1) = 4.885, p = 0.027). No parents with children who were boys reported that their child had used a laptop whereas a small percentage of parents of girls did (11.5%) and the association was statistically significant (X^2 (1) = 4.217, p = 0.040). There were no significant differences across parents of girls or parents of boys for any of the other three devices. A higher proportion of parents who reported living in the more deprived areas reported that their child has used a mobile phone the evening before (73.1%) compared to those living in the less deprived areas (46.6%; X^2 (1) = 5.099, p = 0.024). There were no other significant deprivation differences in parental reports for any other device they reported their child had used (see Appendix 5.5). A higher percentage of boys reported they had used a games console (70.6%) compared to girls (23.1%; X^2 (1) = 19.068, p < 0.001). There were no other significant sex differences as to which devices children had reported using. There were no significant deprivation differences in children's reports for any of the devices (see Appendix 5.6).

5.5. Parent and Child Perceptions of Device Use Generally

5.5.1. Parental Distraction by Electronic Devices

Parents and children were asked to report on how often the parent uses electronic devices in four specific scenarios: (1) when the child is talking to their parent, (2) when the child is eating meals with their parent (3) doing activities with their parent and (4) being picked up from school by their parent.

5.5.1.1. Eating Meals Together

The highest proportion of responses by both parents and children were that parents 'never' use an electronic device when eating meals with their children. However, a higher proportion of parents (65.1%) compared to children (47.1%) gave this response. Whilst only a small proportion of parents (2.3%) reported they use a device during meal times 'most of the time' or 'all of the time', a higher proportion of children chose these responses (17.6%; Figure 5.5). The relationship between parent and child responses for this question was statistically significant (Z = -3.329, p = 0.001, r = -.36).

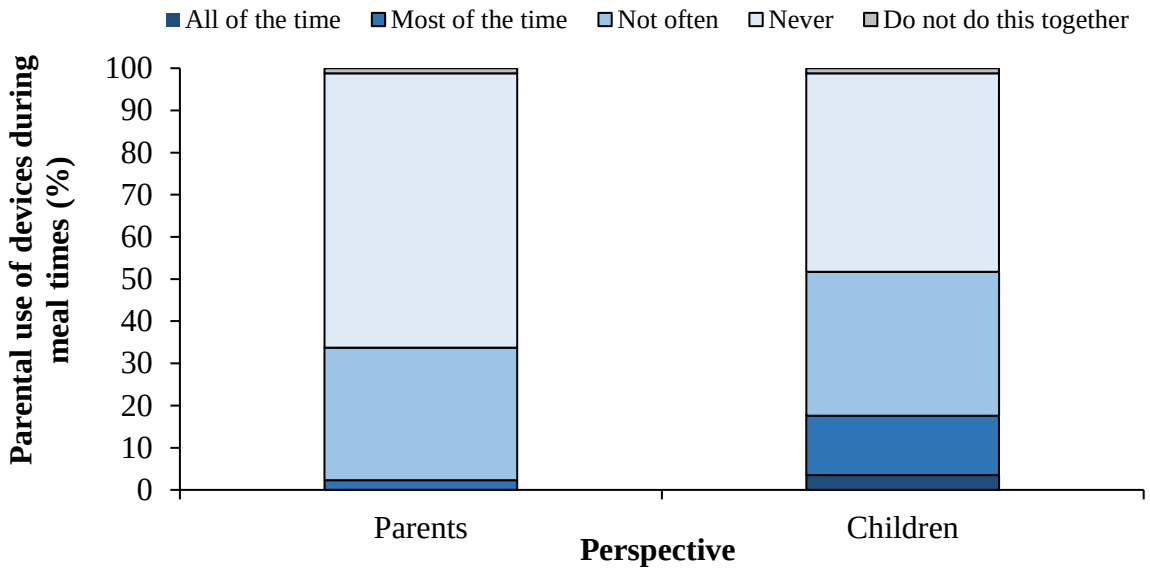

Figure 5.5 .Percentage of children and parents responses on whether parents use an electronic device during meal times.

Parental responses did not significantly differ across deprivation (X^2 (3) = 7.316, p = 0.062) or child's sex (X^2 (3) = 4.557, p = 0.207) in their responses on device use during meal times. Children's responses did not significantly differ across deprivation (X^2 (4) = 3.874, p = 0.423) or sex (X^2 (4) = 3.874, p = 0.423).

5.5.1.2. Doing Activities Together

The most chosen response by both parents and children when asked about times doing activities together was that parents '*never*' use an electronic device when doing activities with their child, although a higher proportion of parents reported this (37.2%) compared to their children (31.8%).

A higher proportion of children compared to parents reported that parents use an electronic device '*most of the time'* or '*all of the time'* when doing activities with their child (children: 27.1%; parents: 8.1%; Figure 5.6). The difference in parent and child responses on how often the parent uses an electronic when doing activities with their child was statistically significant (Z = -3.226, p = 0.001, r = -.35).

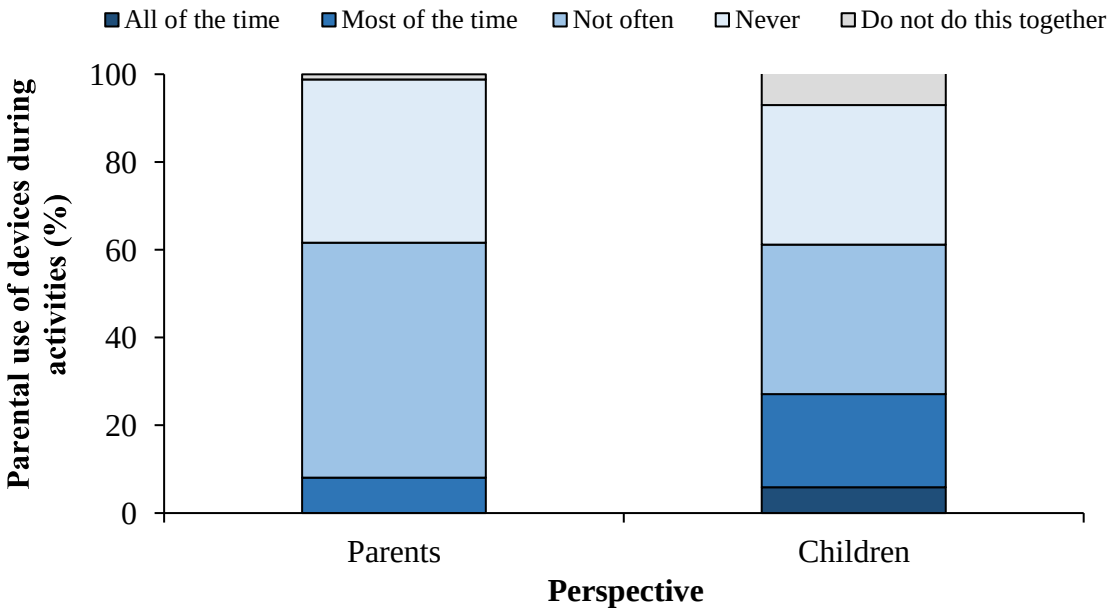

Figure 5.6. Percentage of parental and child responses on how often the parent uses an electronic device when doing an activity with their child.

Children's responses did not significantly differ across deprivation levels (X^2 (4) = 1.186, p = 0.880) or children's sex (X2 (4) = 3.510, p = 0.476) and parents responses did not significantly differ across deprivation (X2 (3) = 2.753, p = 0.431) or child's sex (X2 (3) = 2.888, p = 0.409) for the activities scenario.

5.5.1.3. Talking to Each Other

A higher proportion of parents (64.0%) than children (36.9%) reported that parents do '*not often'* use an electronic device when their child is talking to them. Four in 10 children (39.3%) reported that their parent uses an electronic device when they are talking to their parent *'most of the time'* or '*all of the time*' compared to less than one in 10 parents (8.1%). A higher percentage of parents compared to children said that parents *'never'* use an electronic device when their child is talking to them (parents: 27.9%; children: 23.8%; Figure 5.7). The relationship between parent and child responses for this question was significant (Z = -3.658, p = <.001, r = -.40).

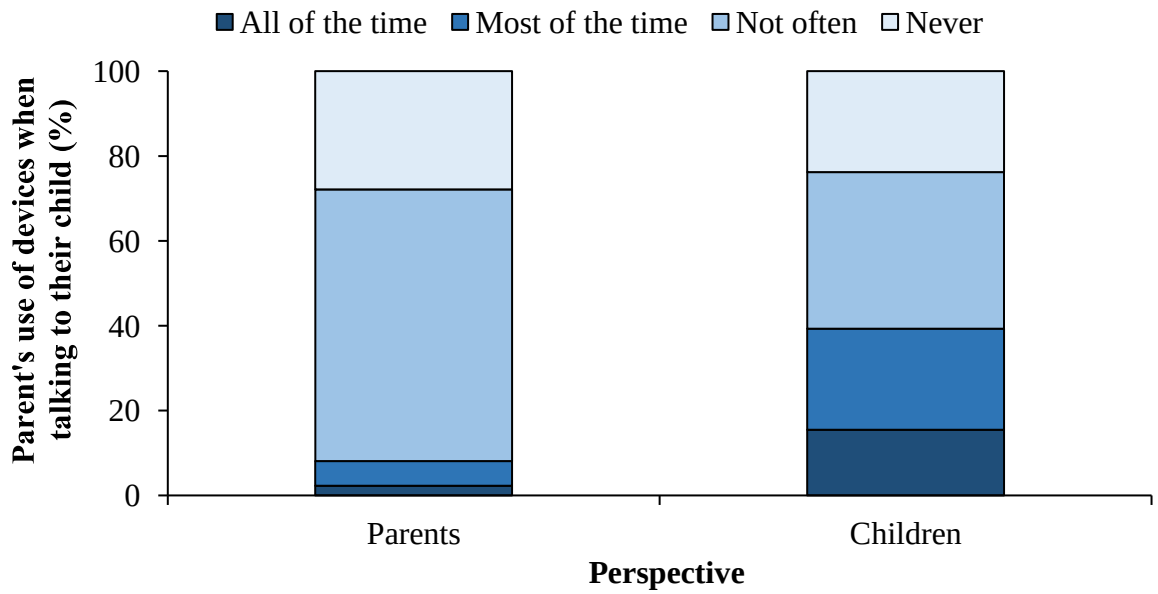

Figure 5.7. Percentage of parental and child responses on how often the parent uses an electronic device when they are talking to their child.

The highest proportion of boys said parents do '*not often'* use an electronic device when they are talking to their child (45.5%) whereas the highest proportion of girls said this happens '*most of the time'* (35.8%) and the difference in responses between both sexes was significant (X^2 (3) = 9.697, p = 0.021). Parents' responses did not significantly differ according to their child's sex (X^2 (3) = 0.139, p = 0.987).

For children with parents living in the more deprived areas, the most common response given was that parents use an electronic device when their child is talking to them '*most of the time'* (34.6%) whereas for children of parents living in the less deprived areas,

the most common response given was that parents do *'not often'* (42.9%) use a device when talking to their child and the difference was statistically significant (X^2 (3) = 8.510, p = 0.037). Whilst children's responses differed significantly across sex and deprivation, parental responses did not significantly differ across deprivation (X^2 (3) = 1.098, p = 0.778) for this question.

5.5.1.4. Being Picked up From School

As seen in Figure 5.8, the majority of parents reported that they *'never'* use an electronic device when picking their child up from school (61.6%). Only 34.5% of children reported this *'never'* happens. Opposite to this, 10.5% of parents reported that they use a device when picking their child up from school '*most of the time'* or '*all of the time'* compared to over three times as many children (36.9%). Child and parent responses differed significantly (Z = - 4.146, p < 0.001, r = -.45) and there were no significant differences in responses by deprivation or child's sex for neither parents nor children's responses (Appendix 5.7).

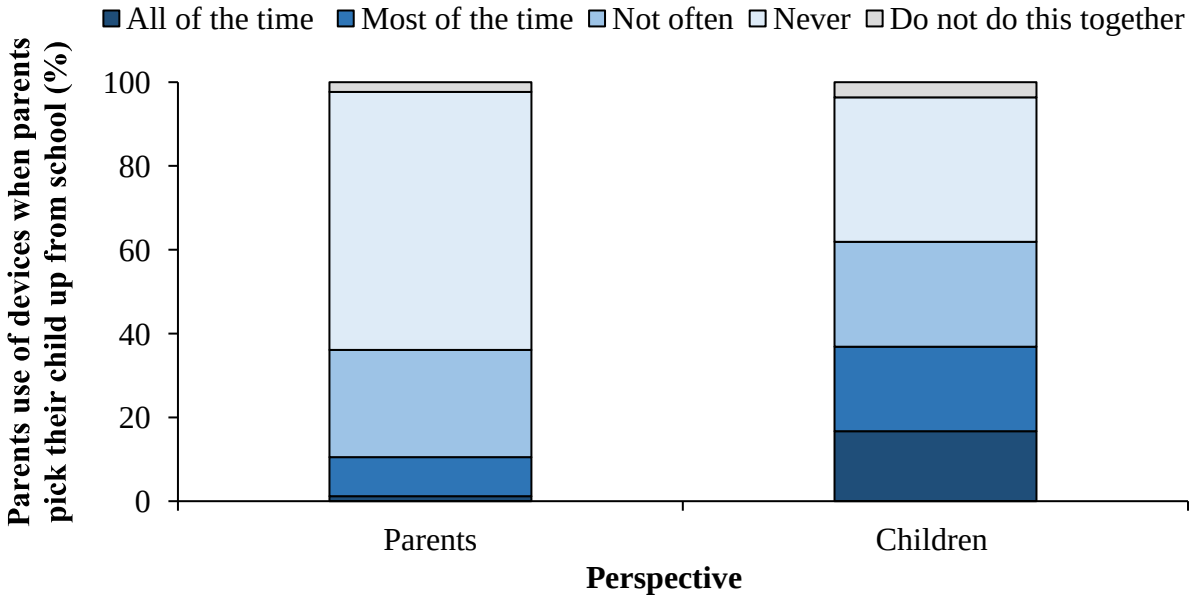

Figure 5.8. Percentage of children and parent's responses on whether parents use a device when picking their child up from school.

5.6. Family Rules of Electronic Devices

A similar proportion of parents and children reported that their family had rules for how much time children spend using electronic devices although this was not significant (Z = -

.898, $p = 0.369$, $r = -.10$). Parental responses to whether children had rules about the time they spend using devices did not significantly differ according to deprivation (X^2 (1) = 3.019, p = 0.082) or the sex of their child (X^2 (1) = 0.320, p = 0.572). Children's responses about whether they had family rules about the time they spend using devices did not significantly differ according to deprivation (X^2 (1) = 1.231, p =0.267) or child's sex (X2 (1) = 0.402, p = 0.526).

Parents and children tended to agree on whether or not children had rules about *when* and *where* children use devices (Table 5.2). Over half of parents (59.3%) and children (61.6%) reported that they did not have rules about *where* children used electronic devices, although both groups agreed they did have rules about *when* children can use electronic devices (parents: 83.7%; child: 72.1%). Parent and child responses did not significantly differ on whether or not they had family rules about *where* children use devices (Z = -.324, p = 0.746, r = -.03) or *when* children use devices (Z = 1.890, p = 0.059, r = .20). Responses of both parents and children for rules about when and rules about where did not significantly differ according to deprivation or child's sex (Appendix 5.8).

Table 5.2.

Parent and child perspectives on different types of family rules about device use.

	Percentage that said "yes" to these rules	
Family rule type	**Children**	**Parents**
Time children spend using devices	63.4	67.1
Where children used devices	61.6	59.3
When children use devices	72.1	83.7
Time parents spend using devices	17.4%	20.9

Parents responses on whether or not they had rules for themselves did not significantly differ across child's sex (X^2 (1) = 1.316, p = 0.251) or deprivation (X^2 (1) = 0.061, p = 0.805).

Over three quarters of parents believed that parents should be given guidance on their use of electronic devices around children (77.9%) and most children believed that parents should have rules about the time they spend using devices (60.5%). Parents views did not significantly differ across deprivation levels (X^2 (1) = 0.005, p = 0.946) or their child's sex

(X^2 (1) = 0.074, p = 0.786). Children's views did not significantly differ across deprivation (X^2 (1) = 0.504, p = 0.478) or sex (X^2 (1) = 0.494, p = 0.482)

5.7. Perceptions of Time Spent Using Devices

Over half of parents reported that their child would think the amount of time their parent spends using electronic devices is '*about right'* whereas most children had this opinion of their parent's use (parents: 54.1%; children: 83.1%). A higher number of parents thought their child would say that their parent spends '*too much'* time using devices than what children did say (parents: 37.6%; children: 13.3%). A minority of 8.2% of parents thought that their child would say their parent does not spend enough time using electronic devices, while only 3.6% of children had this view of their parent's use. There was a significant relationship between children's views and parental views on the perceptions of time parents spend using devices **(**Z = - 3.048, p = 0.002, r = -.34).

Just over half of parents reported that the amount of time their child spends using electronic devices is *'about right'* (52.4%) and over half of children believed their parent had this opinion (60.2%). Just over half of parents reported that the time their child spends using devices is '*too much'* (46.4%) while just over a third of children believed their child had this opinion (34.9%). A smaller minority of children and parents believed that children don't spend enough time using devices (parents: 1.2; children: 4.8%). A higher proportion of children of parents who reported living in the less deprived areas reported that the time their parent spends using devices is *'about right'* (89.5%) compared to those living in more deprived areas (66.7%; X^2 (2) = 7.183, p = 0.028). There was no significant association between child and parent views on their opinions on children's use of electronic devices (Z = -.552, p = 0.581, r = -.06)**.**

5.8. Perceptions of Four Device-based Scenarios

As mentioned in the previous chapter, children were asked to think of four scenarios together: (a) being at home, (b) being at the park (c) eating meals together and (d) walking together. Parents were also given the same scenario questions, and were asked which photo was most applicable to them and their parent during those times.

5.8.1. (a) At Home

As seen in Figure 5.9, for the '*at home'* scenario, both parents and children chose the image of both child and parent using an electronic device as being the most applicable (parents: 53.1%; children: 41.7%). The majority of parents who chose this photo as being most applicable reported that this happens *'most of the time'* rather than '*all of the time'* (97.4%) and the majority of children agreed ('*most of the time'*: 91.4%; '*all of the time'*: 8.6%). Children and parents both agreed that the image that was least applicable to being at home together was the image of the parent only using a device (children: 10.7%; parents: 2.5%). The association between parent and child responses for this scenario was not significant (Z = -.596, p = 0.551, r = -.07). Child responses to the '*at home'* scenario did not significantly differ across sex (X^2 (3) = 2.345, p = 0.504) or deprivation (X^2 (3) = 1.089, p = 0.780). The parent responses also did not significantly differ across deprivation (X^2 (3) = 5.209, p = 0.157) or the child's sex (X^2 (3) = 0.589, p = 0.899) for this scenario. Child responses to the '*at home'* scenario did not significantly differ across sex (X^2 (3) = 2.345, p = 0.504) or deprivation (X^2 (3) = 1.089, p = 0.780). The parent responses also did not significantly differ across deprivation (X^2 (3) = 5.209, p = 0.157) or the child's sex (X^2 (3) = 0.589, p = 0.899) for this scenario.

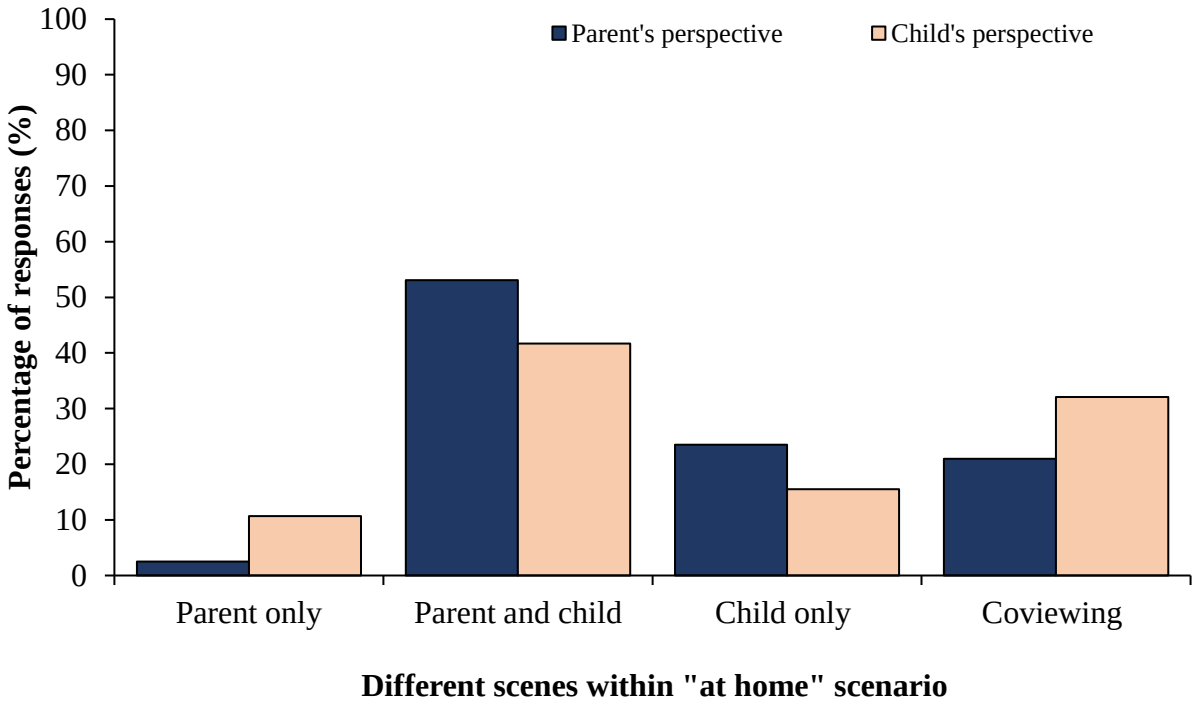

Figure 5.9. Percentage of parent and child responses on which image was most applicable to being at home together.

5.8.2. (b) At the Park

Figure 5.10 illustrates that both children and parents agreed that the image most applicable to being at the park together was the device free image; where neither child nor parent are using a device (parents: 84.5%; children: 78.2%). Nearly a quarter of children chose the image of the parent only using a device (21.8%) while 15.5% of parents chose this image. The association between parent and child responses for this scenario was not statistically significant (Z = -.688, p = 0.491, r = -.08).

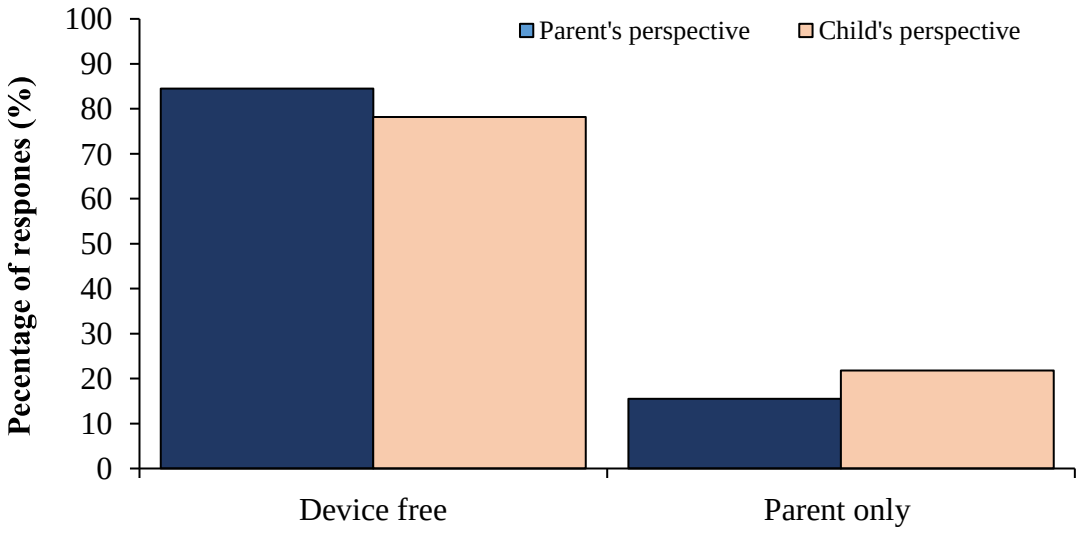

Figure 5.10. Percentage of parent and child responses on which image was most applicable to being at the park together.

Children and parents differed in their views of how often this happens. Over half of parents reported that this happens *'all of the time'* (54.9%) compared to '*most of the time'* (45.1%) whereas over half of children said this happens '*most of the time'* (55.0%) compared to *'all of the time'* (43.3%) for the park scenario.

Whilst both parents of girls and boys agreed that the most applicable image for the scenario was the device free image (parents of girls: 74.5%; parents of boys: 100.0%) over a quarter of parents of girls chose the image of the parent only using a device (25.5%) and the difference between sexes was statistically significant (X^2 (1) = 9.952, p = 0.002). Parents in both deprivation categories agreed that the device free image was most applicable to them and their child at the park (more deprived: 72.0%; less deprived: 89.5%). Despite this, 28.0% of parents living in the more deprived areas chose the image of the parent only using a

device, compared to 10.5% of those living in less deprived areas. The difference in parent's responses across deprivation levels was statistically significant (X^2 (1) = 3.977, p = 0.046). A similar pattern of deprivation differences was identified in the children's responses. Whilst children in the less deprived and more deprived areas chose the device free image as being most applicable (more deprived: 60.9%; less deprived: 84.9%), a higher number of children in the more deprived areas chose the image of the parent only using a device (more deprived: 39.1%; less deprived: 15.1%). The difference in children's responses across deprivation levels was statistically significant (X^2 (1) = 5.336, p = 0.021).

5.8.3. (c) Meal Times

Parents and children agreed that the device free image was most applicable to meal times with 93.0% of parents choosing the image and 78.3% of children. The majority of both parents and children also agreed that this happens '*all of the time'* during meal time (parents: 77.5%; children: 81.5%) rather than '*most of the time'* (parents: 22.5%; children: 18.5%). Parents and children deemed the image of both parent and child using a device during meal time as being least applicable, with no parents having chosen this image, and only 3.6% of children having chosen the image (see Figure 5.11). The association between parent and child responses for this scenario was statistically significant (Z = -2.656, p = 0.008, r = -.29).

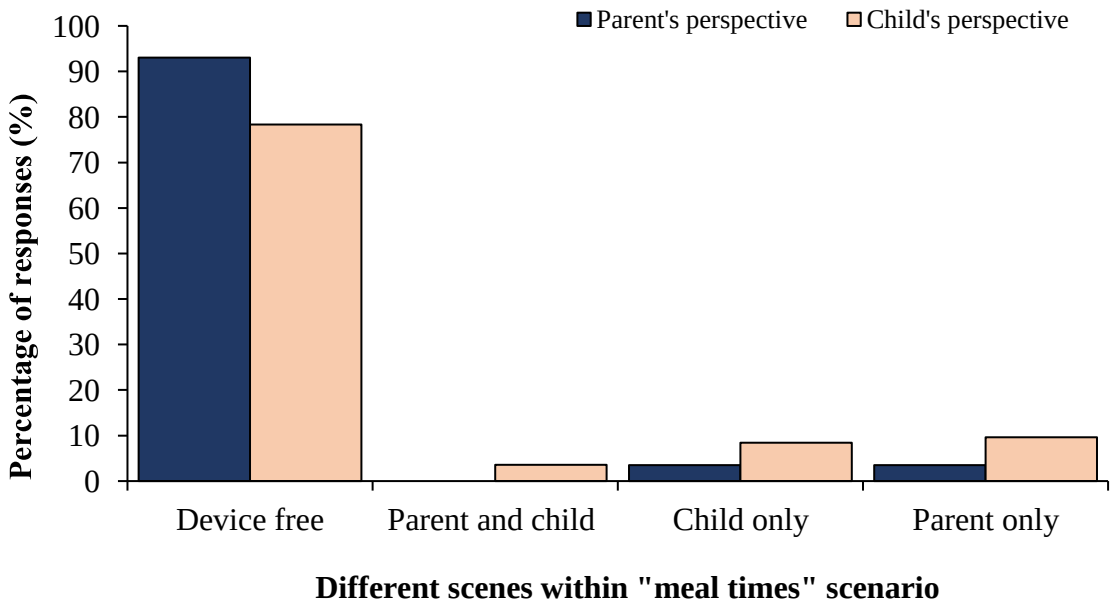

Figure 5.11. Percentage of parent and child responses on which image was most applicable to eating meals together

Parents in the less and more deprived areas agreed that the device free image was most applicable (more deprived: 84.6%; less deprived: 96.6%) and a similar percentage chose the image of only the child using a device (more deprived: 3.8%; less deprived: 3.4%). However, 11.5% of parents living in the more deprived areas chose the image of the parent only using device in contrast to no parents living in the less deprived areas having chosen the image. The differences in responses across deprivation level was significant (X^2 (2) = 6.976, p = 0.031). Parents responses did not significantly differ according to child's sex (X^2 (2) = 2.893, p = 0.235). Children's responses did not significantly differ across sex (X^2 (3) = 3.405, p = 0.333) or deprivation (X^2 (3) = 2.298, p = 0.513) for the meal time scenar**io.**

5.8.4. (d) Walks

Children and parents chose the device free image as being most applicable (parents: 89.4%; Children: 76.2%). Most parents who chose this image said it happened 'all of the time' (64.0%) compared to 'most of the time' (36.0%). Children's views were quite evenly split with just over half of children reporting this happens 'all of the time' (50.8%) compared to just under half that reported this happens 'most of the time' (49.2%). Both parents and children deemed the image of the parent and child using a device as being least applicable to the walking scenario (parents: 0.0%; children: 3.6%; Figure 5.12). There was no significant difference in parent and child responses for this scenario (Z = -.858, p = 0.391, r = -.09).

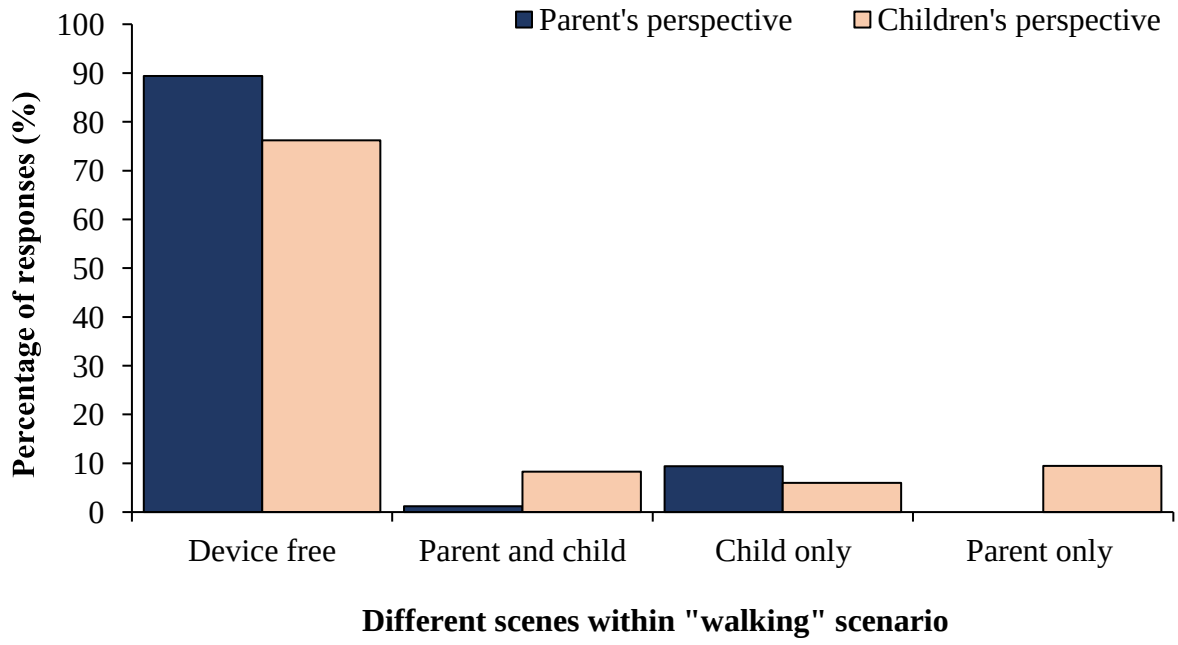

Figure 5.12. Graph showing parents and children's perceptions of parent and children's electronic device use when walking together.

Children with parents who reported living in both more and less deprived areas chose the device free image as being most applicable to this scenario (more deprived: 60.0%; less deprived: 82.1%). A higher percentage of those with parents living in the more deprived areas chose the image of both parent and child using a device compared to those with parents living in the less deprived areas (more deprived: 20.0%; less deprived: 3.5%) and the same pattern could be seen for the image of the parent only using a device (more deprived: 16.0%; less deprived: 7.0%). The differences in children's responses according to deprivation were found to be statistically significant (X^2 (3) = 8.392, p = 0.039). There was no significant association between deprivation and parent's responses (X^2 (2) = 3.020, p = 0.221). There was no significant association between child's sex and the responses of parents (X^2 (2) = 0.707, p = 0.702) or children (X^2 (3) = 0.397, p = 0.941) for this scenario.

5.9. Summary of the Key Points of the Dyads' Perceptions of Device Use

- The highest proportion of parents (44.2%) reported that they spent less than an hour using devices during an evening, whilst the highest proportion of children (28.6%) reported their parent had spent an hour
- Parents living in more deprived areas spent more time using devices during an evening (61.6%) than those living in less deprived areas (86.2%)
- The highest proportion of parents and children agreed that children spent an hour using devices during an evening (parents: 31.8%; children: 29.1%).
- The time children reported parental technoference occurring most often was when talking to their parent (39.3%)
- There was a general agreement between parents and children that meal times doing activities together, and walking together were the times both were least likely to use a device
- Parents and children agreed that both of them are likely to use a device when they are at home together (parents: 53.1%; children: 41.7%)

Chapter Six – Results: Parents' Perceptions of Electronic Device Use

6.1. Introduction

This chapter presents the results of questions that were only included in the parent's questionnaire. The deprivation measured used in this chapter refers to the home deprivation as parents provided post codes which enabled the categorisation of deprivation quintiles in line with the Welsh Index of Multiple Deprivation (WIMD; Welsh Government, 2014). As a reminder ahead of this results chapter, the key aims/objectives of this study were:

- Child and parent perspectives on their own and each other's device use
- Child and parent perspectives on parental technoference
- Child and parent perspectives on the effects of parental device use on parent-child attachment
- Children's perspectives on parental device use and children's internalising and externalising behaviour

6.2. Parent's Sample

A total of 183 parents gave their consent to take part. Due to the absence of their children on the day of the questionnaire session, a total of 173 children received a parent's questionnaire to distribute to their parents on the day of the questionnaire session. Of the 173 parents, 91 parents (52.6%) completed and returned the questionnaire. Three parents were removed from the data due to missing information on the demographic questions of: age, gender and how much time they had spent using electronic devices between after their child had finished school and going to bed the evening before the questionnaire session. Therefore, a final analytical sample of 88 parent's data was obtained (Table 6.1).

Table 6.1.

Table demonstrating demographic information of the 88 parents.

Demographics		%
Qualifications	No qualifications	1.2
	Secondary school or equivalent	27.9
	College/sixth form or equivalent	29.1
	Higher education/University qualifications	41.9
Caregiving role	Mother	80.2
	Father	15.1
	Other	4.7
Socioeconomic status of home postcode	50% most deprived area	31.4
	50% least deprived area	68.6

6.3. Activities Parents Reported Engaging in Using Electronic Devices

Parents were asked how often they use devices for a list of activities. Texting was the most regularly reported activity (69.8%), closely followed by searching the internet (67.8%) and social media (57.5%). Around half of parents reported never using an electronic devices to play a game (50.6%), while three quarters (78.2%) reported using devices for work purposes '*sometimes'* or *'often'* (Table 6.2).

Table 6.2

Table to illustrate how often parents use electronic devices for the following activities.

Activity	**Frequency (%)**		
	Never	**Sometimes**	**Often**
Work purposes	21.8	23.0	55.2
Texting	1.2	29.1	69.8
Online shopping	10.5	52.3	37.2
Searching the internet	1.1	31.0	67.8
Social calls	8.0	65.5	26.4
Social media	6.9	35.6	57.5
Playing a game	50.6	36.8	12.6

6.4. Reducing Parental Device Use

Nearly nine in 10 parents reported they '*sometimes*' (47.7%) or '*often'* (38.4%) try to cut back on the time they spend using electronic devices. A minority of 2.3% reported that they '*never'* try to cut back on their usage when they are with their child, and 11.6% reported this does not happen often. Over a third of parent's report they *'often'* succeed when trying to cut back on usage (36.5%) and over a fourth reported succeeding '*sometimes'* (42.4%). A smaller percentage of 12.9% reported '*never*' succeeding in reducing usage, and 8.2% of parents reported not having tried. Responses on whether or not parents had tried to cut back on usage did not significantly differ across the sex of their children (X^2 (3) = 3.213, p = 0.360) or deprivation level (X^2 (3) = 5.696, p = 0.127).

6.5. Co-viewing

Seven in 10 parents (70.4%) reported discussing the content of what they do together when using electronic devices with their child ('*sometimes*': 47.7%; '*often'*: 22.7%). While 19.3% reported that they do not do this often and 10.2% reported *'never'*. Occurrences of coviewing did not significantly differ across the significantly differ according to the sex of the parent's children (X^2 (3) = 1.339, p = 0.720) or deprivation level (X^2 (3) = 2.082 p = 0.556).

6.6. Feelings on a Day without Devices

Parents were asked how they thought they and their child would feel if they had to go a day without using electronic devices. Parents were asked to select from the emotions of; '*anxiety'*, '*happiness*', '*loneliness*', '*relief*', '*boredom*' and '*freedom*' as to whether they think they/their child would or would not feel each emotion. Parents were allowed to choose as many emotions as they felt were applicable.

6.6.1. Parent's Feelings

If they had to spend a day without using electronic devices, 55.8% of parents reported they as parents would feel freedom, and 44.2% and 43.0% reported that they would feel '*relief*' and *'happiness'*, respectively. A higher proportion of parents of boys reported that they as parents would feel '*happiness'* (62.9%) compared to parents of girls (29.4%; X^2 (1) = 9.471, p = 0.002). Nearly three quarters of parents of boys reported they would feel

'freedom' (71.4%) compared to under half of parents of girls (45.1%; X^2 (1) = 5.835, p = 0.016). Parental responses on how they would feel did not significantly differ according to deprivation (Appendix 6.1).

6.6.2. Parents Perceptions of Children's Feelings

The majority of parents (76.7%) felt that their child would feel *'boredom'* if they spent a day without electronic devices, while 24.4% thought their child would feel *'happiness'*, and 18.6% thought their child would feel *'anxiety'* (Figure 6.1).

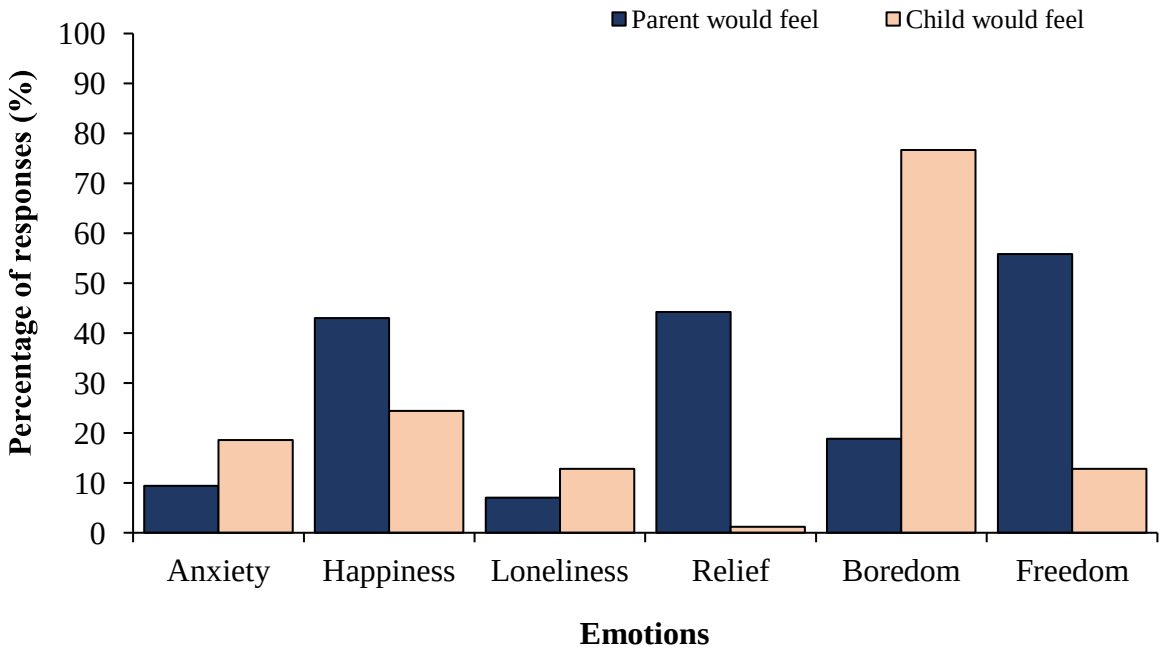

Figure 6.1. Percentage of parent's responses on how they think they and their child would feel during a day without using electronic devices.

A significantly larger proportion of parents of children living in the more deprived areas reported that their child would feel '*loneliness*' (26.9%) compared to parents living in the less deprived areas (6.9%; X^2 (1) = 6.327, p = 0.012). A significantly higher proportion of parents living in less deprived areas reported that their child would feel *'happiness'* (32.8%) compared to parents living in more deprived areas (7.7%; X^2 (1) = 6.016, p = 0.014).No further differences across child's sex or deprivation were found for any of the other feelings (Appendix 6.2).

6.7. Parents Perceptions of Device Use on Children's Skills/Activities

Parents were asked what effects they believed electronic devices have on their children's skills and activities. Nine in 10 parents (89.0%) thought children's physical activity levels were most negatively affected, and five in 10 parents deemed their child's attention (53.7%) and child's behaviour (47.6%) to be negatively affected. In terms of positive effects, parents perceived their child's reading skills as being most positively affected by electronic device use (59.8%) followed by maths and creativity equally with 58.5% of parents giving this responses (Figure 6.2).

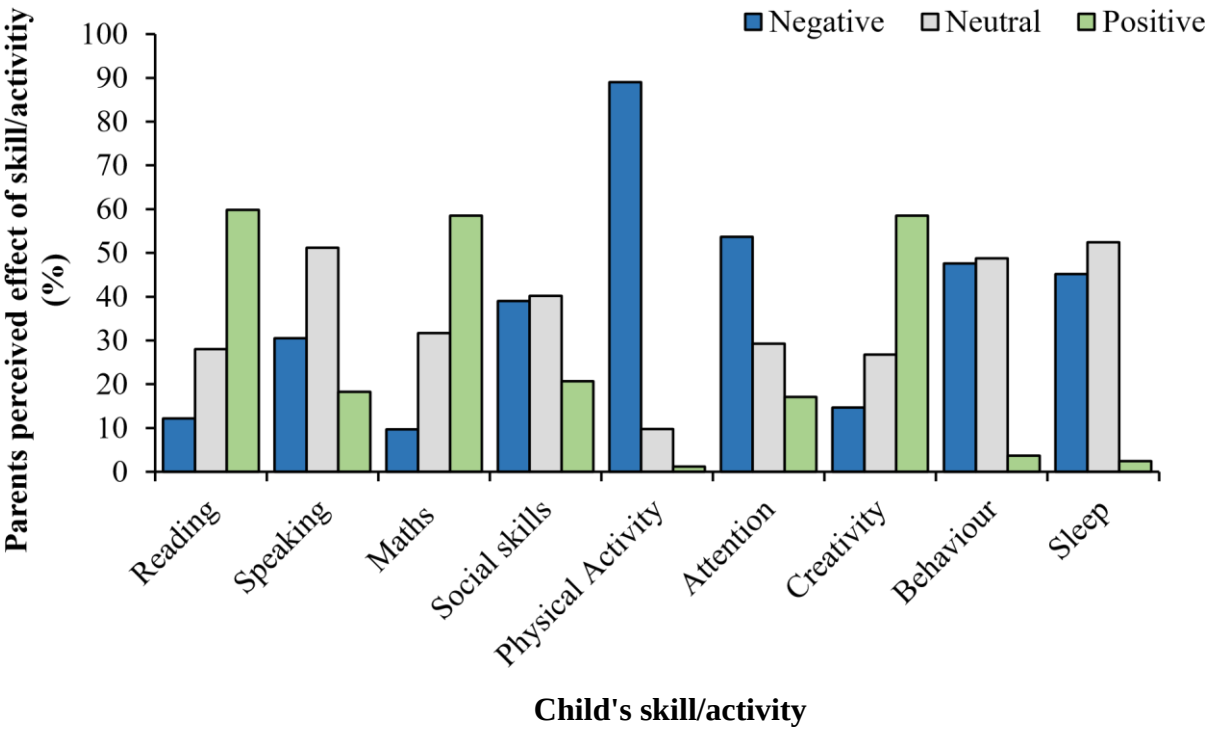

Figure 6.2. Parent's perceptions of the effects of children's device use on various skills/activities.

6.8. Summary of the Key Points of Parent's Perceptions of Electronic Device Use

- The activities parents reported using electronic devices for most were: texting (98.9%), searching the internet (98.8%) and social media (93.1%)
- The feelings parents associated most with a day without electronic devices was freedom (55.8%)
- The feeling parent reported that they thought their child would feel during a day without devices was boredom (76.7%)

- Children's physical activity was perceived as the most negatively affected by children's device use (89.0%)
- Children's reading skills were perceived as being most positively affected by children's device use (59.8%)
- Nearly half of parents reported trying to cut back the amount of time they spend using electronic devices when they are with their child (86.1%)

Chapter Seven: Discussion

7.1. Summary of Study

This study aimed to contribute to the evidence-base on parental use of electronic devices by investigating the topic through the perspectives of children in middle childhood, and comparing children's perceptions with those of their parents. More specifically, the study aimed to investigate a number of topics associated with parental technoference, which has been defined as "*intrusions or interruptions in interactions or time spent together that occur due to electronic devices"* (p.4; McDaniel & Coyne, 2016). The relationship between children's perceptions of parental technoference and attachment with their parent was investigated to further develop earlier research which demonstrated associations between parental technoference and children experiencing weaker feelings of connection (Kushlev & Dunn, 2018), lower levels of parental responsivity (Davidovitch, Shrem, Golovaty, Assaf & Koren, 2018; Radesky et al., 2015) and lower levels of parental warmth (Stockdale, Coyne & Padilla-Walker, 2018).

The association between parental technoference and children's feelings was also investigated, as previous research has found children's feelings to be negatively impacted by parental device use (Steiner-Adair & Barker, 2013). The effects of parental technoference on children's levels of internalising and externalising behaviour were investigated to further explore previous research which demonstrated parental technoference was associated with increasing levels of children's internalising and externalising behaviours (McDaniel & Radesky, 2018). In order to develop a wider understanding of device use within families, children and parents were asked about their own usage, as well as any potential mediating factors such as co-viewing or family rules on device use.

7.2. Children's Perceptions of Electronic Device Use

7.2.1. Use of Devices the Evening Before

The majority of children reported spending two hours or less using electronic devices the evening before completing the questionnaire, although a substantial proportion of children reported spending more than two hours using devices. Boys reported spending more time using electronic devices than girls in general. This may be due to the different types of devices reported as being used by boys. For example, boys were significantly more likely to use a games console than girls. In terms of the type of devices used, mobile phones were the most popular device for children to use which supports the findings by Ofcom (2019b) on the

prevalence of smartphone ownership amongst 8-11 year olds in the UK, which demonstrated that the most used devices by children that age was a mobile phone.

7.2.2. Parental Technoference

The overall score for children's perceptions of parental technoference was relatively low at 1.72, which corresponds to the children feeling that parental technoference does not happen often. Whilst this study focused on the perspectives of children using a modified scale to that previously used, this contrasts previous parental views, with previous studies showing that 48% of parents reported parental technoference to occur three times or more a day (McDaniel & Radesky, 2018) and 78% of adolescence reported parental technoference when interacting with them (Stockdale, Coyne & Padilla-Walker, 2018).

Whilst overall technoference scores were low,technoference scores were made up of four items. Those four items were parental technoference when parents are; picking their child up from school, talking to their child, eating meals with their child, or doing activities with their child. Consideration of the individual items suggests that technoference may occur in some situations. A higher proportion of children (51.8%) reported that their parent uses an electronic device when they are trying to talk to them '*most of the time'* or '*all of the time'*, whereas a smaller proportion of children said the same for being picked up from school (39.7%), meal times (25.6%), or when doing activities together (26.8%). Thus, interruptions may be occurring in specific contexts, but when considered cumulatively the presence of the interruption is not that great.

Conversations together

Conversations between children and their parents are a central part of communication in day-to-day life and occur across a range of environments and contexts (Sztainer, Story & Perry, 2006). With the increased portability of devices (Harmon & Mazmanian, 2013) and increased applicability of device use (Lissitsa & Kol, 2016; Subrahmanyam & Greenfield, 2008) technoference is almost always possible.

Meal times

Previous research has demonstrated that meal times are a problematic time in terms of children's and parent's use of electronic devices (Kellershohn, Walley, West & Vriesekoop, 2018; Radesky et al., 2014). This study did not support findings that meal times are times in

which children and parents are likely to use devices. A total of 11.9% children reported that their parent uses a device during meal times, 7.3% of children reported that both they and their parent use a device, whilst a majority of 74.8% reported that neither use a device during meal times.

Previous studies have focused on meal times in the context of fast-food restaurants (Radesky et al., 2014; Kellershohn, Walley, West & Vriesekoop, 2018), however this study was not context specific and it is likely that children may have focused on meal times at home. Moreover, this suggests that research is needed to explore the difference contexts to contrast the behaviours and investigate the different impacts devices may be having in different situations. This highlights that behaviours where devices are concerned do not generalise across contexts.

Further to this, previous observational studies have been conducted in Canada (Kellershohn, Walley, West & Vriesekopp, 2018) and America (Radesky et al. 2014), which suggests that concepts such as methodology, or cultural differences could be prompting the differences and elements underpinning the cultural differences may require further investigation. Whilst scores of technoference during meal times were lower than during times of talking to parents, over a quarter of children reported it which still demonstrates a prevalent issue of parental device use during meal times which are important for the development of family relationships (Neumark-Sztainer, Story, Ackard & Perry, 2000; Wolin & Bennett, 1984). As trends of device use are still increasing (Ofcom, 2019a) concern for public health will continue to grow.

The lack of devices used during meal times in this study could be explained through the importance parents and children have been found to put on meal times as a time to interact with each other (Neumark-Sztainer, Story, Ackard & Perry, 2000). In support of this, children reported positive feelings about the idea of device free meal times. However, as other studies have found prevalence of technoference during meal times (Kellershohn, Walley, West & Vriesekoop, 2018; Radesky et al. 2014) the association between cognitive beliefs and device use requires further investigation. A simpler explanation would be that the decrease in device use during meal times shown in this study could be a reflection of the recent increase in media attention on electronic device use in the United Kingdom (Ofcom, 2019) as well as guidelines focusing on reducing device use during meal times (Royal College of Paediatrics and Child Health, 2019). It could be postulated that society is becoming more aware of the impact of device use.

Walking/ at the park

Times walking with parents or times at the park with parents were not deemed as problematic time of parental device use by children. This contrasts the findings of previous studies which found device use to be relatively common during times at the playground (Lemish, Elias & Floegel, 2019; Mangan, Leavey & Jancey, 2018). As earlier mentioned, cultural differences could also explain the differences with previous research having been conducted in Australia (Lemish, Elias & Floegel. 2019; Mangan, Leavey & Jancey, 2018). Differences across ages could also be viewed as a contributing factor to the differences of parental device use at the park. Previous studies at the park have used a sample of children aged two to six (Lemish et al. 2019) or children aged zero to five (Mangan et al. 2018). Moreover, this study was not the first to find device use at the park to be a rarity for parents and children, as Hiniker et al. (2015) found similar results in the United States, with only a minority of parent using electronic devices at the park. It is clear that contributing studies have been carried out across different contexts, with children of different ages, across different cultures. Further research is needed to establish a clearer pattern of the prevalence and effects of parental use of electronic devices during time at the park, a time which provides opportunities for children to interact, and learn with their parents (Vygotsky, 1979), as well as develop social skills such as turn taking (Sluckin, 1981).

At home

It appears that time at home together may be the most problematic time for device use for both children and parents. Children and parents in this study agreed that time at home was the time during which they were both most likely to use electronic devices in each other's company. This pattern of similarity in responses could be explained through social learning theory, more specifically, role modelling (Bandura, 1978). Most children and parents reported that neither of them use a device during meal times, times at the park, or when walking together, whereas most parents and children also agreed that they both use a device when at home together. Children themselves have acknowledged that they view their parents as role models in terms of electronic devices use (Hiniker, Schoenebeck & Kientz, 2016) and previous research has found children to model their parents use of electronic devices, with higher levels of parents device use being associated with higher levels of children's device use (Hefner, Knopp, Schmitt & Vorderer, 2018).

7.2.2.1. Children's Feelings on Parental Technoference

Children have previously reported feelings of loneliness and sadness about the time they spend with their parent if their parent uses electronic devices when in their company (Steiner-Adair & Barker, 2013). The current study found further support for the association between parental device use and children's feelings, as children reported feeling negative emotions of feeling '*not very good'* or feeling '*awful*' when their parent uses an electronic device when they are trying to talk to them.

It can be argued that there were inconsistencies in the association between parental device use and the emotions of children, as there was no significant association between parental technoference and children's positive affect or negative affect. Nevertheless, this difference could be explained by the different emotions children had to choose from in both measures, as the feelings children elicited in the happiness scale (Donarth, 2018) such as 'not very good' or 'awful', were not options in the PANAS scale (Ebesutani et al., 2012). In addition to this, the happiness scale (Donarth, 2018) is visual, whereas the PANAS entails words alone, therefore research should consider how information in different modes such as pictures, or text, elicit different responses. If children experience negative emotions due to parental technoference, and feel dissatisfied with the time they spend with their parents as a result (Steiner-Adair & Baker, 2013), this poses the question on whether this impacts the way they perceive their interactions and relationship they have with their parents.

7.2.2.2. Parental Technoference and the Parent-child Relationship

This study demonstrated that parental technoference is inversely associated with children's perceptions of parental warmth, that as the magnitude of parental technoference increases, perceived levels of parental warmth decreases, or inversely, as parental technoference decreases, children's perceived levels of parental warmth increases. This suggests that parental technoference is associated with children perceiving lower levels of parental warmth from their parents.

Responsive and warm interactions between parents and children lead to stronger parent-child attachments (Egeland, Kalkoske, Gottesman & Erickson, 1990; Stockdale, Coyne & Padilla-Walker, 2018) and weaker parent-child attachments predict poorer mental health and physical health for children (Fagundes, Jaremka, Malarkey & Kiecolt Glaser,2014), as well as relationship problems in later life (Diamond, Brimhall & Elliott, 2017).

Parental warmth is a construct that has repeatedly been associated with attachment (Egeland, Kalkoske, Gottesman & Erickson, 1990; Stockdale, Coyne & Padilla-Walker, 2018) and the this association was replicated in this study. This study found that parental technoference was inversely associated with attachment. Children who reported lower levels of parental technoference also reported higher levels of attachment, or those who reported higher levels of parental technoference, had lower attachment scores. Whilst previous research has examined parental use of devices and parental responsivity (Kushlev & Dunn, 2018), this highlights the importance that children develop secure attachments with their parents, and reflects the magnitude of the potential implications of parental technoference on child development and the parent-child relationship. However, the majority of parents captured in this study were mothers, therefore the impact of paternal technoference on such outcomes remain unknown.

7.2.2.3. Parental Technoference and Child Behaviour

Regardless of context, evidence has found that parental use of electronic devices impacts children's behaviour. McDaniel and Radesky (2018) found that maternal use of electronic devices increases internalising and externalising behaviours in children aged zero to five according to parental reports. This study further applies those findings to the perspective of children in middle childhood. There was a significant positive correlation between parental technoference and children's internalising and externalising behaviour, which suggests that parental technoference influences a child's psychological environment such as feelings of anxiety and depression (Liu, Chen & Lewis, 2011), as well as children's outward behaviour such as hyperactivity and conduct problems (Hinshaw, 1987). Therefore, our study supports the findings of McDaniel and Radesky (2018) study through demonstrating similar results for children in middle childhood, from the perspective of children themselves.

The rationale for the current study was that parent-child interactions are reciprocal, and that solely focusing on one half of the parent-child relationship when investigating device use does not provide a whole picture of the situation. Thus, whilst this study demonstrated the prevalence of parental technoference on children's behaviour, the impact of children's device use on their own behaviour must not be overlooked. For example, whilst an association was found between parental technoference and children's internalising and externalising behaviour in the regression models, the time children had spent using electronic devices the evening before was a significant contributor to both models, which suggests that children's use alone may also impact these behaviours. In addition to this, a significant correlation was

found between the time children had spent using devices the evening before, and their selfreported levels of externalising behaviour.

These findings correspond with previous research which demonstrated an association between children's use of devices, and children's levels of externalising behaviours (Keles, McCrae & Grealish, 2019; Tamana et al., 2019). Moreover, a key discussion point is that a cause and effect relationship cannot be established between parental technoference and children's externalising behaviour, as confounding variables such as children's use of devices, and how children's device use can also interact with children's externalising behaviour should not be overlooked. Nevertheless, regression models also included variables of: children's use, child's sex, and deprivation in each of the regression models, the positive association between parental technoference and children's internalising and externalising behaviour remained.

7.2.3. The Benefits of Device Use

Whilst associations were found in the study that suggest parental technoference is associated with several negative outcomes for children, parental device use was not always viewed negatively by children. Children generally associated co-viewing devices; using devices with their parent, with positive feelings. Children reported more negative feelings towards their parent using a device on their own when with them, and more positive feelings towards the co-use of a device with their parent. Previous research on co-viewing has found evidence that co-watching television with a parent may be beneficial for children (Lemish & Rice, 1986) and more recent research has found the co-viewing of electronic reading books to be beneficial for children (Lauricella, Barr & Calvert, 2014), as well as the use of videogames with the wider family (Aarsand, 2007). This study demonstrated that other portable devices have the same effects as previously questioned (Coyne, Padilla-Walker, Stockdale & Day, 2011).

The benefits of co-viewing could be explained in terms of context, rather than the time children/parents spend using electronic devices. If parents engage in content with their children, children have a more enjoyable experience and are have opportunities to learn new things, However if child and parent viewing is simultaneous although passive with no interaction, this provides less opportunities for children to learn and is less cognitively stimulating (Sweetser, Johnson, Ozdowska & Wyeth, 2012). It could be argued that the benefits associated with parent and child co-viewing are due to the parent engaging with the

child in an activity in general, rather than the use of an electronic device to do so (Lee, Spence & Carson, 2017) and that devices are not required for children and parents to feel these benefits.

7.3. Parent-child Dyads Comparisons of Perceptions

7.3.1. Use of Electronic Devices the Evening Before

According to children's reports of parental device use, parents underestimated the time they spent using devices the evening before, or oppositely, children tended to overestimate their parent's use. Children reported that their parent had spent an hour using devices the evening before, whilst parents reported spending less than one hour. Despite the differences, both the perceptions of parents and children suggest device use to be low amongst parents compared to recent research with suggests that one in five adults spent more than 40 hours a week using electronic devices (Ofcom, 2018). It may be that whilst parents spend a lot of time using device, that they do not use their devices when around their children. It would be interesting to explore the differences in parent's use of devices when with their children compared to when without their children. It must be remembered that this part of the current study was based on device use during a specific weekday evening when children had come home from school, therefore parental device use during times such as weekends, school holidays or the rest of the day remains unknown. It is also unknown whether the evening they reported device use on is typical of the parent's usual device use around their children.

7.3.2. Parental Technoference

Similar to the children's results, eating meals was a time in which parents and children tended to agree that neither parents nor children used a device. In terms of time at the park together, both parents and children agreed that parents do not use electronic devices when at the park with their children. In contrast to this, when parents are picking their child up from school, over a quarter of parents and children reported that the parent use a device '*most of the time'* or '*all of the time'*, whilst it appears the majority do not use a device, this context appears to be more problematic for device use compared to meal times and times at the park together. The most prominent time in terms of device use was device use within the home, with the parent-child dyads agreeing again that both parents and children are most likely to be using an electronic device each, during time at home together.

Whilst the dyads seemed to mostly agree on their perceptions of device use across the different scenario contexts, they did not have the same perceptions of parental device use during conversations with each other. A much higher proportion of children than parents reported that parents use a device when their child is trying to talk to them '*most of the time'* or '*all of the time'*. This raises the question as to whether children overestimate their parent's device use, or whether parents use devices subconsciously when talking to their children, which may result in the underestimation of their own device use. Conversations occur across several contexts, therefore the magnitude of parental technoference remains unknown.

Rules

More recent guidelines have now begun to acknowledge the role of parental use of devices, and suggest that parents consider their own device use of devices (Davies, Atherton, Calderwood & McBride, 2019). Most parents (79.1%) in this study reported that they do have rules about how much time they as parents spend using devices, although most children were unaware of any self-imposed rules their parents had for their device use. The highest proportion of both children and parents agreed that children had rules about when they use electronic devices, rather than where they use devices, or how much time they spent using devices. This suggests that parents impose context based rules on their children on their device use, and may be moving away from time based restrictions which has been found to lack an evidence base (Przybylski & Weinstein, 2017).Benefits have been associated with children having rules on their device use (Haddon, Mante-Meijert & Loos, 2016; Livingstone et al., 2017), but the debate remains on whether similar guidance for parents would be beneficial.

Children believed families should have rules about the time parents spend using devices (60.5%), which replicates the findings of previous research which demonstrated that children want parents to follow the same rules on their device use (Hiniker et al., 2016). Most parents (77.9%) were in agreement with children and believed that parents should be given guidance on their device use around children. It seems that both parents and children would be in agreement of a family wide approach for controlling device use, which may be the next step for policy makers. The Royal College of Paediatrics and Child Health (2019), published the United Kingdom's first set of guidelines for parents and professionals focusing on children's use of electronic device use. Whilst the guidelines acknowledge that parents too should consider their own use, no further specific guidance for parents is found, and guidance for parents on their device use generally remains limited.

7.4. Parents' Perceptions of Electronic Device Use

7.4.1. Reasons for use

Parents echoed the rise of using devices at home for work purposes found in previous studies (Derks, van Duin, Tims & Bakker, 2014; Peters, den Dulk & Van der Lippe, 2009), with over half reporting that they use devices at home for work purposes *'often'*. This suggests that interventions to reduce parental device use may require involvement with work places, such as minimising access to emails outside of the work place. This could also combat the feelings of pressure some parents face to complete work at home in fear of not being as studious as other colleagues who may not have children (Radesky et al., 2016). An argument is that it cannot be guaranteed that parents would use that spare time to interact with their child. The flexibility of parents working from home could also be viewed a positive concept, as this allows parents to work and be with their children at the same time, whereas if they did not have the accessibility to complete work from home they may not have that time with their children.

Nevertheless, work purposes was not the most prevalent reason for parental device use, with texting, the internet, and social media being the most prevalent activities devices were used for. Despite the reliance on devices for varying activities, some aspects of social media use may be beneficial for parenting, as parental use of social media and the internet has its benefits for parents in terms of increased feelings of social support and increased access to parenting advice (Baker, Sanders & Morawska, 2016).

Increased feelings of social support for parents may also have positive effects for children. Social support for parents in particularly mothers, has been associated with more positive parenting practises (Taylor, Conger, Robins & Widaman, 2015). Restricting parents from their devices may lead to a reduction in feelings of social support, which has been associated with poorer psychopathology for parents and poorer parenting behaviours (Crnic, Greenberg, Robinson & Ragozin & Basham, 1983). This ambivalence can be reflected using the concept of the goldilocks hypothesis (Przybylski and Weinstein, 2017), that whilst complete elimination of devices, or the constant use of devices, may not be beneficial, use in moderation may have positive effects. Whilst Przybylski and Weinstein based their hypothesis on adolescents, testing the same hypothesis on parental use of devices should be considered.

7.4.2. Parental Feelings on Device Use

In terms of parental feelings on their own device use, nearly all of the parent sample reported that they have tried to reduce their device usage at some point, which implies that parents feel that they spend too much time using devices. Previous research has found that 43% of adults reported feeling like they spend too much time using online devices (Ofcom, 2018). Earlier studies found that parents reported an internal conflict between the positives of their device use such as social support, as well as the exhaustion of balancing device use and parenting (Radesky et al. 2016). The findings of this study support the concept of an internal conflict for parents, as whilst most parents reported trying to reduce their device usage suggesting they feel they spend too much time using devices the emotions parents reported most about the prospect of a day without electronic devices were '*freedom*', '*relief*' and '*happiness*'. In contrast to their own positive feelings parents reported they would feel during a day without devices, parents believed that their child would feel mainly '*boredom*' or *'anxiety'*. Parent's reports that their child would feel anxiety demonstrates the prevalence of device use in the daily lives of children, and the rising levels of reliance generations seem to have on devices (McCrindle, 2017).

7.4.3. Impact of Device Use on their Children

The main concerns parents associated with children's device use were on physical activity, and their concerns are supported by previous research showing a relationship between the use of electronic devices, lower levels of physical activity, and poorer weight status (LeBlanc et al., 2015). Parents also expressed concerns about the negative impact of devices on children's sleep, behaviour, and attention. Ambivalence can also be seen in parent's perceptions of children devices use, as whilst nearly half of parents reported the opinion that device use has a negative effect on children's behaviour as found in previous studies (Tamana et al., 2019), almost a fourth also reported using devices as a reward for their children's good behaviour.

7.5. Wider Implications

Collectively, the results of this study suggest that parental technoference is not something that is context specific, for example, something that happens during mealtimes or times at the park. In fact, the results of this study suggest that those are the times which parents and children are least likely to use devices. The results suggest that technoference is

something that happens in regular day-to-day interactions such as conversations, according to children's reports. Only a minority of parents reported the same, the majority of parents believe this does not happen often, or never happens. The results demonstrate that electronic devices have the potential to disrupt interactions between parents and children in middle childhood and that parental technoference is significantly associated with; children's perceptions of parental warmth, attachment and their level of internalising and externalising behaviour. It must be remembered that parents were not of the same viewpoint as children and further research is needed to establish consistency across both parental and child reports.

Children with parents who are less responsive and demonstrate lower levels of communication are more likely to experience health-harming behaviours in later life such as; poorer weight control, low self-esteem and a history of suicide attempts (Ackard, NeumarkSztainer, Story & Perry, 2006) which highlights the importance of the topic in a wider public health context. Additionally, responsive behaviours such as eye contact demonstrate to children that their parents are emotionally available to them (Farran & Kasari, 1990) which is particularly important during middle childhood, a developmental stage where emotional availability is fundamental (Lieberman, Doyle & Markiewicz, 1999) and the results of this study suggest that electronic devices may lower the responsivity levels of parents. Further to the emotional impacts associated with parental devices use, safety concerns have also been raised based on the theory that when parents use a device, they demonstrate lower levels of supervision towards their children (Lemish et al., 2019). The magnitude of concern around parental device use is demonstrated through the development of interventions by play therapists to attempt to mitigate the risks device use poses to attachment, through attempting to increase feelings of attachment and instances of bonding (Courtney & Nowakowski-Sims, 2019).

It does not appear that it is the use of electronic devices directly that children associate with negative feelings, or that lead to lower levels of attachment. If this was the case, every child who has a parent that used an electronic device would demonstrate a weaker attachment style. This is further supported by the finding that children did not view parental device use negatively on every occasion. Children reported negative feelings around their parent's using a device without them when in their presence, but reported feeling positive feelings about sharing device use with their parents. The difference between these two concepts is the presence of interaction with their parent. This suggests that rather than the presence of electronic devices specifically, it may be the displacement of parental interaction that may be driving the effects of parental device use on attachment and children's behaviour

(Neuman, 1988). The difference in children's feelings across sole parental use and co-use, highlights that co-viewing may serve as a mediating factor for the risks associated with parental technoference.

One argument in the literature is that displacement can occur due to a number of factors other than electronic device use such as; parents talking to a friend face-to-face, or reading a book, and whilst all types of distraction can compromise the safety of a child, parental device use seems to be the distraction associated with the most safety risks for children (Lemish, Elias & Floegel, 2019). This reflects the level of engagement that people demonstrate when using electronic devices, and contributes to the evidence base on how parental technoference lowers parental responsivity that continues to expand, with recent research demonstrating mobile phone use to be associated with the extent of sensitivity mothers demonstrate towards their children (Wolfers, Kitzmann, Sauer & Sommer, 2020). It should not be forgotten that children's device use can also disrupt parent-child interactions (Moawad & Ebrahem, 2016) which suggests that a whole family-based approach to device use may be beneficial in supporting healthy device use. Whilst the ways device use may hinder parent-child interactions have been discussed, device use can also facilitate interactions, for example, parents may use a device to find a location to share a family picnic (Oduor et al., 2016). In addition to this, parents often report using devices to seek social support and parenting advice (Baker, Sanders & Morawska, 2016). In light of this, guidelines shifted away from a focus of time reduction, towards a harm minimising approach, for example encouraging device-free family times such as mealtime (Davies, Atherton, Calderwood & McBride, 2019).

This study suggests that not only are parent-child interactions interrupted by children use of electronic devices (Moawad & Ebrahem, 2016) an evidence base is emerging that parental use may also affect those interactions in the same way. Collectively, the evidence base that is emerging on the effects of parental device use (McDaniel, 2019) combined with the evidence base of the effects of children's use (Moawad & Ebrahem, 2016; Richards, McGee, Williams, Welch & Hancox, 2010) on parent-child relationships and behaviour, can be combined to contribute to the further development of device use guidelines by public health policy makers, which further develop and integrate more specific guidance for parents on their own device use.

7.6. Strengths and Limitations

To our knowledge, this study is the first to investigate the relationship between parental technoference and parent-child attachment. This study also contributed to the evidence base on children's perspectives of parental device use, as most studies investigating parental technoference have investigated this from the perspective of the parents (McDaniel & Radesky, 2018; Radesky et al., 2016). Whilst a large focus of the literature has been based on observational and qualitative methods (Lemish, Elias & Floegel, 2019; Mangan Leavy & Jancey, 2018; Radesky et al., 2014) this piece of research used cross-sectional methods which allowed the project to capture a relatively sized sample. Further to this, this study bridged the gap in research on parental technoference in middle childhood, with previous studies having focused on parental technoference with younger children up to the age of five (McDaniel & Radesky, 2018) and adolescence over the age of ten (Stockdale, Coyne & Padilla-Walker, 2018).

The cross-sectional method also has limitations. Children and parents were asked to describe their device use based on the evening before the questionnaire session, between the time periods of when the child arrived home from school up until the child went to bed. When interpreting the findings of this study, it should therefore be considered that this snapshot of children and parent's device use, may not be applicable to their general device use. For example, children have been found to spend more time using electronic devices during the weekend compared to weekdays (Tang, Darlington, Ma & Haines, 2018). Therefore research on days when children are not in education may demonstrate a stronger magnitude of technoference.

A further point to consider is the significant relationship found between parental technoference and attachment. Correlation does not mean causation, and potential extraneous variables should be discussed. For example, whilst children's perceptions of the strength of attachment they have with their parents become stronger in middle childhood (Verscheueren & Marcoen, 2005) and children still rely on their parents for emotional availability during this time period (Lieberman, Doyle & Markiewicz, 1999), it has also been argued that during middle childhood, children develop more dismissive attitude towards their attachments with their parents (Ammaniti, van IJzendoorn, Speranza & Tambelli, 2000) which could be an alternative explanation for the lower levels of attachment demonstrated by some children in this study.

Parent-child attachments have been associated with a wide range of predictors such as parenting behaviours (Bosmans, Braet, Koster & Raedt, 2009) and socioeconomic status

(Bradley & Corwyn, 2002) therefore the relationship between technoference and attachment could be the result of confounding variables such as lower levels of parental support, or lower levels of parental monitoring, which also result in weaker parent-child attachments (Karavasilis, Doyle & Markiewicz, 2003). However, regression models investigating the relationship between parental technoference and attachment also included the potential confound of deprivation, and deprivation did not contribute significantly to the model.

The sample characteristics were a further limitation of the study, with the majority of parents who completed the questionnaire being white British mothers, therefore generalisability of the findings is limited. An example of this is that cross cultural differences have been found in the attachments between parents and children (van IJzendoorn & Kroonenberg, 1988). In addition to this, a large majority of parents who completed the questionnaire were the children's mothers. Whilst Bowlby (1958) theory was originally based on the mother-child attachment and the mother as a primary caregiver, due to economic and demographic differences, fathers now often take the role of primary caregiver and have greater involvement in the caregiving of children, in which respect suggests that traditional views of the mother as a primary caregiver are outdated (Cabrera, Tamis-Lemonda, Bradley, Hofferth & Lamb, 2000).

Children have found to respond to paternal sensitivity in the same way as they do maternal sensitivity, with sensitivity in parental parenting being associated with more secure attachments in children (Cassidy & Shaver, 2008). In the same way, higher levels of paternal interaction and involvement also results in children being more securely attached to their fathers (Cox, Owen, Henderson & Margand, 1992). Further to this, middle childhood seems to be a developmental stage in which children develop stronger attachments towards their fathers compared to their mothers (Kamza, 2019). Parental differences have also been found before in terms of the relationship between technoference and behaviours, with only motherchild technoference being associated with greater levels of internalising and externalising behaviour in children (McDaniel & Radesky, 2018) which demonstrates the need for further research into how the impact of technoference differs across mothers and fathers. This study aimed to recruit both mothers and fathers, although a large majority of the sample were mothers, which suggests that aiming to recruit a sampling pool of fathers to investigate parental technoference may be the most efficient way to proceed in future research.

7.7. Implications and Future Research

The results of this study can be viewed as a contribution to the evidence base of technoference in families, to help inform public health policy makers and professionals in making decisions regarding future recommendations, guidelines and potential interventions on electronic device use. The findings reflect the importance of a family wide approach, that recommendations for both children and parent's use of electronic devices, and that further development and clearer guidance for parents on their own device use may benefit families. Future research should aim to further investigate the effects of parental technoference, through longitudinal research. Longitudinal research could assist in establishing the impact of parental technoference on attachment through different stages of a child's development to establish a cause and effect relationship. In addition to this, research into the association between parental technoference and specific attachment styles should also be considered, as well as the effects of paternal parental technoference.

7.8. Conclusion

This thesis contributes to the evidence base on the impact of parental use of electronic devices on children, through exploring the perspectives of children in middle childhood, and investigating similarities and differences in their perspectives and their parent's perspectives. The thesis demonstrates the development of two measurement tools; both a child and parent questionnaire to investigate perceptions of device use within families. The findings contribute to the emerging evidence base on the influence of parental technoference, and provide a platform for further research, and a contribution to inform public health professionals and policy makers when developing evidence based guidelines for parents and professionals on electronic device use in families.

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Appendices

Appendix 2.1.

The final version of the children's questionnaire.

Children's Questionnaire

ID CODE:_____

Thank you for taking part in our questionnaire about electronic devices.

There are 6 parts to this questionnaire:

- **Part 1** will ask about the electronic devices you and your parent/caregiver used after school yesterday;
- **Part 2** will ask you about when you normally use electronic devices;
- **Part 3** will ask what you think about family rules for using electronic devices;
- **Part 4** will ask about your relationship with your parent/caregiver;
- **Part 5** will ask about how you have been feeling;
- **Part 6** will show photos of different situations and ask which photo is most like you and your parent/caregiver.

This questionnaire will take you about 20 minutes to fill in. Please answer all questions as honestly as you can. Nobody will get to know what your answers are and nobody will know who the questionnaire belongs to as each questionnaire will be identified using numbers and not names.

To help you understand the questionnaire, we will explain a few of the words we use:

- **Electronic devices:** this includes mobile phones, computers, laptops, tablets (e.g. iPad) and gaming consoles (e.g. playstation, Xbox, Wii)
- **Parent/Caregiver:** the person who looks after you most of the time

1

To start, please answer the questions below to help us know a little bit about you.

1. How **old** are you? _____ years
2. Are you a **girl or a boy** (please circle)? Girl Boy
3. Which **school year** are you in (please circle)? Year 4 Year 5 Year 6

Part 1 – Thinking of **yesterday**

4. What **day** was it **yesterday**? (please circle)

Monday Tuesday Wednesday Thursday

5. What **time** did you get **home from school yesterday?** _____PM
6. How did you **feel** when you **got home from school yesterday**? (Circle 1 face)

7. **Who was the main parent/caregiver** who was **looking after you** when you got home from school yesterday (e.g. Dad)?

_____

As you fill in this questionnaire, we would like you to answer the questions thinking about this person who looked after you yesterday.

8. Does this **parent/caregiver** look after you **most of the time?** (Tick 1 box)

Yes	
No	

9. What **time** did you **go to bed yesterday**? _____PM
10. How did you **feel** when you **went to bed**? (Circle 1 face)

2

11. **After school yesterday**, which of the following electronic devices did **you and your parent/caregiver use**? (Tick all the devices that were used)

Electronic device	I used	My parent/caregiver used
Mobile phone		
Laptop		
Tablet (e.g. iPad)		
Desktop computer		
Games console (e.g. PlayStation, Xbox,Wii)		

Use this clock to help you answer the next few questions

If you got home at 4pm and went to bed at 8pm, you were at home for 4 hours before bed time.

12. **After school yesterday**, about how much time did **you spend using an electronic device** (up to when you went to sleep)? (Tick 1 box)

Less than 1 hour	
1 hour	
2 hours	
3 hours	
4 or more hours	

3

13. **After school yesterday**, about how much time did **your parent/caregiver spend using an electronic device on their own** (up to when you went to sleep)? (Tick 1 box)

Less than 1 hour	
1 hour	
2 hours	
3 hours	
4 or more hours	

14. **After school yesterday**, about how much time did **you and your parent/caregiver spend using electronic devices together** (up to when you went to sleep)? (Tick 1 box)

Less than 1 hour	
1 hour	
2 hours	
3 hours	
4 or more hours	

15. How does it make you feel when **you and your parent/caregiver** use electronic devices **together** (e.g using a tablet together)? (Circle 1 face)

16. **After school yesterday**, about how much time did you spend **talking** with your **parent/caregiver** (up to when you went to sleep)? (Tick 1 box)

Less than 1 hour	
1 hour	
2 hours	
3 hours	
4 or more hours	

4

Part 2 - Thinking of when you **normally** use electronic devices.

17. How often does **your parent/caregiver** use electronic devices when you are... (Tick 1 box in each row)

	Never	Not often	Most of the time	All of the time	We don't do this activity together
Eating meals with them?					
Doing activities with them (including sports)?					
Talking to them?					
Being picked up from school by them?					

18. Can you think of any other times **your parent/caregiver** uses electronic devices when you are together? Please tell us about this is by writing your answer in this box.

19. How often do the sentences below happen to you: (Tick 1 box in each row)

	Never	Not often	Most of the time	All of the time
I struggle to get my **parent/caregivers' attention** when they are using their electronic device				
I struggle to get my **parent/caregiver to talk** to me when their electronic device				
My **parent/caregiver** uses their electronic device even when I am right in the middle of a **conversation with them**				

20. How does it make you feel when **your parent/caregiver** uses an electronic device **without you when you are with them**? (Circle 1 face)

21. How does it make you feel when **your parent/caregiver** uses an electronic device when you are **trying to talk to them**? (Circle 1 face)

22. I think **the time my parent/caregiver spends** using electronic devices is: (Tick 1 box)

About right	
Too much	
Not enough	

23. My **parent/caregiver thinks the time that I** spend on electronic devices is: (Tick 1 box)

About right	
Too much	
Not enough	

24. How often do **you use electronic devices** for the **following activities?** (Please tick 1 box for each row).

	Never	Sometimes	Often
Playing games			
Watching videos			
Homework			
Listening to music			
Searching the internet			
Reading			
Talking to friends			
Talking to family			
Using social media (e.g snapchat)			
Other (Please specify) _____			

Part 3 - Thinking of when you **normally** use electronic devices.

(a) Does **your family** have rules about how much time **you** spend using electronic devices (e.g. 2 hours a day)? (Tick 1 box)

Yes	
No	

(b) **If yes you do have family rules**, which of the sentences below are **true for you**? (Tick what happens at your house)

My parent/caregiver...	Yes	I do not use one
limits how long I spend using a computer/laptop per day.		
limits how long I spend using a tablet per day.		
limits how long I spend using a mobile phone per day.		
limits how long I spend using a games console per day.		

25. Does **your family** have rules about **where** you can use electronic devices (e.g. not in your bedroom)? (Tick 1 box)

Yes	
No	

26. Does **your family** have rules about **when** you can use electronic devices (e.g. not at bedtime)? (Tick 1 box)

Yes	
No	

27. Does your **parent/caregiver** have rules about how much time **they** spend on electronic devices? (Tick 1 box)

Yes	
No	
I don't know	

28. Who is most likely to break **your family rules** about using electronic devices? (Tick 1 box)

We don't have rules	
Me	
Parent/caregiver	
Both of us	
Neither of us	

29. Do you think your family **should have rules** about how much time **you** spend using electronic devices (e.g. mobile phones, computers, tablets)? (Tick 1 box)

Yes	
No	

30. . Do you think your family **should have rules** about how much time **parent/caregivers** spend using electronic devices? (Tick 1 box)

Yes	
No	

Part 4 – Thinking about **normally**

31. Do you talk to your parent/caregiver about things that **happen with your friends**? (Tick 1 box)

No	
Yes, a little	
Yes, a lot	

32. Do you talk to your parent/caregiver about things that **happen at school**? (Tick 1 box)

No	
Yes, a little	
Yes, a lot	

33. Does your parent/caregiver give you **comfort and understanding when you are upset**? (Tick 1 box)

Never	
Not often	
Most of the time	
All of the time	

34. Is your parent/caregiver responsive to your **feelings and needs**? (Tick 1 box)

Never	
Not often	
Most of the time	
All of the time	

35. Does your parents/caregiver have **warm and loving times with you?** (Tick 1 box)

Never	
Not often	
Most of the time	
All of the time	

36. **How often** would you say that... (Tick 1 box in each row)

	Never	Not often	Most of the time	All of the time
You get along with your parent/caregiver?				
You trust your parent/caregiver?				
Your parent/caregiver understands you?				
Your parent/caregiver is demanding?				
You like your parent/caregiver?				
You have a lot of respect for your parent/caregiver?				
Your parent/caregiver interferes with what you are doing?				
You think your parent/caregiver is terrific?				
You feel angry towards your parent/caregiver?				
You feel proud of your parent/caregiver?				

Part 5

37. Tick the box in each statement that you think **describes how you feel.** (Tick 1 box in each row)

	Not true	Sometimes true	Always true
I try to be nice to other people, I care about their feelings			
I cannot stay still for long			
I get a lot of headaches, stomach aches or feel sick			
I usually share with others (e.g. food, games, pens)			
I get very angry and lose my temper			
I am usually on my own. I usually play alone			
I usually do as I'm told			
I worry a lot			
I am helpful if someone is upset, hurt or feeling ill			
I cannot sit still			
I have one good friend or more			
I fight a lot. I can make other people do what I want			
I am often sad or tearful			
Other people my age like me			
I am easily distracted, find it hard to concentrate			
I am nervous in new situations. I easily lose confidence			
I am kind to younger children			
I am often accused of lying/cheating			
Other children pick on me or bully me			
I often help others (teachers, parents, children			
I think before I do things			
I take things that are not mine			
I get on better with adults than children			
I am easily scared			
I finish the work I am doing			

38. Read each word and then tick the appropriate answer next to that word. Indicate to what extent **you** have felt this way in **the past week.** (Tick 1 box in each row)

	Very slightly	A little	Moderately	Quite a bit	Extremely
Miserable					
Joyful					
Mad					
Cheerful					
Afraid					
Happy					
Scared					
Lively					
Sad					
Proud					

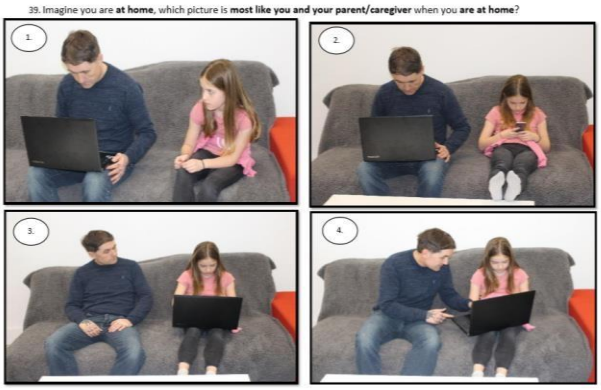
Part 6

For the next questions, please look at the pictures of a child and parent/caregiver using an electronic device. For each question, please tell us which photo is most like you and your parent/caregiver when using electronic devices. The electronic device is an example of any electronic device, and does not have to be the same as the one in the picture. Turn to next page to begin...

13

Part 6

39. Imagine you are **at home**, which picture is **most like you and your parent/caregiver** when you **are at home**?



(a) Imagine you are **at home**, which picture is **most like you and your parent/caregiver** when you **are at home**?**(Circle 1 number)**

1 2 3 4

(b) How often does this happen? (Tick 1 box)

All of the time	
Most of the time	

c) How does this make you feel? (Circle 1 face)

If you have any other feelings, please write them in the box

15

40. Imagine it is **meal time and you are having food with your parent/caregiver**, which picture most applies to you?

(a) Imagine it is **meal time and you are having food with your parent/caregiver**, which picture most applies to you? **(Circle 1 number)**

1 2 3 4

(b) How often does this happen? (Tick 1 box)

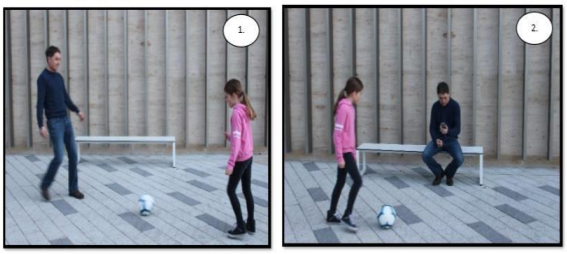
All of the time	
Most of the time	

c) How does this make you feel? (Circle 1 face)

If you have any other feelings, please write them in the box

17

41. Imagine **you and your parent/caregiver are at the park doing an activity**, which picture most applies to you? **(Circle one number)**



18

(a) Imagine **you and your parent/caregiver are at the park doing an activity**, which picture most applies to you? **(Circle one number)**

1 2

(b) How often does this happen? (Tick 1 box)

All of the time	
Most of the time	

c) How does this make you feel? (Circle 1 face)

If you have any other feelings, please write them in the box

19

42. Imagine you are **walking with your parent/caregiver**, which picture most applies to you?

20

(a)Imagine you are **walking with your parent/caregiver**, which picture most applies to you?

1 2 3 4

(b) How often does this happen? (Tick 1 box)

All of the time	
Most of the time	

c) How does this make you feel? (Circle 1 face)

If you have any other feelings, please write them in the box

21

Please can you look back through your questionnaire to make sure that you have answered all the questions you are happy to answer.

Gorffen! Finished!

Diolch! Thank you!

22

Appendix 2.2.

The final version of the parent's questionnaire.

Parent/Caregiver Questionnaire

ID CODE: _____

Thank you for agreeing to take part in our questionnaire. As described in the information sheet, this study is to investigate family use of electronic devices.

Your child has completed their questionnaire in school today, and written that the person who looked after them after school yesterday was _____. Please could _____ complete the questionnaire. We would be very grateful if you could complete this questionnaire tonight, Wednesday 12th June so that you are your child are both reflecting on the same day. This questionnaire will take you about 20 minutes to complete. Please answer all questions as honestly as you can. Your answers will be anonymous and confidential.

The questionnaire has been split into 6 parts:

- **Part 1** will ask you about the electronic devices you and your child used after school yesterday;
- **Part 2** will ask you about you and your child's general use of electronic devices;
- **Part 3** will ask you about family rules for using electronic devices;
- **Part 4** will ask you about your relationship with your child;
- **Part 5** will show photos of different situations and ask which photo is most like you and your child
- **Part 6** will ask general questions about yourself

To help clarify terminology used in this questionnaire, we would like to state that when the term **'electronic devices'** is used, we mean devices such as mobile phones, computers, laptops, tablets (e.g. iPad) and gaming consoles (e.g. Wii, PlayStation).

Please return this questionnaire in the pre-stamped envelope to the research team by 19TH JUNE

If you have any questions when completing your questionnaire please contact the research team by e-mail on c.sharp@bangor.ac.uk or phone 01248 383519.

1. **My parent/caregiver role** is (e.g. Dad): _____

2.What **day** was it **yesterday** (please circle)?

Monday Tuesday Wednesday Thursday

3. What **time** did your **child get home from school** (e.g. 3.30pm)? _____PM

4.What **time** did your **child go to bed last night**? _____PM

5.**After school yesterday**, which of the following electronic devices did **you and your child use**? (Tick all devices that were used)

Electronic device	I used	My child used
Mobile phone		
Laptop		
Tablet (e.g. iPad)		
Desktop computer		
Games console (e.g. PlayStation, Xbox, Wii)		

6. **After school yesterday**, about how much time did **you spend using an electronic device on your own** (up to when your child went to sleep)? (Tick one box)

Less than 1 hour	
1 hour	
2 hours	
3 hours	
4 or more hours	

7.**After school yesterday**, about how much time did **your child spend using an electronic device** (up to when they went to sleep)? (Tick one box)

Less than 1 hour	
1 hour	
2 hours	
3 hours	
4 or more hours	

Turn to the next page...

8. **After school yesterday**, about how much time did **you and your child spend using electronic devices together** (up to when they went to sleep)? (Tick 1 box)

Less than 1 hour	
1 hour	
2 hours	
3 hours	
4 or more hours	

9.**After school yesterday**, about how much time did you spend **talking with your child (up to when they went to sleep)?** (Tick one box)

Less than 1 hour	
1 hour	
2 hours	
3 hours	
4 or more hours	

Part 2 - Thinking of when you **normally** use electronic devices.

10.How often do **you use** electronic devices when you are... (Tick one box for each row)

	Never	Not often	Most of the time	All of the time	We do not do this activity together
Eating a meal with your child?					
Doing activities with them (including sports)?					
Talking to your child?					
Picking your child up from school?					

11. Can you think of any other times **you** get **distracted** by electronic devices when you are **with your child**? Please tell us about this by writing your answer in this box.

Turn to the next page...

12.How often do electronic devices **interrupt a conversation/activity** with your child? (Tick one box)

Never	
Not often	
Most of the time	
All of the time	

13. I think the time that **my child spends using electronic devices** is:

About right	
Too much	
Not enough	

14.My child thinks the time that **I spend using electronic devices** is:

About right	
Too much	
Not enough	

15.How often do you **use electronic devices** for the following activities? (Tick 1 box for each row)

	Never	Sometimes	Often
Work purposes			
Texting			
Online shopping			
Searching the Internet			
Social calls			
Using social media			
Playing a game			
Other (please specify)			

Turn to next page...

16. During the time you use electronic devices with your child, how often do you **discuss the content** of what you are doing together (e.g. explaining a game)? (Tick one box)

Never	
Not often	
Sometimes	
Often	

17.(a) How often do you try to **cut back** on the amount of time you spend using electronic devices **when you are with your child**? (Tick one box)

Never	
Not often	
Sometimes	
Often	

(b) If you have tried, **how often do you succeed?** (Tick one box)

I haven't tried	
Never	
Not often	
Sometimes	
Often	

Turn to next page...

18.In general, do you think electronic devices have a **positive** (better) or **negative** (worse) impact on **your child's** (Tick one box in each row)

	Very negative	**Negative**	**Neutral**	**Positive**	**Very positive**
Reading skills					
Speaking skills					
Math skills					
Social skills					
Physical activity					
Attention span					
Creativity					
Behaviour					
Sleep					

19.Imagine **you and your child** have to go a day without using electronic devices. **How do you think you both would feel?** (Tick all the feelings which apply to you and your child)

	I would feel	**My child would feel**
Anxiety		
Happiness		
Loneliness		
Relief		
Boredom		
Freedom		

Turn to next page...

Part 3 - Thinking of when you **normally** use electronic devices.

20. (a) Do you have family rules about how much time **your child spends** using electronic devices (e.g. 2 hours a day)? (Tick one box)

Yes	
No	

(b) If yes you do have family rules, which of the sentences below are **true**?? (Tick all that apply)

	Yes	**I/They do not use one**
I limit how long **my child** spends using a computer/laptop per day		
I limit how long **my child** spends using a tablet per day		
I limit how long **my child** spends using a mobile phone per day		
I limit how long **my child** spends using a games console per day		
I limit how long **I** spend using a computer/laptop per day		
I limit how long **I** spend using a tablet per day		
I limit how long **I** spend using a mobile phone per day		
I limit how long **I** spend using a games console per day		

21.Do you have family rules about **where** your **child** can use electronic devices (e.g. not in their bedroom)? (Tick one box)

Yes	
No	

22.Do you have family rules about **when** your **child** can use electronic devices (e.g. not at bedtime)? (Tick one box)

Yes	
No	

23.Do you have family rules about how much time **you** as a parent/caregiver spend using electronic devices? (Tick one box)

Yes	
No	

Turn to the next page...

24.Who is **most likely** to break family rules about using electronic devices? (Tick one box)

We don't have rules	
Me	
My child	
Both of us	
Neither of us	

25.Do you use **time with** electronic devices as a **reward for your child's good behaviour**? (Tick one box)

Yes	
No	

26.Do you think parents should be given **advice or guidance on their use of** electronic devices **in the company of children?** (Tick one box)

Yes	
No	

27.Do you think parents should be given **advice or guidance** on **children's use** of electronic devices**?** (Tick one box)

Yes	
No	

Turn to the next page...

Part 4

28.How often would you say that...? (Tick one box in each row)

	Never	Not often	Most of the time	All of the time
You get along with your child?				
You trust your child?				
Your child understands you?				
Your child is demanding?				
You like your child?				
You have a lot of respect for your child?				
Your child interferes with what you are doing?				
You think your child is terrific?				
You feel angry towards your child?				
You feel proud of your child				

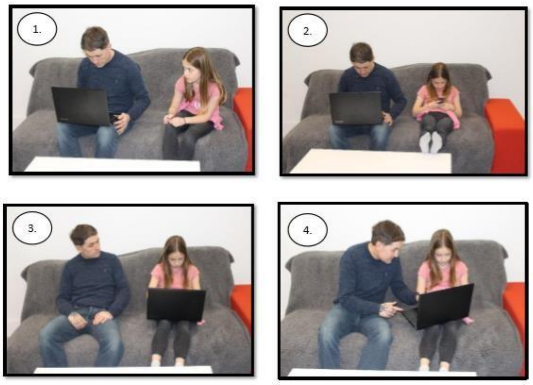
Turn to the next page...

Part 5

For the next question, please look at the pictures of a child and parent/caregiver using an electronic device. For each question, please tell us which photo is most like you and your child when using electronic devices. The electronic device is an example of any electronic device, and is not specific to the example.

29.(a) Imagine you are at **home**, which picture is most like you and your child when you **are at home**? **(Circle one number)**

1 2 3 4



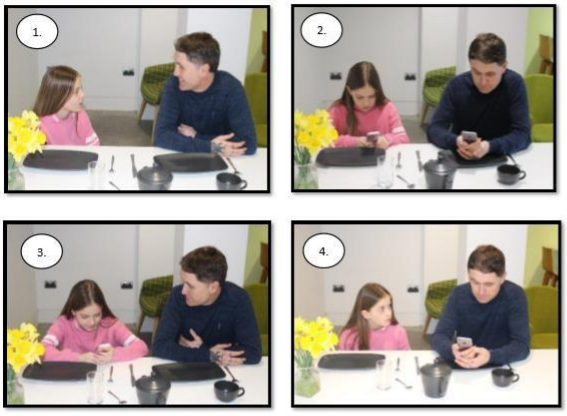
(b) How often does this happen? (Tick one box)

All of the time	
Most of the time	

Turn to the next page...

30.(a) Imagine it is **meal time and you are having food with your child**, which picture most applies to you? **(Circle one number)**

1 2 3 4



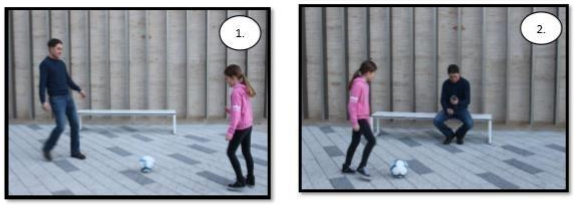
(b) How often does this happen? (Tick one box)

All of the time	
Most of the time	

Turn to next page...

31.(a) Imagine **you and your child are at the park doing an activity**, which picture most applies to you? **(Circle one number)**

1 2



(b) How often does this happen? (Tick one box)

All of the time	
Most of the time	

Turn to the next page...

32.(a) Imagine you are **walking with your child**, which picture most applies to you? **(Circle one number)**

1 2 3 4

(b) How often does this happen? (Tick one box)

All of the time	
Most of the time	

Turn to the next page...

Part 6

We would like to ask you some questions about you and help make sure we have captured views from a cross section of people. We recognise you might consider some questions to be personal or sensitive, in which case you are free not to answer them. Your answers will be used for the sole purpose of understanding the views of different groups.

33. What is your **gender**? (Tick one box)

Male	
Female	
Other	

34.What is your **ethnicity**? (Tick one box)

WHITE	
Welsh/English/Scottish/Northern Irish/British	
Eastern European	
Irish	
Gypsy or Irish Traveller	
Other White	
Asian or Asian British	
Bangladeshi	
Chinese	
Indian	
Pakistani	
Other Asian or Asian British	
Black/African/Caribbean/Black British	
African	
Caribbean	
Other Black/African/Caribbean/Black British background	
Mixed	
White and Asian	
White and Black Caribbean	
White and Black African	
Other mixed	
Other	
Arab	
Other (Please specify) _____	

Turn to the next page...

35.How **old** are you? (Tick one box)

Under 18 years	
18 -29 years	
30-39 years	
40-49 years	
50-59 years	
60 years or over	

36.Which of these categories **best describes** your **highest level of qualification?** (Tick one box)

No Qualifications	
Secondary school or equivalent qualifications- Including O levels, CSEs/GCSEs, NVQ level 1 or 2, Foundation/Intermediate GNVQ, City & Guilds Craft, BTEC First/General Diploma, RSA Diploma, non-UK secondary school qualifications	
College/Sixth form or equivalent qualifications- Including A levels, AS levels, Higher School Certificate, Apprenticeship, NVQ level 3, Advanced GNVQ, City & Guilds Advanced Craft, ONS, OND, BTEC National, RSA Advanced Diploma, Non-UK college qualifications.	
Higher education/University qualifications- Including First Degree (e.g. BA, BSc), Higher Degree (e.g. MA, PHD, PGCE), NVQ Level4-5, HNC, HND, RSA, Higher Diploma, BTEC Higher level	

37.What is your **employment status?** (Tick one box)

Employed full-time (35 + hours)	
Employed part-time	
Self-employed	
Student	
Unemployed	
Long-term sick or disabled	
Retired	
Carer, including those not working for domestic reasons (e.g. at home parent)	

38. If **100 is the BEST** state of health you could possibly imagine and **0 is the WORST** state of health you can imagine, **how good or bad is your own health generally?** Mark an "X" on the scale, and please write the number you marked on the scale in the box below.

0 10 20 30 40 50 60 70 80 90 100 [ ]

Turn to the next page...

39.Below are some statements about **feelings and thoughts**. Please tick the box that best describes **your experience of each over the last 2 weeks.** (Tick one box in each row)

	None of the time	Rarely	Some of the time	Often	All of the time
I've been feeling optimistic about the future					
I've been feeling useful					
I've been feeling relaxed					
I've been dealing with problems well					
I've been thinking clearly					
I've been feeling close to other people					
I've been able to make my own mind up about people					

40. What is your **postcode**? This information will not be stored. We will used it to identify socioeconomic status of the local area and then the information will be deleted.

My postcode is _____

Thank you for completing our questionnaire!

Diolch am cwblhau ein holiadur!

If you have any questions about the research you have taken part in, or would like to receive a copy of the results, please contact Dr Catherine Sharp (c.sharp@bangor.ac.uk). If you have any complaints about the research, you can contact the Chair of Healthcare and Medical Sciences Academic Ethics Committee: Dr Lynne Williams (lynne.williams@bangor.ac.uk)

Appendix 2.3.

Measure to investigate parental disruption by electronic devices across different settings.

17. How often does **your parent/caregiver** use electronic devices when you are... (Tick 1 box in each row)

	Never	Not often	Most of the time	All of the time	We don't do this activity together
Eating meals with them?					
Doing activities with them (including sports)?					
Talking to them?					
Being picked up from school by them?					

Appendix 2.4.

Information and consent form for parents to sign for the photograph session to create the scenario based questions in the questionnaires.

COLEG GWYDDORAU DYNOL
COLLEGE OF HUMAN SCIENCES
YSGOL GWYDDORAU IECHYD
SCHOOL OF HEALTH SCIENCES

To Whom It May Concern:

Electronic devices are an ever-present feature in modern day life, and the use of electronic devices are on the rise. They are now used for a variety of things such as leisure, socialising, and work. Due to the increase in prevalence of electronic devices, there are growing concerns around its encroachment into family life, and the impact this may have on the development of; family relationships, children's feelings, and children's behaviour. In our research, we hope to explore the impact electronic devices are having on family life.

To complete our questionnaires for a study, we are looking to recruit individuals to model different scenarios so that we can ask children and parents which scenario is the one they are most familiar with. We would like to invite to you a photographing session to create the photographs to be used in the questionnaires. The photograph session will take no longer than 30 minutes.

The themes of these photos will be; a child using a mobile phone whilst ignoring their parent, a parent using a mobile phone while ignoring their child, both using a mobile phone whilst ignoring each other, and neither using a mobile phone whilst interacting with each other. The photographs will need to be taken in different contexts such as at meal time and at the park.

If you are happy to have your photograph taken and used in the study, please sign the sheet below and hand it back to the researcher. If you later decide you no longer wish to have your photograph taken, or later decide you do not wish for your photo to be used in the study, please inform the researcher at the earliest possible opportunity.

If any problems arise or if you have any concerns about you or your child having their photograph taken, please do not hesitate to contact the principal investigator; Dr Catherine Sharp at c.sharp@bangor.ac.uk. If you have any complaints about the research, you can contact the Chair of Healthcare and Medical Sciences Academic Ethics Committee: Dr Lynne Williams (lynne.williams@bangor.ac.uk). This study has received ethical approval from the Healthcare and Medical Sciences Academic Ethics Committee.

Thank you for your support.

Dr Catherine Sharp PhD FHEA
Research Officer, Public Health Collaborating Unit
School of Health Sciences
Bangor University
c.sharp@bangor.ac.uk

COLEG IECHYD A GWYDDORAU YMDDYGIAD
COLLEGE OF HUMAN SCIENCES
YSGOL GWYDDORAU IECHYD
SCHOOL OF HEALTH SCIENCES

Adult Consent Form

Please initial box

1. I confirm that I have read and understood the information sheet. I have had time to consider my participation and had the opportunity to ask any questions. I am happy for my photograph to be taken. ☐
2. I am happy for the photographs of me to be used in the questionnaires that will be distributed during the study. ☐
3. I consent for the photographs of me to be used for presentations and conferences related to this research. ☐

Name: .....

Date: .....

Signed: .....

COLEG IECHYD A GWYDDORAU YMDDYGIAD
COLLEGE OF HUMAN SCIENCES
YSGOL GWYDDORAU IECHYD
SCHOOL OF HEALTH SCIENCES

Child Consent Form

Please initial box

1. I confirm that I have read and understood the information sheet. I have had time to consider my child's participation and had the opportunity to ask any questions. I am happy for my child's photograph to be taken. ☐
2. I am happy for the photographs of my child to be used in the questionnaires that will be distributed during the study. ☐
3. I consent for the photographs of my child to be used for presentations and conferences related to this research. ☐

Name of Parent(s)/Guardian(s): .....

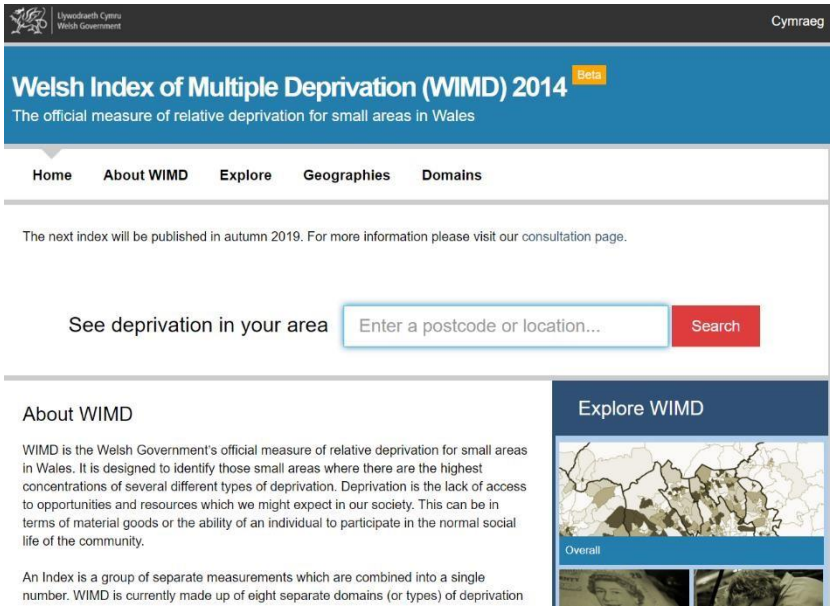
Name of Child: .....

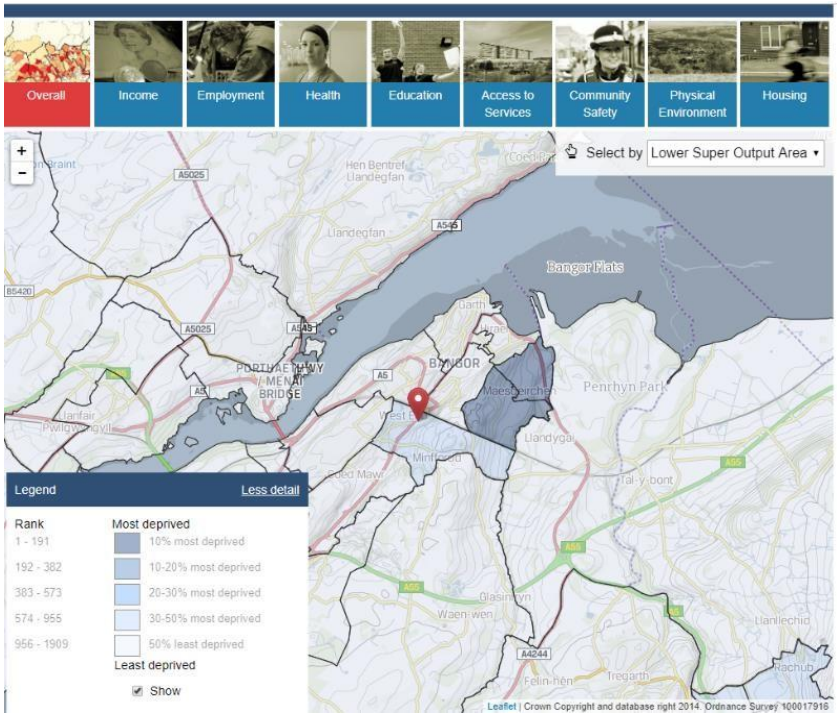
Date: .....

Signed: .....

Appendix 2.5.

The Welsh Index of Multiple Deprivation online tool.





Appendix 2.6.

Example of email sent to recruit schools to take part in the study.

From: Ffion Thomas [mailto:psu661@bangor.ac.uk]
Sent: 28 February 2019 12:07
To: Newton Primary Admin
Subject: Bangor University research project in collaboration with Public Health Wales.

Dear Mr Griffiths,

My name is Ffion Thomas, and I am a postgraduate research student in the School of Health Sciences at Bangor University. I am contacting you as we are conducting a research project exploring the influence of parent's use of technology and how this interacts with how children feel, and the interaction of technology with family life. You may have recently seen the report published by the four Chief Medical Officers in the UK highlighting that there is limited evidence of the impact of screen-based activities on health and well-being. Through our research we would like to contribute to the evidence, and this is where we would be grateful of your help and the help of your school.

Ethical approval for this research has been received from Bangor University Healthcare and Medical Sciences Academic Ethics Committee. This research is being conducted in collaboration with Public Health Wales.

Taking part in the study would involve a researcher visiting your school in the upcoming weeks and administering a questionnaire with children in years 4 and 5, preferably in a classroom setting. The questionnaire will take approximately 25 minutes to complete and we anticipate 5-10 minutes would be required before the questionnaire to explain.We would need to send letters to all parents of these years to obtain their consent for participation. In addition to getting the views of children, we would also like to send letters to the parents of the children who take part, by sending these questionnaires home with the children for their parents to complete, and asking them kindly to return them when complete.

We are currently looking to recruit a school to pilot the questionnaires. We hope this research is of interest to you and a project you would like your school to take part in. It would be great if we could arrange a phone call to discuss the next steps of the project and answer any questions you may have?

If you wish to speak over the phone at any time today, i will be available until 5pm on 07528434425.

Best Wishes,
Ffion Thomas.

Appendix 2.7.

Consent form given to parents to consent for themselves and their child to complete the questionnaire.

COLEG GWYDDORAU DYNOL
COLLEGE OF HUMAN SCIENCES

YSGOL GWYDDORAU IECHYD
SCHOOL OF HEALTH SCIENCES

Cronfa Gymdeithasol Ewrop
European Social Fund

PRIFYSGOL BANGOR UNIVERSITY

Dear Parent/Guardian,

We wish to understand the influence of parental use of electronic devices and how this interacts with how children feel, and the interaction of electronic devices within family life. Children's use of electronic devices is also growing. In 2017, Ofcom found that 39% of 8-11 year olds have their own smartphone, and 52% have their own tablet. Electronic devices are an ever-present feature in modern day life and there are growing concerns around their impact on family life and parenting, and also the impact this may have on child development and behaviour. Electronic devices are used for various reasons, for example, using a mobile phone to scroll through social media sites like Facebook, using a laptop to answer work emails, or using a tablet to play a game. It is clear that in modern day life, parents face a lot of pressure to balance parenting, their work, and their social lives.

As part of this study, we would like to ask you and your child to complete a questionnaire. All participation in the study will be anonymous. The children's questionnaire will ask about how much you and your child use electronic devices together, family rules on the use of electronic devices, their relationship with you, and how they have been feeling. We will also show photos of different scenarios and ask which photo is most like home for them. Your questionnaire will contain similar questions; your usage of electronic devices, family rules, your relationship with your child, and your thoughts and feelings. The parent questionnaire will also include the scenario questions. Both questionnaire should take approximately 20 minutes each to complete. Your child's school has kindly agreed for your child's class to take part, therefore, the children of whom we receive consent for their participation will complete the questionnaire in the classroom. We will then send the parent's questionnaire home with your child for you to complete and return to us in a pre-stamped and addressed envelope.

If you are happy for you and your child to take part, please sign the sheet below and return to your child's teacher by _____. If you do not wish your child to participate, or wish to stop your participation, or your child's participation at any time, please inform the researcher immediately. You have the right to withdraw yourself and/or your child from the study at any point. Your decisions to not take part or to withdraw will not affect any future treatment you may receive.

If you have any questions please do not hesitate to contact the principal investigator, Dr Catherine Sharp (c.sharp@bangor.ac.uk). If you have any complaints about the research, please contact the Chair of Healthcare and Medical Sciences Academic Ethics Committee: Dr Lynne Williams (lynne.williams@bangor.ac.uk). This study has received ethical approval from the Healthcare and Medical Sciences Academic Ethics Committee.

Thank you in advance for your support.

Dr Catherine Sharp PhD FHEA
Research Officer, Public Health Collaborating Unit
School of Health Sciences
Bangor University
c.sharp@bangor.ac.uk

This study is fully funded by KESS 2.

COLEG GWYDDORAU DYNOL
COLLEGE OF HUMAN SCIENCES

YSGOL GWYDDORAU IECHYD
SCHOOL OF HEALTH SCIENCES

Cronfa Gymdeithasol Ewrop
European Social Fund

PRIFYSGOL BANGOR UNIVERSITY

Project title: Exploring influence of parental use of electronic devices and how this interacts with how children feel, and the interaction of electronic devices within family life

Consent Form

Please read each point and initial each box to provide your consent to participate in this study:

1. I confirm that I have read and understood the information sheet for this study. I have had time to consider both mine and my child's participation and have had the opportunity to ask any questions. ☐
2. I understand that mine and my child's participation is voluntary and that I have the right to withdraw myself and/or my child from the study at any time. ☐
3. I give consent for my child to complete the child's questionnaire. ☐
4. I consent to completing the parent's questionnaire. ☐
5. I agree to take part in the above study. ☐

Child's name: .....

Child's school: .....

Child's school year: .....

Parent/guardian name: .....

Signed: .....

Please return this form to your child's teacher by

_____

Appendix 2.8.

Children's certificate for completing the questionnaire.

JUNIOR SCIENTIST CERTIFICATE

This certificate is for

_____

for taking part in a study on the use of electronic devices in the family with Bangor University.

Signed:

Dr Catherine Sharp
Public Health Collaborating Unit,
School of Health Sciences

PRIFYSGOL BANGOR UNIVERSITY

Appendix 4.1.

Chi-square significance table showing the relationship between children's perceptions of the electronic devices they used the evening before, and their sex and school deprivation levels.

Demographic variable	**Device used**	**df**	**X^2**	**p**
Child's sex	Mobile Phone	1	0.012	0.911
	Laptop	1	0.003	0.959
	Tablet	1	0.042	0.838
	Desktop Computer	1	0.365	0.546
	Games Console	1	36.550	< 0.001
	Total devices used	5	14.885	0.011
School deprivation	Mobile Phone	1	0.014	0.905
	Laptop	1	2.259	0.133
	Tablet	1	0.928	0.335
	Desktop Computer	1	1.008	0.315
	Games Console	1	3.283	0.070
	Total devices used	5	3.987	0.551

Appendix 4.2.

Chi-square significance table showing the associations between child's sex and school Deprivation, and which activities children reported they use their devices for.

Demographic variable	Activity	df	X^2	p
Child's sex	Playing games	2	9.893	0.007
	Watching videos	2	0.954	0.621
	Homework	2	3.217	0.200
	listening to music	2	3.345	0.188
	Searching the internet	2	1.018	0.601
	Reading	2	0.662	0.718
	Talking to friends	2	12.006	0.002
	Talking to family	2	4.135	0.126
	Social media	2	6.817	0.033
School deprivation	Playing games	2	2.845	0.241
	Watching videos	2	1.996	0.369
	Homework	2	4.936	0.085
	Listening to music	2	0.301	0.860
	Searching the internet	2	1.570	0.456
	Reading	2	0.320	0.852
	Talking to friends	2	1.161	0.560
	Talking to family	2	0.266	0.876
	Social media	2	0.287	0.866

Appendix 4.3.

Chi-square significance table showing the differences in children's responses on the four questions of parental technoference, according to the child's sex and school deprivation level.

Demographic variable	Activity	df	X^2	p
Child's sex	Eating meals with them	4	4.733	0.316
	Doing activities (including sports)	4	9.661	0.047
	Talking to them	3	3.738	0.291
	Being picked up from school by them	4	5.177	0.270
School deprivation	Eating meals with them	4	5.907	0.206
	Doing activities (including sports)	4	2.372	0.668
	Talking to them	3	5.965	0.113
	Being picked up from school by them	4	1.007	0.909

Appendix 4.4.

Non-significant associations between children's sex and school deprivation, and their feelings across three situations involving their parent and an electronic device, determined by chi square significance tests.

Demographic variable	Activity	df	X^2	p
Child's sex	Using devices together	3	2.796	0.424
	Parent using device without them	4	2.688	0.611
	Parent using device when talking to them	4	6.634	0.157
School deprivation	Using devices together	3	0.854	0.836
	Parent using device without them	4	1.961	0.743
	Parent using device when talking to them	4	2.920	0.571

Appendix 5.1

Chi square significance table demonstrating how parent and child reports on parental device use the evening before differed according to child's sex or deprivation level.

Demographic variable	Rule type	df	X^2	p
Child's Sex	Time children perceived their parent spent	4	2.925	0.570
	Time parents perceived they spent	4	7.382	0.117
Parent's Postcode	Time children perceived their parent spent	4	6.292	0.178
	Time parents perceived they spent	4	10.560	0.032

Appendix 5.2.

Chi-square associations between the devices children reported that their parents had used the evening before, the sex of the child, and the deprivation level of the parents.

Demographic variable	Device	df	X^2	p
Child's sex	Mobile phone	1	0.404	0.525
	Laptop	1	0.001	0.974
	Tablet (e.g Ipad)	1	0.002	0.961
	Desktop Computer	1	0.002	0.961
	Games Console	1	0.001	0.974
	Total devices used	5	4.756	0.446
Parent's deprivation	Mobile phone	1	0.993	0.319
	Laptop	1	1.419	0.234
	Tablet (e.g Ipad)	1	8.273	0.004
	Desktop Computer	1	1.126	0.289
	Games Console	1	1.927	0.165
	Total devices used	5	9.188	0.102

Appendix 5.3.

Chi-square associations between the devices parents reported they had used the evening before, the sex of their child, and the deprivation level of the area they live in.

Demographic variable	Device	df	X^2	p
Child's sex	*Laptop	1	0.281	0.596
	Tablet (e.g Ipad)	1	0.430	0.512
	Desktop Computer	1	0.930	0.335
	Games Console	1	0.662	0.416
	Total devices used	2	3.214	0.200
Parent's deprivation	*Laptop	1	0.232	0.630
	Tablet (e.g Ipad)	1	5.089	0.024
	Desktop Computer	1	0.298	0.585
	Games Console	1	2.258	0.133
	Total devices used	2	2.685	0.275

*as "mobile phone" was chosen by all parents and was a constant, it was not possible to assess significance across gender or deprivation

Appendix 5.4.

Chi square cross tabulations of children and parent's responses on the time children spent using devices across children's sex and deprivation.

Demographic variable	Rule type	df	X^2	p
Child's sex	Time children perceived they spent	4	5.915	0.206
	Time parents perceived their children spent	4	6.692	0.153
Parent's deprivation	Time children perceived they spent	4	6.322	0.176
	Time parents perceived their children spent	4	1.342	0.854

Appendix 5.5.

Associations between the devices parents reported that their children had used the evening before, the sex of the child, and the deprivation level of the parent.

Demographic variable	Device	df	X^2	p
Child's gender	Mobile phone	1	4.885	0.027
	Laptop	1	4.217	0.040
	Tablet (e.g Ipad)	1	0.004	0.949
	Desktop Computer	1	0.957	0.328
	Games Console	1	26.466	< 0.001
	Total devices used	4	15.753	0.003
Postcode deprivation	Mobile phone	1	5.099	0.024
	Laptop	1	0.617	0.432
	Tablet (e.g Ipad)	1	2.619	0.106
	Desktop Computer	1	1.395	0.238
	Games Console	1	0.470	0.493
	Total devices used	4	2.387	0.665

Appendix 5.6.

Chi square significance associations between the devices children reported that they had used the evening before, the sex of the child, and the deprivation level of their parent.

Demographic variable	Device	df	X^2	p
Child's gender	Mobile phone	1	0.000	0.983
	Laptop	1	0.007	0.932
	Tablet (e.g Ipad)	1	0.395	0.530
	Desktop Computer	1	0.296	0.587
	Games Console	1	19.068	0.000
	Total devices used	5	12.434	0.029
Postcode deprivation	Mobile phone	1	2.413	0.120
	Laptop	1	0.446	0.504
	Tablet (e.g Ipad)	1	2.113	0.146
	Desktop Computer	1	0.017	0.896
	Games Console	1	0.005	0.946
	Total devices used	5	3.885	0.566

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Appendix 5.7

Chi square cross tabulations of children and parent's responses on parent's device use when picking their child up from school.

Demographic variable	Rule type	df	X^2	p
Child's sex	Parent's perceptions of picking their child up from school	4	7.200	0.126
	Children's perceptions of their parent picking them up from school	4	3.679	0.451
Parent's deprivation	Parent's perceptions of picking their child up from school	4	4.382	0.357
	Children's perceptions of their parent picking them up from school	4	4.481	0.345

Appendix 5.8.

Chi square tests investigation associations between parent and child perceptions of children's rules, and child's sex and parent's deprivation.

Demographic variable	Rule type	df	X^2	p
Child's sex	Children's perceptions of rules about where	1	0.861	0.353
	Children's perceptions of rules about when	1	0.063	0.801
	Parent's perceptions of rules about where	1	0.005	0.942
	Parent's perceptions of rules about when	1	0.102	0.749
Parent's deprivation	Children's perceptions of rules about where	1	3.961	0.047
	Children's perceptions of rules about when	1	0.557	0.455
	Parent's perceptions of rules about where	1	0.770	0.380
	Parent's perceptions of rules about when	1	0.178	0.673

Appendix 6.1.

How parents perceived they would feel during a day without devices.

Demographic variable	Device	df	X^2	p
Child's sex	Anxiety	1	0.954	0.329
	Happiness	1	9.471	0.002
	Loneliness	1	0.145	0.703
	Relief	1	2.441	0.118
	Boredom	1	3.708	0.054
	Freedom	1	5.835	0.016
Parent's deprivation	Anxiety	1	0.165	0.685
	Happiness	1	0.477	0.490
	Loneliness	1	1.097	0.295
	Relief	1	0.046	0.830
	Boredom	1	1.422	0.233
	Freedom	1	2.845	0.092

Appendix 6.2.

How parents perceived children would feel during a day without devices.

Demographic variable	Device	df	X^2	p
Child's sex	Anxiety	1	0.705	0.401
	Happiness	1	0.054	0.817
	Loneliness	1	1.002	0.317
	Relief	1	1.474	0.225
	Boredom	1	0.005	0.942
	Freedom	1	0.942	0.332
Parent's deprivation	Anxiety	1	3.355	0.067
	Happiness	1	6.016	0.014
	Loneliness	1	6.327	0.012
	Relief	1	0.454	0.501
	Boredom	1	1.473	0.225
	Freedom	1	0.080	0.777