All screen and no play?
A mixed methods approach to screen time in middle childhood.

Mira Dobutowitsch

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Head of Department: Professor Sharon Todd

Supervisors: Dr. Catriona O'Toole & Prof. Sharon Todd

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Abstract

Children's engagement with screens and digital devices at home is often associated with negative outcomes. However, there is increasing criticism that most claims of detrimental effects of screen time are not supported, that research in the area often lacks rigour in design, and fails to account for contextual factors. Furthermore, given the positive discourse around technology in educational settings, parents are faced with juxtaposed messages.

Drawing on Bronfenbrenner's bioecological framework (Bronfenbrenner & Morris, 2006) and Gibson's (1979) concept of affordances, the aim of the mixed methods project was to investigate the relationship between screen time and socio-emotional outcomes, as well as explore how parents navigate their children's screen time. Secondary analyses of Growing Up in Ireland (GUI) data were conducted to explore children's time use, and investigate the relationship between screen time and scores on the Strengths and Difficulties Questionnaire and the Piers-Harris Self-Concept Scale at age nine and again at age 13, whilst also considering important mediating factors. A qualitative study explored parents' concerns, strategies, and decision-making in relation to screen time. GUI data showed that at age nine, low screen time was associated with fewer behavioural difficulties for girls, but high screen time was associated with a more favourable self-concept for boys. At age 13, low screen time is associated with a more favourable self-concept for girls. However, effect sizes were small. The qualitative study suggests that screen time access, parental rules, and strategies to balance concerns varied significantly across families.

Overall, screen time only had a weak relationship with socio-emotional outcomes. Outcomes were best explained by factors related to children's characteristics, and the parent-child relationship. Parents were concerned about potentially negative impacts of screen time and their strategies to navigate screen time were tailored around their own attitudes and values, but were not impervious to external influence.

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List of Acronyms

BERA	British Educational Research Association
BMI	Body Mass Index
BPS	British Psychological Society
C9	Children's rating at age nine
C13	Children's rating at age 13
CES-D	Center for Epidemiological Studies Depression Scale
CRS	Cumulative Risk Score
DCCAE	Department of Communications, Climate Action and Environment
DES	Department of Education and Skills
DOHC	Department of Health and Children
EAS	Emotionality, Activity, Sociability
ESRI	The Economic and Social Research Institute
GUI	Growing Up in Ireland
ICT	Information and communications technology
ISSDA	Irish Social Science Data Archive
MFT	Monitoring the Future
NS	Nonsignificant
OECD	Organisation for Economic Co-operation and Development
P9	Parents' rating for children aged nine
P13	Parents' rating for children aged 13
PC	Primary caregiver
PPCT	Process-Person-Context-Time
PSI	Psychological Society of Ireland
SD	Standard deviation
SDQ	Strengths and Difficulties Questionnaire
SE	Standard error
ST	Screen time
T9	Teachers' rating for children aged nine
TV	Television
UN	United Nations
UNICEF	United Nations International Children's Emergency Fund

1 Introduction

Children matter. From discussions about helicopter parenting (Cline & Fay, 1990) to those about tiger moms (Chua, 2011), and rushed childhoods (Elkind, 2001), one thing becomes obvious: there is a great interest in childhood and parenting practices, and in determining influential factors on child development. One topic that has been at the forefront of discussions in recent years is screen time, along with a growing concern that children's engagement with digital technologies may have deleterious impacts on their physical, social, and emotional wellbeing (e.g., Fuller, Lehman, Hicks, & Novick, 2017; Gray, 2013; Hancox, Milne, & Poulton, 2004; Sigman, 2005; Twenge, 2017). Screen time is seen as one of the major contributors to the lack of physical activity, especially for children (e.g., Anderson et al., 2006; Ekelund et al., 2012). However, the specific relationship between screen time and socio-emotional outcomes is yet unclear (e.g., Kardefelt-Winther, 2017) and requires further exploration.

Initially used to describe television (TV) viewing (Daugherty, Dossani, Johnson, & Wright, 2014), screen time has grown to encompass the use of a computer, mobile phone, tablet, or other digital devices (e.g., Poulain, Peschel, Vogel, Jurkutat, & Kiess, 2018; Singer & Singer 2005; Singer, Golinkoff, & Hirsh-Pasek, 2006). Anecdotally, the proliferation of children's engagement with screens and digital devices is often contrasted with adults' recollections of their own childhood and comparisons of how different their own experiences were compared to what they witness today. These memories are typically characterised by the freedom to roam around the neighbourhood unsupervised, with plenty of opportunity for unstructured play. Play is acknowledged as a vital component of childhood, and the right to play is anchored in the United Nations (UN) Convention on the Rights of the Child (UN General Assembly, 1989). Play is often described as a catalyst and medium for a range of positive outcomes. Gray (2013) calls play "nature's means" (p. 18) of teaching children many valuable life lessons.

A change in access to, and use of, public spaces has impacted on children's opportunities to play. Although stratified by age, gender, and class, there is a general tendency toward children engaging in less unsupervised play outside, and more in supervised indoor and extracurricular activities (Leander, Phillips, & Taylor, 2010). Within these "institutionalised spaces" (Leander et al., 2010, p. 354), children, particularly from middle class families, tend to engage in a range of sports, arts, or cultural structured leisure activities. However, not only has outdoor play changed, but indoor play has been impacted by the significant increase in availability of digital devices and children's engagement with screens.

One of the discussions that the speed of this expansion has brought about is the comparison between so-called "digital natives" and "digital immigrants" (Prensky, 2001). Digital natives are those who have grown up with technology around them from the very beginning, digital immigrants depicts people who have only acquired their technology-related skills as adults. While it could be argued that this binary distinction does not adequately capture the scope of knowledge of new technologies (Wang, Myers, & Sundaram, 2013), its very existence exemplifies the rapid expansion of technology and digital devices during a relatively short period of time. Within the same family, it is possible to have someone who remembers watching black and white television, someone who remembers carrying around a chunky and heavy mobile phone, and finally someone for whom *to google* was never anything but a perfectly acceptable verb.

Technology has transformed much of our modern lives: we can now witness major global events in real-time via video and live streaming and control our heating via a smartphone. The digital age and technology are being embraced on a national level here in Ireland. In 2013 a "National Digital Strategy" was launched "to help Ireland to reap the full rewards of a digitally enabled society" (Department of Communications, Climate Action and Environment (DCCAE), 2018a, para. 1) and to obtain "the optimal economic and social use of the internet" (para. 4). There is also a strategy to expand the use of technology in schools (Department of Education and Skills (DES), 2015) and secondary school pupils are described as "leaders in the application of digital [technology]" (DCCAE, 2018b, para. 3).

Technology has also become an integral part of the home for most, and one of the major aspects of technology is entertainment, which is appealing to adults and children alike. In educational contexts, terms like *technologically enhanced learning* and *digital literacy* are used, and access is deemed essential. For instance, access to the internet has been described as "ever more important in allowing everybody to wholly participate in society" (Hooft Graafland, 2018, p. 7). However, in contrast, discussions about technology at home is dominated by *screen time*, which often carries negative associations. This is particularly evident in the mainstream media, where screen time debates are less about praising the advances of a technology-savvy youth, and much more likely to have headlines such as "Screen-time for children: how much is too much?" (MacDonald, 2018), "The harmful effects of too much screen time for kids" (Morin, 2018), "How too much screen time affects kids' bodies and brains" (Walton, 2018), and "Ed Power: How I banned screen time for my kids when I realised they were addicted" (Power, 2017).

Although these articles often draw on scientific research studies, results tend to be reported in a black and white fashion, frequently portraying screen time in a negative light. Perhaps in an effort to create a catchy headline, the details sometimes get lost. Research that discusses minimal tendencies and minor effect sizes get translated into much stronger findings, and the nuances and complexity of the studies are not sufficiently highlighted. Of course, there are articles with less sensationalising headlines and more nuanced discussions (e.g., Kucirkova & Livingstone, 2017), but these do not dominate. Popular media also highlight another factor: parents are increasingly confused about how to manage their children's screen time activities and struggle with the lack of guidance provided regarding screen time (Power, 2018).

Indeed, the British Psychology Society (BPS) has recently issued a statement in which they point out that newspaper articles often do not accurately reflect studies, and the authors also highlight the lack of guidance for parents (Galpin & Taylor, 2018). Furthermore, the authors caution that many studies are methodologically weak. They call for more studies based on longitudinal data or with an experimental design, as well as the inclusion of potential mediators in data analyses and more qualitative research in the area. Similar suggestions were made by Przybylski, Weinstein, and Orben (2018), who submitted evidence to the UK parliament relating to the supposedly negative impact of screen time. They concluded that based on the existing evidence, no definite conclusions can be drawn. They also called for a more rigorous approach in studying effects, specifically with longitudinal datasets that would allow for more scope to infer causality. The current research project is designed to address many of these concerns and as such, it utilises data from a longitudinal study and considers myriad factors that may mediate any effects found in bivariate analyses.

1.1 Purpose of the Research Project

The aim of the study is to investigate children's engagement with screen time in an Irish context. Specifically, the objectives are to examine the relationship between screen time and socio-emotional outcomes, and to explore parents' perceptions, values and concerns regarding screen time and strategies used to navigate children's screen time.

The project is a mixed methods project, working with data from Waves 1 and 2 of the child cohort of the Growing Up in Ireland (GUI) Longitudinal study (The Economic and Social Research Institute (ESRI), 2010, 2014), and a small sample (N = 12) of parents with children in middle childhood. The study utilised Bronfenbrenner's (Bronfenbrenner & Morris, 2006) bioecological framework and Gibson's (1979) concept of affordances in an effort to acknowledge the complexity of child development, family life and interactions between individuals and their environment.

To date there is no study comprehensively investigating the relationship between screen time and children's socio-emotional outcomes in an Irish context. There are some studies that explore screen time in relation to primary caregivers' (PC) level of education, family income, and gender (GUI, 2013b; Williams et al., 2009); one of the GUI reports investigates the relationship between out-of-school activities (which included screen time) and academic achievement (McCoy, Quail, & Smyth, 2012). Garcia, Healy, and Rice (2016) examine individual, social, and environmental correlates of screen time. Lane, Harrison, and Murphy (2014) explore the relationship between screen time and the risk of overweight and obesity. Nixon (2012) explores determinants of wellbeing using GUI child cohort data, but did not include screen time as a variable. Bivariate analyses in the key findings of Wave 3 data from the GUI infant cohort show that five-year-olds who spent three hours or more per day with screens were more likely to score in the problematic range of Strengths and Difficulties Questionnaire (SDQ) scores (GUI, 2013a). They also found an association between high screen time and unhealthy dietary habits and an increased likelihood of overweight among five-year-olds (GUI, 2013b). However, their analyses are purely descriptive and do not account for any potentially mediating variables.

Considering the growing prevalence of screen time and the uncertainty surrounding its relationship with children's socio-emotional outcomes, there is a gap in the existing research and a need to examine this (a) in a contextualised framework that consider the rich and diverse factors that characterise children's development, and (b) in an Irish context, so that national conversations about screen time can be based on relevant evidence. The current project aims to address this gap. This thesis is comprised of four studies, each one examines a particular set of research questions related to the overall objectives.

Framing these studies, Chapter 2 outlines the theoretical framework of the project, Chapter 3 reviews the relevant literature, and Chapter 4 outlines the project's epistemological position and the methodological approaches of the four studies. The first three studies offer quantitative analyses of GUI data: Study I (Chapter 5) explores children's time use; Study II (Chapter 6) explores associations between screen time and socio-emotional outcomes ate age nine with the consideration of potentially mediating variables; Study III (Chapter 7) tracks the changes of screen time from age nine to age 13, and explores the association between screen time at age nine and outcomes at age 13, including mediating factors. Study IV (Chapter 8) is a qualitative study and explores parental values and attitudes regarding screen time and how they navigate their children's screen time use. The concluding chapter, Chapter 9, offers a general discussion in which key findings of the research are synthesised and discussed in relation to existing literature and discourses in the field.

2 Theoretical Framework

The primary objectives of the project are to explore the relationship between screen time and children's socio-emotional outcomes, and the strategies parents use to navigate and manage their children's engagement with screen-based activities. Pivotal to the project is the inherent embeddedness of children's development in multiple layers of context, reaching from the nucleus of the family unit to much broader distal factors, such as cultural ideologies and societal norms. One theory that supports a sophisticated understanding of these multiple and reciprocal influences is Bronfenbrenner's bioecological theory (Bronfenbrenner, 2005; Bronfenbrenner & Evans, 2000; Bronfenbrenner & Morris, 2006), and more specifically, his Process-Person-Context-Time (PPCT) model. Supporting this framework, and offering a lens through which different contexts can be considered, is the concept of affordances (Gibson, 1979). In addition to providing a scaffold for analysis, these concepts offer a lens through which to view and evaluate existing literature. This chapter also discusses gender as one of the key variables throughout analyses.

2.1 Process-Person-Context-Time

According to Bronfenbrenner (2001), both objective and subjective factors play a part in human development. He views development as a process involving the interactions between individuals and their environments (Bronfenbrenner & Morris, 2006). This approach factors in an individual's characteristics and the characteristics of people around them; it also factors in the contexts in which the individual finds themselves, the passing of time, and most importantly, the interactions in which the individual engages. The PPCT model offers a bioecological lens to research, which acknowledges the mutual influence of biological and environmental factors, and can help to identify contexts, characteristics and processes that may aid or hinder development. Each of the model's four elements is described below.

Central to the PPCT model are *proximal processes*, which describe the aforementioned interactions between an individual and their environment. According to Bronfenbrenner, proximal processes are the pivotal driving force of human development. The extent of their influence and the strength of these processes are contingent upon the other factors contained within the model. Proximal processes are the encounters, experiences and influences created over a person's lifetime. Within the PPCT model, there is a constant flow back and forth between the external world and the individual. Bronfenbrenner highlights that, especially during the early years, proximal processes must occur on a regular basis for a substantial amount of time to be meaningful; for example, through play, reading, sports, problem solving and so on (Bronfenbrenner & Morris, 2006). It is important to consider interactions with peers and families, and the quality of these interactions, since family and peers comprise the circles that are closest to the individual. They are the significant others children engage with probably the main influence on the child.

Person characteristics are strong candidates to influence the child's everyday life. There are several mechanisms through which these characteristics come to bear on the individual's life and their socio-emotional outcomes. Person characteristics influence and determine the child's skills and abilities to interact, and influence the nature, quality, and scope of interactions. In this way they are an important driver in the child's developmental trajectory.

Bronfenbrenner describes three different types of person characteristics: demand, resource, and force characteristics. Demand characteristics are features that elicit certain responses from the social environment that may aid or discourage psychological growth; for example gender, age, and physical appearance. Resource characteristics are features, such as low birth weight, a disability, or a persisting illness, that create a barrier for the person to engage with proximal processes in a way others may. However, they also include ability, skills, and knowledge, which are acquired with experience and allow for an increasingly complex engagement with proximal processes. Force characteristics are described as “active behavioural dispositions” (Bronfenbrenner & Morris, 2006, p. 810), and are the characteristics that can initiate, sustain, or prevent proximal processes. On the one hand, traits such as impulsivity, distractibility, difficulties with emotion regulation, inattentiveness, shyness, or a tendency to withdraw, are described as “developmentally disruptive” (Bronfenbrenner & Morris, p. 810). On the other hand, there are “developmentally generative characteristics” (Bronfenbrenner & Morris, p. 810), such as curiosity, openness to engage with other people and initiate interactions, and the ability to delay instant gratification.

Some person characteristics are fixed, others deemed to be relatively stable, for example the child’s temperament. While many characteristics are beyond the control of the individual (e.g., chronic illnesses), not all are strictly impervious to influence. Their influence is contingent upon myriad factors; for example any difficulty a child may have, and the support system available to them. For instance, a child with a history of a serious illness might have a particularly protective parent, who is reluctant to let the child take part in some activities, like contact sports. In this situation, it is neither the child’s difficulty, nor the parent’s disposition, that determines the non-participation, but the combination of both. Certain characteristics and experiences can be a catalyst for both difficulties and strengths; for instance, the experience of some adverse life events can contribute to resilience (Seery, 2011). This illustrates the complexity and possibilities that arise in the interplay between person and context. Altogether, person characteristics are the mental and social toolkit the individual brings into interactions. They are the resources that can help to build resilience, establish coping mechanisms and they shape relationships and proximal processes.

Contextual factors are embedded in familial, societal, and cultural characteristics and impact on the type of relationships and thus the proximal processes children engage with. These also include community characteristics which co-design and shape the child's and the family's surroundings. Oftentimes, children have limited power over context variables, for example on family structure and income. These set structures influence the child's developmental trajectory, even though the mechanisms are often indirect. Family's resources invariably impact on the activities children are exposed to and the kind of school they go to. While some context variables are concrete and measurable, such as family income and housing, others are not as easily captured. These pertain to cultural and social capital, access to resources that help children along the way that are not material (Bourdieu, 1986). For example, the path to third-level education will be easier for a child growing up in a family where parents also have a high level of education; whereas parents under financial distress will have restricted access to resources, and associated worries can impact on family life.

Time elements are woven into many variables. Bronfenbrenner distinguishes between micro-time, meso-time, and macro-time (Tudge, Mokrova, Hatfield, & Karnik, 2009): micro-time describes the time passing in the moment; meso-time refers to the frequency and consistency of proximal processes; macro-time relates to the broader context of historical events and specific characteristics of a time or an era. In the GUI study, many questions were worded in a way that captures micro-time and meso-time. For instance, parents were asked how many times a child has exercised over the course of the past 14 days, about their children's behaviour during the past six months. Many questions aimed to establish typical or usual patterns in this way.

Macro-time might provide an explanation as to how the current era differs from previous ones, which in turn might stimulate a different trajectory of development. For the purpose of this project, it is worth noting that the GUI child cohort was born in 1997 and

1998, during a period of economic growth in Ireland (O'Hearn, 2003). In the 1990s there was also an increase of families where both parents were working fulltime, as many mothers entered the workforce (Curran, 2013). The first wave of GUI data collection took place between September 2007 and June 2008, coinciding with the beginning of a substantial economic recession (Whelan, 2013). The second wave of data collection took place in 2011/2012. In 2011, just under 20% of Irish households were in arrears with payments on mortgages, rents, utility bills and other schemes; this was almost double the European average (Whelan, Russell, & Maître, 2016). These disparities were largely due to unemployment, which reached 12% in 2012, and long-term unemployment, which reached 8% (up from 5% and 2% respectively in 2007). Many families experienced a change in financial circumstances during this time, and there are studies that have utilised GUI data to investigate the impact of Ireland's recession on family life (e.g., Watson, Whelan, Maître, & Williams, 2016).

For the purpose of this project, the bioecological lens offers a framework to situate the processes and contextual factors that play a part in shaping children's lives, and in this case, which factors influence children's screen time use. It acknowledges the interconnectedness of many different layers; the influences of proximal processes in children's home and daily lives, parental ideas, values, concerns and aspirations, and communal and societal influences. Processes do not happen in isolation, and the model offers a guide to map out these significant factors.

There are a range of studies that have situated their analyses within Bronfenbrenner's theory (e.g., Bennetts et al., 2018; Cadogan, Keane, & Kearney, 2014; Lee et al., 2015; Vanderloo, 2014), and the GUI study itself used its encompassing structure to design their study (Murray et al., 2010). Many studies rely on earlier iterations of Bronfenbrenner's framework, which focused on different levels of contextual influences. While retaining the components of his earlier work, the PPCT model underscores the pivotal role of processes (Tudge et al., 2009). As such, it is more elegant, and encompasses the insights gained by Bronfenbrenner through his life's work.

2.2 Affordances

In order to support the bioecological framework, it is useful to include a lens that might offer insights into matters of agency and availability of opportunities, or into the probability of choices. The concept of affordances could be regarded as a mechanism by which some proximal processes happen, and an explanation for patterns of behaviour. Initially as a response to a mechanistic view of perception, Gibson (1979) proposed an ecological approach to describe the kind of information that is perceived. He coined the term *affordances*. These are characteristics in the environment that may be an invitation for interactions for the perceiver. Affordances can therefore be thought of as potential actions embedded into the physicality of the environment (Gibson, 1977, 1982a). These affordances, as possibilities, provide opportunities to the individual interacting with their surroundings. Interactions are specific but also relational in nature. While the affordances of the environment are permanent, the actions an individual may take depend on the "internal state of the observer" (Gibson, 1982b, p. 410). There is no fixed action prescribed to a certain object; what is perceived as an affordance varies according to individuals' needs, motivations, and action capabilities. For example, a tree can afford climbing but can also afford sitting under it when it is sunny. Gibson uses the example of a stone to illustrate how the existence of an affordance does not guarantee that individuals will avail of the opportunity; a stone affords throwing, yet it is not likely that a stone would be used in such a way.

The concept of affordances is often used to explore children's engagement with spaces, such as neighbourhoods or playgrounds (Kyttä, 2002; Sandseter, 2009; Storli & Hagen, 2010). Consideration for how structures need to be created to increase the likelihood of being perceived as a salient or inviting affordance can help to create spaces that provide a stimulating environment for children. There have been some discussions around the variability of affordances depending on the individual interacting with an object, which tie into the question of agency. Some authors distinguish between potential, or perceived, affordances, and actualised affordances (Heft, 1988, 1989; Kyttä, 2002, 2004). The former are perceived possibilities, the latter describe the various affordances that an individual utilises. Withagen et al. (Withagen, de Poel, Araújo, & Pepping, 2012) suggest that one of the factors determining whether an affordance or possibility is realised depends on the effort required to engage. Others have documented that the types of affordances perceived are contingent upon the individual's perceived action possibilities (e.g., Carello, Grosofsky, Reichel, Solomon, & Turvey, 1989; Mark, Balliett, Craver, Douglas, & Fox, 1990; Wagman & Malek, 2008).

Expanding the scope of affordances, Heft (2001, 2012) also argues that affordances can be applied to cultural aspects as well as physical environments. From an ecological perspective, perception involves detecting patterns or regularities in the environment. These patterns are not merely formed or guided by physical objects, but also by the actions and the behaviours of other actors around us and the normative behaviour of our surroundings. Gibson makes no direct reference to concepts like social or cultural affordances. However, some of his descriptions refer to the affordances a person may represent for another person. Gibson does not view affordance as a concept applied to physical environments only; this omission reflects his view that environmental, cultural, and social aspects are not separate entities (Kyttä, 2003). Considered in this broader sense, affordances can be conceived as the possibilities for action embedded in our surroundings, both tangible and non-tangible, physical or social.

This concept is compatible with the many layers and interlinked concepts provided in Bronfenbrenner's PPCT model. In the context of this project, Gibson's idea of what could be seen as the pre-reflexive way to interact offers an explanation as to why some pastimes have become more prevalent. This may provide an explanation for the proliferation of screen time engagement. Furthermore, affordances may offer a rationale for differences across communities or families because they are rooted in the physical and social contexts surrounding children and thus can vary across the board.

Combined, these two lenses were chosen to provide a framework that hopefully manages to capture the complex and dynamically connected interactions that influence children's lives. By taking these lenses, the project acknowledges that, even though the primary focus is children's screen time, no singular process can be considered in isolation.

2.3 Gender

While each layer and aspect of children's bioecological systems could become a further lens to examine the position of screen time in children's lives, one element that warrants a closer look is gender. Gender is considered in most of this projects' analyses, but due to the nature of the data there is only limited scope to incorporate substantive issues pertaining to gender, and thus this thesis cannot do justice to the complexity of the subject. However, it is important to contemplate its role within the frameworks utilised, to discuss gender differences, and to consider broader conceptualisations of gender.

In the PPCT model, gender is a person characteristic (Bronfenbrenner & Morris, 2006). Person characteristics can be thought of as the tools or skills available to a person in their interactions with the environment. More specifically, gender is a demand characteristic, a feature that is visible. As such, it is displayed and interpreted by the people a person interacts with, intentionally or unintentionally. Unlike other, more subtle, characteristics, gender is a feature that it often easily recognised. It can impact on the dynamics of encounters, similar to the effect age might have.

Differential treatment based on gender starts at a very early stage; for instance, mothers tend to engage with boys in ways that are more physically active (Fausto-Sterling, 2017). Fausto-Sterling (2017) and Eliot (2017) thematise the pervasive influence of the social and cultural environment in shaping perceived gender roles. While male and female infants may have subtle differences in temperament, these are exacerbated by differential treatment. The crucial point is that the sustained differential treatment impacts on biology. The plasticity of developing brain structures facilitates adaptation to the environment and the inputs received. Therefore, the performance of gender is not only perpetuated by a person's surrounding, but gendered behaviour becomes part of the person.

It can then be conceived that gender may impact on what Heft (1989) and Kyttä (2002) describe as perceived and actualised affordances. Perceptions are guided by context, not just in a physical sense, but by the feedback received from our surroundings as well (Heft, 2012). Davis and Chouinard (2017) expand on Gibson's conceptualisation of affordances and suggest a broader spectrum between affordances and non-affordance, artefacts may "request, demand, allow, encourage, discourage, and refuse" interactions (p. 242). This points to the subtlety that factors may have in shaping relationships. The association is unlikely to be a binary choice, but can be complex. Gender plays part in forming perceptions of affordances; it might therefore mediate the relationship between a person and their environment.

In the context of this study, the literature supports the notion that gender interacts with proximal processes, and that young people might be treated differently based on their gender. Gender differences in leisure activities are not unusual, for instance, boys tend to engage in more physical activity compared to girls, girls are more likely to be enrolled in cultural activities such as arts and drama (Fairclough, Boddy, Hackett, & Stratton, 2009; Marshall, Gorely, & Biddle, 2006; McCoy, Byrne, & Banks, 2012). Boys tend to be given more freedom around outdoor play and are generally given more lenient curfews (Lee et al., 2015; McCoy et al., 2012). There are also differences in screen time behaviour, which will be discussed in Chapter 3.

Studies also find gender differences in socio-emotional domains. Girls tend to exhibit more internalising problem behaviours, more effortful control and associated constructs, such as inhibitory control and perceptual sensitivity (Bertrand & Pan, 2013; Else-Quest, Hyde, Goldsmith, & Van Hulle, 2006; Kristoffersen & Smith, 2013; Maurice-Stam et al., 2018). Boys tend to score higher on measures of externalising behaviours, hyperactivity and inattention, peer problems and surgency, such as activity and high-intensity pleasure. Data from the GUI's infant cohort at ages seven and eight suggest that boys have more behavioural difficulties overall (GUI, 2017).

In a meta-review of gender differences in self-concept, Wilgenbusch and Merrell (1999) found that boys (at primary school level) tended to score higher in global self-concept. A study of young people between nine and 17 years of age found that while physical and psychological wellbeing and self-perception decreases with the onset of puberty, this decline is more pronounced among girls (Bisegger et al., 2005). This suggests that any meaningful analysis of screen time and socio-emotional outcomes needs to consider gender. If behaviours and interactions between measures differ based on gender, a joint analysis may fail to find significant patterns.

It is also important to acknowledge that gender itself is considered a socially defined categorisation, whereas sex describes biological characteristics (Lindsey, 2015). However, it is not unusual to see gender and sex being treated interchangeably. For instance, in the GUI questionnaire, the corresponding question asks respondents to indicate the gender of all people sharing the household, but the adjacent table into which the information is added lists this as *sex*, rather than gender. Aside from male and female, there is also a *not sure* option, which offers a little insight into more advanced issues regarding gender, and the limitations of conceiving gender as binary. On a very simple level, the creation of a very small subgroup can potentially pose a risk for the safekeeping of anonymity of participants, and is likely to compose too small of a subsample in a quantitative data set to facilitate a meaningful statistical analysis.

For the purpose of this study, the term gender is used, corresponding to the wording in the GUI questionnaire. In light of the gender differences that present themselves in the literature, the project's quantitative analyses were conducted separately for boys and girls. In the chapters drawing on GUI data, results of boys are listed first. This does not reflect a hierarchy or priority of position but was chosen and kept consistent to aid the structure of the text.

3 Literature Review

Since screen time has become an integral part of children's leisure activities, it is important to consider the broader subject of children's activities first. This chapter will discuss the interest in children's pastimes, changes in children's leisure activities and likely contributors to this process. Turning to the matter of screen time, the chapter reviews the literature pertaining to the impact of screen time on physical health, cognition, mental health, and wellbeing. Finally, literature on parents' attitudes towards screen time and strategies to navigate children's use of digital devices will be explored.

3.1 Interest in Children's Pastimes

As a society, we have a keen interest in how children spend their time. Aside from the fact that we have all been children ourselves at some stage, many of us are parents, or might be parents in the future, and almost everybody has contact with children through their circle of friends, family, or professional life. Interest in children's formal and informal education, psychosocial wellbeing and children's free time activities exists both in everyday culture and in academic research (e.g., Elkind, 2003; Gray, 2013; Hofferth & Sandberg, 2001; Singer et al., 2009).

Much like the parents, societal and educational frameworks generally aim to find a way to equip the next generation with the skills and knowledge to be successful in adulthood, although what constitutes success is, of course, highly variable. This in turn means that the types of skills, knowledge, and experiences deemed important to succeed are equally diverse. Success could be about becoming future leaders and responsible adults, endowed with the attitudes and skills necessary for taking on complex tasks, such as ensuring the future of the planet; or it could be more focused on the knowledge and resource needed to help children gain an advantage that would lead to professional careers and improve their social standing. It can also be about more personal values and ethics, like becoming a caring person, emotionally stable, and well-rounded (e.g., Masten &

Coatsworth, 1998). As non-tangible ideas, these goals are difficult to capture. Doing well can be defined quite broadly, or narrowly. Definitions are rooted in the values deemed important in the context in which children grow up.

There is no consensus on a universal definition of children's wellbeing (e.g., Amerijckx & Humblet, 2014; Ereaut & Whiting, 2008). Nevertheless, one way wellbeing has been approached is by looking at skills that are deemed core competencies needed to be well adapted to the environment. There are some skills that are considered important across many societies and cultures. These so-called developmental tasks (Havinghurst, 1972) contain certain milestones that are important at certain ages; for example, self-regulation, self-confidence, self-esteem, self-efficacy, socially appropriate conduct, positive peer relationships, and academic achievement (Masten & Coatsworth, 1998). These milestones can then be incorporated into research enquiries that aim to ascertain how well children are adapted by measuring their competencies.

Of course, this approach is not without flaws or criticism (e.g., Rothermel, 2012). For instance, study participants might disagree that children ought to prefer social play over solitary activities, or that the willingness to share toys or treats with others is a desirable behaviour. This is likely to be reflected in children's behaviour. If, then, a psychometric or developmental test works on the assumption that social play and sharing are deemed positive indicators, children could be labelled as having poor peer relationships based on how the test was constructed. However, a more appropriate way of regarding test results in this situation would be to see it as a reflection of the parents' own philosophy and approach to child-rearing. From this perspective, a low score does not necessarily mean that a child has not adapted well, instead it does beg a reconsideration of what exactly it is that children are supposed to adapt *to.* So it is important to keep in mind that not all values are held universally. Despite these limitations, studies that use validated standardised tests to assess competencies, milestones, or children's wellbeing are worthwhile, since they highlight general tendencies and differences across groups and enable comparisons across studies. Furthermore, as part of the validation process, these measurements undergo a rigorous testing of their psychometric properties and they tend to encompass a range of items assessing a multitude of skills.

The consideration of the concerted effort to equip children with the necessary skills to master adult life and the difference in interpretation of what success would look like throws up some important questions around equality and children’s status in society. Lareau (2011) coined the phrase *concerted cultivation* to describe engagement patterns of middle class families in America. Supported by sufficient resources, children are typically enrolled in a number of different leisure activities. Lareau argues that the concerted parental effort to stimulate children’s cognitive development and social skills leads to an advantage by providing experiences with institutional structured and ways to navigate them. In contrast, working class and low income parents need to invest more time and effort to meet basic needs, and their children tend to engage in more unstructured play and activities. As a consequence, these families are less well equipped to navigate institutions such as schools. The differential access to resources reproduces inequalities.

Analyses based on GUI data showed children from families with more disposable income tend to be enrolled in more structured activities (McCoy et al., 2012). Further analyses showed that the association between social class and structured activities is stronger among boys. The study also suggests that while participation in structured activities is positively related to academic achievement, there is a happy medium. Enrolment in many activities is associated with a lower score on reading and mathematics tests.

The other point raised relates to the position that children are afforded, the extent of their agency, and essentially about their status in society. There is a philosophical argument to be made around the status of children, and whether children are *beings* or *becomings*. It has been argued that seeing children as becomings typically limits their autonomy and agency, viewing them as *citizens in waiting* (Arneil, 2002, p. 70) or as "human capital in formation" (Qvortrup, 2009, p. 632). Becoming implies not being there yet, which suggests that something or someone is not yet fully established, and, as such, is restricted in their ability to make choices, since they are not yet fully capable of making these decisions. Becoming is a journey, which also implies that there is some kind of end point that has yet to be reached. From this perspective, it is a logical choice to provide children with opportunities to maximise their chances to flourish fully in the future. But it also runs the risk of curtailing children's agency, their status in the here and now and their self-exploration. Seeing children as beings affords them a place in society, gives them a voice, and sees them as social actors in their own right (Uprichard, 2008; Qvortrup, 1994). This perspective acknowledges that children have views, experience being a child, and are actively constructing their own childhood.

The importance of how children spend their time is recognised at the level of policy as well. The right to play, and the right for recreational and leisure activity, is anchored in the United Nations Convention on the Rights of the Child (UN General Assembly, 1989). On a national level, play is integrated into Irish policies (Síolta and Aistear; National Council for Curriculum and Assessment, 2009; Centre for Early Childhood Development and Education, 2006) as a key foundation for children's learning, especially in early childhood. Ireland's national policy framework for children and young people, under the heading of "being active and healthy", recommend that children's lives should be "enriched through the enjoyment of play, recreation, sports, arts, culture and nature" (Department of Children and Youth Affairs, 2014, p. 5).

Within these key documents, play is a central feature. There is plenty of literature that supports an association between play and a range of positive outcomes for children's physical health, socioemotional wellbeing, cognitive skills, and development in general (e.g., Fantuzzo & McWayne, 2002; Goldstein, 2012; Gray, 2013; Jarvis & George, 2010; Sutton-Smith, 2003; Vygotsky, 1978). Within the PPCT model, play can be understood as a proximal process, providing an opportunity for the individual to develop. However, there is no universal definition of play and what exactly constitutes play. There are certain elements that occur frequently in the literature when play is described. Play is characterised as: (a) child-directed and child-led (b) freely chosen, (c) intrinsically motivated, and (d) fun (Bundy, 1997; Goldstein, 2012; Steward et al., 1991; Vygotsky, 1976). Play is an umbrella-term for processes rather than a product and can take many shapes or forms with respect to the four characteristics described above. The essential part is the process itself, the motivation and agency behind it, rather that the form it takes; as such, the focus is on individuals and their agency.

Considering Bronfenbrenner's approach (Bronfenbrenner & Morris, 2006) and Gibson's concept of affordances (Gibson, 1977), it is important to remember that the environment plays a role in shaping the kinds of opportunities individuals have to play. This raises an important question regarding the quality of play. In light of the definition of play given above, once an activity is child-initiated and fun, it would be considered play. However, this pays little attention to whether this activity takes place in a sparse room with a handful of building blocks, or outside in a forest. Therefore, the definition might be somewhat limited as it fails to account for the role contextual factors play in shaping play, and specifically in relation to the opportunities and affordances offered by rich and stimulating environments. Considering the rise of screen time as a popular pastime, this raises another question: can screen time be considered play? This will be considered later on.

3.2 Changes in Children's Leisure Activities

There have been a lot of changes to how children spend their free time in recent years. Overall, there is a shift from outdoor and unsupervised free play to more indoors, supervised and adult-led free time activities (Clemens, 2004; Cooper, Page, Wheeler, Hillsdon, Griew, & Jago, 2010; Elkind, 2008; Gray, 2013; Singer & Singer 2005; Skår & Krogh, 2009; Veitch, Bagley, Ball, & Salmon, 2006). This is not necessarily due to decisions made by individuals, but instead reflects a shift that has happened on a macro level. In this, it is important to consider the time element of the PPCT model. No two childhoods can be compared merely by looking at environments and interactions; growing up in a different time also bears on the overall dynamics. In the summer of 2015, the Irish Times published an article exemplifying this shift (McTeirnan, 2015). It tells the story of three generations; a mother, aged 77, her 52- year-old son, and her grandchild, aged 11.

Figure 3.1 Room to Roam

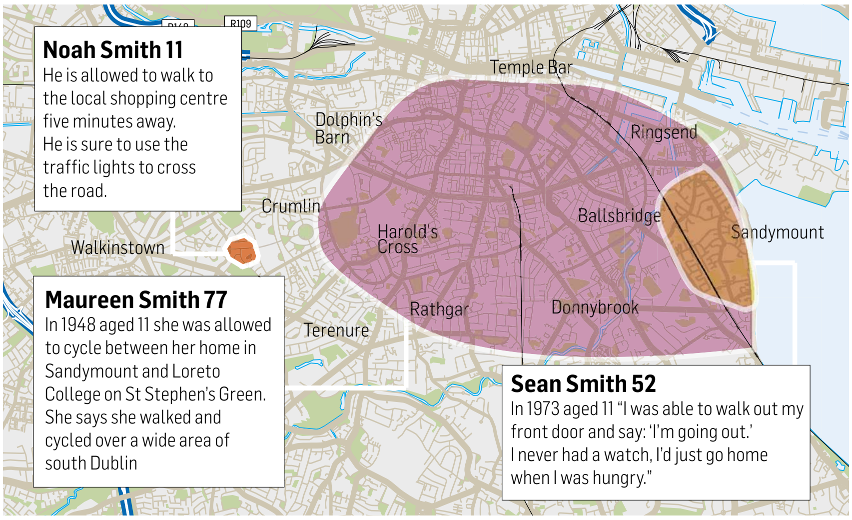

Figure 3.1. Image illustrating the areas accessed when 11 years old. Source: McTeirnan (2015). Room to roam: children's lives are restricted by modern world. Irish Times. Reproduced with permission.

The article is accompanied by a map (see Figure 3.1), with highlights areas indicating the territory in which each of the three protagonists were allowed to roam freely when they were 11 years old. The most striking feature is the difference in size. The areas that the individuals are, or were, able to access freely has decreased significantly. While this is just one family's experience, it is illustrative of a broader shift in children's lives. Of course, this change is a societal shift, and cannot be attributed to any singular cause. There are, however, some strong contributing factors, including space, safety concerns, and competing activities.

3.2.1 Space. With growing populations, there is less space available and therefore a shortage of adequate play spaces accessible to children (Singer & Singer, 2005; Singer et al., 2006). Coupled with the increasing move towards urbanisation, soon half of the world's children will be living in cities. A survey by the Heritage Council of Ireland (2010) shows that children spend more time indoors and less time playing in the streets, in fields, in the woods, and in other outdoor places that their parents frequented when they were younger. Interestingly, even when outdoors, children tend to engage in more adult-led, organised sports activities and fewer make-believe, child-created imaginative games, or games using self-initiated rules (Clemens, 2004).

A report by the UK National Trust estimates that the range of the area that children are allowed to roam freely and unsupervised has decreased by 90% compared to the 1970s (Moss, 2012). It has also been suggested that there is a mismatch between the kinds of play spaces children would like and the kinds of spaces that are designed for them by adults (Hart 2002; Rasmussen 2004). Discussions around children's spaces often link in with affordances, as discussed in Chapter 2; for instance, by examining to what extent an outdoor environment affords physical play (e.g., Cloward Drown & Christensen, 2014).

Studies suggest that being in natural environments can provide learning opportunities for children and has beneficial effects on children's physical, mental, and social health, and wellbeing (Chawla, Keena, Pevec, & Stanley, 2014; Fjortoft, 2004; MacQuarrie, Nugent, & Warden, 2015). Time spent outdoors has been shown to be a strong and consistent correlate of physical activity in children (Sallis, Prochaska, & Taylor, 2000). Limited access to outdoor play spaces and nature has been linked with increased rates of obesity, diagnoses of mental health disorders, and self-harm in children (Louv, 2005). Studies are consistently showing that children are more active when they are outside; they move more, play longer, and therefore spending less time sedentary (Cooper et al., 2010; Gray, 2013; Wheeler, Cooper, Page, & Jago, 2010).

3.2.2 Safety. There is an increased concern about child safety due to perceived risks from increased traffic, crime, violence and harassment, and the fear of child abduction by strangers (Carver, Timperio, & Crawford, 2008; Clemens, 2004; Singer et al., 2009; Tandy, 1999; Valentine & McKendrick, 1997; Veitch et al., 2006). These concerns often curtail opportunities for children to play outside. In a study comparing children's independent mobility (ability to move freely within your neighbourhood or city without supervision) levels in 16 countries, Ireland ranked 12th, ahead of Australia, Portugal, Italy, and South Africa (Shaw et al., 2015). The top four spots were occupied by Finland, Germany, Norway, and Sweden, with England in 7th place. The study found that traffic is one of the major factors impacting on children's independent mobility, and there is also a small association between restricted mobility and parents' fear of strangers.

An important point is that safety concerns are often anchored in the perception of safety. For example, the number of road traffic deaths per capita in Ireland are almost the same as in Finland (Shaw et al., 2015), and the danger posed by strangers is very small overall (Gill, 2007). Therefore, the origin of parental fears is not reflective of statistics regarding these potential threats, but rather based on the perceived significance of the threat. There are, of course, variations within countries, but the difference in attitudes across countries highlights the important part cultural and social norms play in parental decision-making regarding the spaces they allow their children to access freely. Parents may also curtail their children's independent mobility because they are concerned that letting children roam too freely may be regarded as poor parenting by others (Shaw et al., 2013, 2015). A loss of independent mobility means diminished access to places outside of children's homes and could have adverse effects, such as missing out on practicing social skills, decreased autonomy, and less physical activity.

Some studies show that parents do generally acknowledge the value of outdoor play for their children's development and recognise the need to balance their concerns (Clemens, 2004; Gill, 2007). But this balancing act can be difficult, especially once certain habits are established and when all the neighbours are doing the same thing. Of course, sometimes parental concerns are very much justified, and it would be presumptuous to regard all parents as overly protective. Neighbourhoods that are perceived as unsafe by parents are a factor in the degree of concern they have about their children playing outside (Kimbro & Schachter, 2011). The details, however, are a lot more complex. Contrary to what might be expected, some studies find that living in public housing, or a disordered neighbourhood, is not necessarily a guaranteed predictor of limited children's outdoor play (Burdette & Whittaker, 2005; Kimbro, Brooks-Gunn, & McLanahan, 2011).

Exploring buffers of the effects of neighbourhood poverty on maternal fear, Kimbro and Schachter (2011) found that socioeconomic status (household class), levels of education, employment status, and mothers' physical and mental health are associated with levels of fear in a sample of mothers of five-year-olds. This study, and similar ones, would suggest that the primary indicator of restrictions based on potential dangers are largely driven by the perception of the level of danger and contextual factors, rather than being solely determined by the physical environment. However, they also point to an oversight in existing research that perceived neighbourhood characteristics are not given enough attention when assessing the fear of danger. Bennetts et al. (2018) acknowledge that families living in less safe neighbourhoods may restrict children's independent mobility for justifiable reasons and are not overly protective. They also suggest that, in safer environments, factors such as neighbourhood knowledge and social cohesion influence children's independent mobility.

Referring to parental practices in middle class America, Malone (2007) warns that children are "bubble-wrapped" by overly concerned parents, and that the exercise of shielding children from potential dangers can mean that children miss out on opportunities to acquire the psychological, social, emotional, and cultural skills needed to navigate their environments well. Thus, the issue of safety and the urge to protect is competing with other values, which would foster children and young people's independent development.

3.2.3 Competing activities. Another change in pastimes, that might be partly driven by the implications of evolving spaces and safety concerns, is the rise in organised leisure activities. Children tend to have a lot of scheduled and organised activities filling their days and fewer opportunities to freely choose their play activities (Christensen 2002; Elkind, 2008; Irish Pre-School Playgroups Association, 2006). These could be music lessons, dance lessons, organised sports activities, or homework clubs (Bergen & Fromberg, 2009; Karsten, 2005; Tandy, 1999). While there may be many benefits associated with structured activities, the concern is that children get fewer opportunities to engage in free, child-led play, and are spending more time in places *for* children than they do in *children's places* that they have made and picked themselves (Rasmussen, 2004).

Changes in the environment introduce the potential for alternative affordances. Due to increased traffic, the changed landscape of play spaces, housing situations, and safety concerns, there are fewer opportunities for free play and outdoor play. Changed environments means that affordances may have changed. Due to increased traffic, the changed landscape of play spaces, housing situations, and safety concerns, there are fewer opportunities provided to play outside and therefore fewer affordances for active and risky play. Considering cultural and societal aspects of modern life, it can be argued that the values or norms embraced afford different behaviours with a greater emphasis on organised, structured activities, the wish to provide a wide range of extracurricular activities to further children's growth, and a need to safeguard children and young people. Furthermore, some affordances are more likely to be actualised than others and interactions require varying levels of engagement or effort. With restricted access to opportunities to outdoor play areas, inside play becomes increasingly more prevalent and offers different affordances that may not yield the same benefits associated with unstructured outdoor play.

3.2.4 Change in time use. Some evidence for the change in children's pastimes comes from longitudinal or panel studies that allow for a comparison over time. One example is the American-based Panel Study of Income Dynamics, which is based on time use diaries and traces the changes in children's time use from 1981 to 1997, and again from 1997 to 2003. The first wave of data showed that, compared to children in 1981, children's schedules in 1997 were increasingly filled and family tended to spend less time together. There was a decrease in free time, play time, unstructured outdoor activities, a decline in household conversation and joint family meal times, along with an increase in time spent studying and engaged in structured sports activities (Hofferth & Sandberg, 2001).

Data on the next wave shows a decline in sports activities and outdoor activities, and a further increase in time spent studying (Hofferth, 2009). One of the big overall changes highlighted by Hofferth and colleagues is the reduction in children's discretionary time, i.e., time children have left over when the time spent on eating, sleeping, personal care, school and day care are subtracted. In 1981, six- to 12-year-olds had 57 hours a week; in 1997 this was reduced to 50 hours, and children in 2003 only had 48 hours of discretionary time per week. The further reduction was mainly caused by an increase in time spent sleeping and in school. Much of this time was spent watching TV (13:46, hours:minutes), or by engaging in other passive leisure activities (1:40), as well as reading (1:35), and art (1:00). The other main chunk was spent more actively, on play (9:56), sport (3:47), outdoors (00:25), and hobbies (00:03). In a survey of 830 American mothers with children aged between three and 12, the primary reason listed (by mothers) for not playing outside was increased screen time, followed by crime and safety concerns, not having enough time to spend time outside with their children, a lack of adult supervision, or a fear that children might harm themselves while playing (Clemens, 2004).

Both studies highlight the growing position of screen time as children's pastimes, but they also show the influence of context in shaping the parameters of children's activities and ultimately the types of proximal processes that children are engaging in. Two themes that are highlighted here are the change in space, from outdoor to indoor, and the change in available time parents have to spend with their children; thus the availability and potential affordances from unstructured activities are shifted to activities that are either structured and supervised, or contained within the home.

3.3 Screen Time

The data from the changing patterns in children's leisure activities show that another type of activity has made its way into children's lives. As the provision of adequate and safe outdoor play spaces has decreased, the proliferation of indoor-based activities, particularly screen time, has increased.

The definition of *screen time* varies from study to study. A recent systematic review of reviews, which addresses the association between screen time and health and wellbeing, includes studies that measure time spent with any type of screen, either self-reported or observed (Stiglic & Viner, 2019). This conceptualisation includes television viewing and other film formats, such as DVDs, as well as computer and console games, tablet use, and mobile phone use (Elkind, 2003; Singer & Singer 2005; Singer et al., 2006). However, studies do not always take all of the different types of screen activities into account. In some cases, this is due to practical reasons. In studies based on existing data sets, for instance, the inclusion criteria of different devices is limited by the scope of the data available.

Compared to other activities, there is one pivotal characteristic of screen time, relating to the level of input required for engagement: the person is usually physically passive. Adding to the sedentary element, screen time is often a low effort and easily accessible activity. Framed within the concept of affordances, screen time as an activity might be more likely to be actualised than other activities, such as reading, playing games, or playing outside (especially in cold or rainy conditions), which require more input and effort. The domination of *receiving* over *creating* is particularly applicable to watching TV. More modern technological tools do offer a certain level of interactivity either by engagement with a game, or interactions with other people.

The definition of play, as given earlier, does not necessarily exclude screen time; however, some who have written extensively about play, such as Vygotsky, conducted their observations in a different era. He might have made different observations if he had lived in the digital era with constant access to screens of all kinds. It could be argued that screen time is indeed freely chosen, intrinsically motivated, and fun; thus it fulfils some of the criteria to be considered as play. But, screen time can be viewed as somewhat restricted in terms of its ability to be child-directed and child-led; in the case of watching television, screen time is generally passive. Games on tablets, computers, consoles, and mobile phones offer more agency to the person interacting with it. Nevertheless, Gardner and Davis (2013) suggest that interactions are still restricted by the frame set by the game creator and are filled with suggestions that subtly direct the user to engage with a game in a certain way. The possibilities to create freely, or to shape the game, are often limited.

Watching television seems to be the main screen time activity for children, but computer games are also very popular (Yang, Helgason, Sigfusdottir, & Kristjansson, 2013). In more recent years, screen time activities have branched out to include other activities, facilitated by the availability of internet access due to the proliferation of smartphones and tablets in households. Research from the UK shows that, from 2005 to 2015, the average time spent watching television for eight- to 11-year-olds rose by about one and a half hours to 14.8 hours per week; time spent online increased more than twofold to 11.1 hours per week (Ofcom, 2015). Data from 2017 show a similar trend, with weekly hours for television viewing slightly reduced and online activities increased by more than two hours on average (Ofcom, 2017). A study from Iceland found that more than a third of 10- to 12-year-olds watched in excess of two hours of TV a day (Yang et al., 2013).

Data from the GUI study (Williams et al., 2009) show that half of Irish nine-year-olds have their own television in their bedrooms. Two-thirds of children watch one to three hours of television on an average weekday, one in ten children watch three or more hours. Only a small minority of children watch no television at all. Another study from Scotland, involving just under a thousand 12- to 16-year-olds, found that television viewing was the most dominant pastime (Biddle, Gorely, Marshall, & Cameron, 2009).

In relation to screen time, studies find that boys tend to spend more time than girls engaging with screens, especially with video and computer games (Fairclough, Boddy, Hackett, & Stratton, 2009; Marshall, Gorely, & Biddle, 2006; Rideout, Roberts, & Foehr, 2005; Roberts & Foehr, 2004). This attraction might be explained by the fact that the structure and rules of many video games mirror those typically played by boys (Greenberg, Sherry, Lachlan, Lucas, & Holmstrom, 2010). In a study of preferences among young people, the authors found that girls preferred traditional games, such as card and dice games, quizzes, puzzles, or arcade type games. Boys were more drawn to games relating to sports, fighting, shooting, and racing.

There are also discussions regarding the role of media in shaping gender roles and perpetuating gender stereotypes. Oftentimes, there are more male than female lead characters (Collins, 2011; Green, 1997). Especially female characters are often portrayed in a negative matter, infantilised or sexualised, and perceived as subordinated. The relationship between gender related messages and children's perceptions and behaviour is not fully understood. Some studies suggest that children's behaviour is influenced by behaviour observed through media (e.g. Coyne, Linder, Rasmussen, Nelson, & Collier, 2014), but the extent to which displays of gender stereotypes impact on children's perceptions are not clear (e.g., Wille, Gaspard, Trautwein, Oschatz, Scheiter, & Nagengast, 2018).

All in all, children spend the majority of their leisure time with sedentary activities, television was the most prominent activity. Given the definition of proximal processes as an activity that is frequent and recurring, screen time can certainly be regarded as a proximal process in children's lives. As such, the research interest in screen time is warranted. It also suggests that, if screen time is an integral part of children's activities, then it may be an influencing factor on children's development and socio-emotional outcomes.

3.4 Impact of Screen Time

As many of the points discussed pre-empt, there are concerns about the increased use of screen time among children. Moreover, most of the literature suggests that screen time is associated with negative outcomes, and only a few studies highlight potential positive associations with screen time (e.g., Bediou et al., 2018; Bittman, Rutherford, Brown, & Unsworth, 2011; Desjarlais & Willoughby, 2010). Studies about potentially detrimental effects of screen time usually concentrate on aspects of physical health, cognitive skills, and mental health and wellbeing which will be reviewed in turn.

3.4.1 Physical health. Overall, the association between increased screen time and negative outcomes in the area of physical health is very well documented and suggests deleterious effects to both the development and maintenance of a healthy body. Some of the associations are arguably a combination of different factors, which cannot solely be attributed to screen time, but are rather a product of the changed routines due to reasons outlined earlier. Thus it is important to acknowledge that most studies are based on associations and hence cannot establish a direct causal link between screen time and physical health outcomes. However, many studies provide a well-constructed argument linking screen time to physical health, even if they controlled for potentially mediating factors.

3.4.1.1 Sleep. Screen time can influence both the quantity and the quality of sleep. A recent survey of parents found that children (between eight and 17 years of age) who watch television, or use a computer, before going to bed slept one hour less on average (Fuller et al., 2017). The study also found that children playing video games, or use a mobile phone, before bed time sleep 30 minutes less on average. The use of electronic devices at bedtime also increased the likelihood of sending text messages in the middle of the night and tiredness in the morning. Three possible mechanisms for this association have been suggested. First, time displacement: children do not get adequate sleep when they stay up using their devices at night time. Unlike adults, children usually do not have the autonomy to compensate for the late onset of sleep by sleeping in longer the next day. Secondly, the stimulation of the screen time content impacts on children's sleepiness levels and delays onset of sleep. Thirdly, there is an increasing body of evidence suggesting that the light emitted by electronic devices hinders the onset of sleep by disturbing the body's natural build-up of melatonin, a hormone that brings about sleepiness (LeBourgeois et al., 2017). In turn, sleep deprivation is associated with obesity, diabetes, behavioural problems, and impacts on the immune system and metabolism (Zimmerman, 2008).

3.4.1.2 Overweight and cardiovascular fitness. Many studies focus on overweight and cardiovascular fitness. Obesity is a growing social problem with rates of childhood obesity high and continuing to increase in the Western world (Ng et al., 2014). According to World Health Organisation data (2018), one third of 11-year-olds are overweight. Data from GUI suggest that one in four children, both at age nine and age 13, are overweight or obese (Williams et al., 2009, 2018).

A New Zealand-based birth cohort study examined television viewing patterns during childhood (age five to 15) of approximately 1,000 26-year-olds, and found an association between average television viewing and heightened BMI, as well as lower cardiorespiratory fitness (Hancox et al., 2004). The study estimates that about 15% of cases of overweight, poor cardiorespiratory fitness, and raised cholesterol are associated with watching more than two hours of television during childhood years. An Australian longitudinal study also found significant cross-sectional and longitudinal associations between television viewing and BMI across three waves of data for children aged six, eight, and 10 (Fuller-Tyszkiewicz, Skouteris, Hardy, & Halse, 2012). A systematic review found an association between hours of television viewing and BMI in 23 of 26 studies reviewed on preschool samples (Cox, Skouteris, Rutherford, & Fuller-Tyszkiewicz, 2012). Mark and Janssen (2008) report a dose-response relationship between screen time and metabolic syndrome among adolescence (aged between 12 and 19). Metabolic syndrome describes a cluster of risk factors for cardiovascular disease and type-2 diabetes; for example, obesity and high blood pressure. Adolescents watching three hours or more television a day were two to three times more likely to have metabolic syndrome, when compared to those watching one hour or less.

Many of these studies focused exclusively on television viewing. However, others have also factored in other forms of screen time. Falbe and colleagues (2013) found that overall screen time (TV/DVD/videos, and electronic games) was associated with an increased BMI, and this effect was stronger for girls. Väistö et al.'s (2014) study on a sample of 468 Finnish six- to eight-year-olds found an association between an increased cardiometabolic risk, lower levels of physical activity (especially unstructured), and sedentary behaviour (especially watching television). The group with the highest cardiometabolic risk were children with high levels of screen time and low levels of physical activity.

There are two common themes in these studies. First, even when multiple types of screen time are considered, associations with television viewing are often strongest. One of the reasons might be that television is a well-established medium and is, or at least used to be, the most popular form of screen time. With the increase in tablet and smartphone use, this trend might be changing, or may already have changed. Viewing is not the only issue; the content of what is being watched on television also matters. In regard to physical health, some studies suggest that screen time is conducive to unhealthy food intake insofar as advertisements influence food choices (Batada, Seitz, Wootan, & Story, 2008; Jackson, Djafarian, Stewart, & Speakman, 2009).

However, some studies on children's weight have suggested that when other factors are considered, the effect of screen time diminishes to levels that are deemed too low to be clinically relevant (Marshall, Biddle, Gorely, Cameron, & Murdey, 2004; Wake, Hesketh, & Waters, 2003). This indicates that the relationship is more complicated, as would be expected from a bioecological perspective. No process can be considered in isolation and other factors can play a mitigating role that influence and possibly trouble potential associations from being made. This also accentuates the earlier suggestion that the relationship between screen time and adverse health outcomes is not necessarily causal in nature. For instance, Fuller-Tyszkiewicz et al. (2012) suggest that the relationship between television watching and BMI is bi-directional. Higher levels of sedentary activity can predispose children to a higher BMI, which in turn can lead to an increase in specific sedentary activities, such as television. Interestingly, a study with 13- to 15-year-olds found that the association between television viewing and increased BMI only holds when the television is actively attended to (Bickham, Blood, Walls, Shrier, & Rich, 2013), which would support the idea that television content might contribute to unhealthy eating.

A second strong feature throughout these studies is the extent to which symptoms associated with screen time are similar to symptoms typically associated with sedentary behaviours, or a lack of physical exercise more generally. Sedentary behaviours are types of behaviour that require very little energy and physical movement, such as reading, sitting, driving, or watching television, and are characterised by a low metabolic equivalents of task rate (Owen et al., 2000; Pate O'Neill, & Lobelo, 2008; Tremblay et al., 2010). Although many children fail to meet healthy activity levels of at least one hour of moderate to vigorous activity a day (DOHC, 2009; Tremblay et al., 2014), they tend to spend several hours engaging in sedentary activity. This inactivity is associated with an increased risk of cardio-metabolic disease, all-cause mortality, as well as other physiological problems, regardless of whether or not activity level guidelines are met (Treuth et al., 2007; Katzmarzyk, Church, Craig, & Bouchard, 2009; Owen, Bauman, & Brown, 2009).

A meta-analysis by Tremblay et al. (2011) supports the hypothesis that less sedentary activity is associated with a decreased BMI score. Their systematic review of 232 studies showed that sedentary behaviour, typically measured by hours spent watching television, is associated with an unfavourable body composition and decreased fitness. Thus it could be argued that any associations found between screen time and poor physical health are simply due to the fact that screen time is a sedentary activity, a category which also includes reading, for example. However, many studies have highlighted that the association between screen time and being overweight holds independent of physical activity levels, that is, the negative effects found in some studies persist, irrespective of physical activity levels (Falbe et al., 2013; Jackson et al., 2009; Maher, Olds, Eisenmann, & Dollman, 2012; Mark & Janssen 2008). Therefore, screen time cannot merely be regarded as a sedentary behaviour, but seems to have an impact in its own right.

3.4.2 Cognition. Some studies show that there is a negative association between television viewing and cognitive skills, measured as attention, executive functioning, and academic skills. Studies on attention and executive functioning often focus on children from zero to six years of age. The evidence on attention problems in relation to screen time is mixed. Several studies show that there is an association between screen time and attention problems (e.g., Christakis, Ebel, Rivara, Zimmerman, 2004; Jolin & Weller, 2011; Nathanson, Aladé, Sharp, Rasmussen, & Christy, 2014; Nikkelen, Valkenburg, Huizinga, & Bushman, 2014; Zimmerman & Christakis, 2007), but some studies do not find a relationship (e.g., Ferguson, 2011; Foster & Watkins, 2010). Others suggest that the relationship between attention problems and screen time is bi-directional (Swing, Gentile, Anderson, & Walsh, 2010; Weiss, Baer, Allan, Saran, & Schibuk, 2011). Foster and Watkins (2010) reanalysed data from the American-based National Longitudinal Survey of Youth, which examined the link between early television viewing (at age one and three) and subsequent attention problems (at age seven) (N = 1,159). They found that the association only exists for extensive viewing and found that other variables control for this effect; for example, mothers' academic achievement and children's poverty status during their early years.

Executive functioning encompasses skills like attention, working memory, problem solving, goal-directed behaviour, and inhibitory control (Lillard & Peterson, 2011). Executive functioning is linked to academic success. In a study with four-year-olds, the researchers created two group conditions. In the first condition, children watched educational cartoons for nine minutes; in the second condition, they watched a fast-paced cartoon for the same amount of time. Afterwards, children were given tasks that assessed their executive functioning. The researchers found that those in the fast-paced cartoon group performed significantly worse than the children who watched an educational cartoon, suggesting that not all television viewing is equally disruptive to executive functioning. However, the evidence is mixed. Blankson, O'Brien, Leerkes, Calkins, and Marcovitch (2015) assessed children at aged three and four, and again at aged five. While they found an association between television viewing and executive functioning, this effect diminished when background variables, such as the home learning environment, and parental scaffolding, were taken into account. This suggests that proximal processes, exemplified by a home that is enriching and provides a support system, add more weight to children's cognitive skill development than screen time.

Furthermore, studies like the Lillard and Peterson (2011) study mentioned above, show that it is not all about quantity; the quality or the content of screen time seems to matter. For instance, Zimmerman and Christakis (2007) found no association between early media exposure (before age three) and attention problems (at age five) for educational content (e.g., Sesame Street, Winnie the Pooh), but found a significant association for nonviolent entertainment (e.g., Flintstones, Bambi) and violent content (Power Rangers, Scooby Doo). A further analysis into content by Lillard, Drell, Richey, Boguszewski, and Smith (2015) used a series of experiments to tease out the impact of different types of programmes. Their research showed a negative association with fast-paced shows with fantastical content, but not for other programmes. The negative effect of fantastical content was not found when children (aged four) were reading fantasy stories instead.

A New Zealand-based prospective birth cohort study found that high levels of television viewing during childhood and adolescence were associated with lower academic achievements at age 26, even when controlled for intelligence, household class, and childhood behavioural problems (Hancox, Milne, & Poulton, 2005). A systematic review found 31 studies that examined media consumption and academic achievement, and 65% of studies found a significant association between increased media consumption and poor academic outcomes (Nunez-Smith, Wolf, Huang, Emanual, & Gross, 2008). However, the authors' definition of media consumption included screen time as well as print media such as magazines. Of the 26 studies in their review that focused solely on television viewing and academic outcomes, 62% of studies showed a significant association.

A large study with approximately 2,000 children and young people between the ages of eight and 18 found that children with high levels of media use tend to get more average, or below average grades, than those with low levels of media usage, even when controlled for contextual factors such as parental education and family structure (Rideout, Foehr, & Roberts, 2010). Again, the study included print media, and excluded phone usage for the purpose of talking and texting, as well as computer usage for non-recreational purposes, such as school work. Data from the Irish national assessment of reading and mathematics, which included over 8,000 sixth class pupils (aged 11 and 12), found that lower average mathematics and reading scores were associated with increased television viewing, playing computer games, and using the internet (Kavanagh, Shiel, Gilleece, & Kiniry, 2015). They also found a negative association between school performance and having a television in their bedroom.

Overall, these studies suggest that there may be deleterious effects for some forms of screen time, and especially with high screen time levels at an early age. Pagani, Fitzpatrick, Barnett, and Dubow (2010) explain that the learning strategies needed in school require effortful control including self-discipline, attention span, and the ability to stick with a task despite frustration or boredom. The authors suggest that early television exposure might contribute to children adopting a passive role that is not conducive to the active nature of the learning processes in school. From the research reviewed, however, there are many factors that also seem to play a role, especially content and context. Since data often do not record these factors, it is difficult to make a definite claim. Nonetheless, regarded from a different angle, studies like Lillard et al. (2015) would suggest that, while there is a possibility for media content to be educational, more benefits are gained when the same material is approached through a different medium; for example, as a story, or a book that is co-read with an adult.

This would fit with Vygotsky's (1962) notion of learning as a co-constructed process, in which the learner is initially guided by a more experienced other, until the process can be internalised. Once the learner has acquired the strategies to do so, they can then use this new skill to solve further problems. The more knowledgeable other, and the interactions taking place with that other, are part of the proximal processes that are highlighted as the driving force in Bronfenbrenner's model. With frequent and sustained encounters of co-constructed learning, children are given a skill set that will aid them in other settings, such as school, or during social interactions.

There are some studies that show that if a more nuanced approach is taken regarding content and context, screen time can have a positive impact. For example, a longitudinal study conducted over a three-year period with preschool children from low to medium income families found that viewing informative programmes, such as Sesame Street or Mister Rogers' Neighborhood, was associated with school readiness and the development of relevant academic skills (Wright et al., 2001). Another study is based on 2004 and 2008 data from the Longitudinal Study of Australian children with two cohorts: one born in 1999 and one born in 2003 (Bittman et al., 2011). For the younger cohort, the researchers found that access to the internet was positively related to verbal ability, after controlling for the amount of time children spent reading. They also found positive associations for television co-viewing. Little television viewing management (i.e., television on in the room although nobody is actively watching) was associated with lower receptive vocabulary. The authors suggested that overall, when all other contextual factors are controlled for, there is no relationship between television viewing and receptive vocabulary. The group most at risk for delayed language acquisition are children from low socioeconomic households where there is poor media use management. The results of the older cohort followed a similar pattern. Relatedly, in their analysis of academic performance of Irish Sixth class students, Kavanagh and colleagues found that pupils with a computer at home had higher mathematics test scores than those with no computer at home (Kavanagh et al., 2015). This would suggest a particular type of use of digital technology can enhance learning.

3.4.3 Mental health and wellbeing. In recent years, numerous authors have explored today's younger generation, and voiced grave concerns over the digital age's influence on children and young people's psychosocial and emotional wellbeing. Gray (2011) suggests a causal link between the decline of play and the rise of psychopathology in children and adolescents, and Aric Sigman (2005) describes how rates of depression have risen with the rates of television ownership.

A book length study about the impact of screens on young people was published in 2017: Jean Twenge's *iGen: Why Today's Super-Connected Kids are Growing Up Less rebellious, More Tolerant, Less Happy- and Completely Unprepared for Adulthood and What that Means for the Rest of Us*. Twenge defines those born in 1995 and later as the *iGen* (internet generation) and argues that they are less happy than previous generations, and less satisfied with themselves overall. She notes that they often feel lonely or left out, are more inclined to say that they feel that they cannot do anything right, and that their life is not useful, or that they do not enjoy life (see also Twenge, 2000, 2015; Twenge et al., 2010; Twenge, Joiner, Rogers, & Martin, 2018). These statistics are based on data from the Monitoring the Future (MFT) project, which has asked American 8th, 10th and 12th graders, as well as students and young adults, the same questions since 1975, with about 50,000 students being surveyed annually. Twenge posits that screen time, and most notably the smartphone, is a likely candidate for the increase in loneliness due to a decrease in face-to-face social interactions. The MFT data also show a rapid increase in depression levels of female pupils, with an increase of 50% in depressive symptoms between 2012 and 2015 (the increase for male pupils was 21%). Twenge suggests that girls are especially vulnerable to potential social media effects due to the heightened emphasis on female body image.

In some of her earlier work, Twenge hypothesised that the increase in scores on standardised measures of anxiety and depression is attributed to the shift from intrinsic goals to extrinsic goals (Twenge, 2000; Twenge et al., 2010). This is mirrored in the literature on happiness. In her book *Born to Buy*, Juliet Schor (2004) argues that high consumer involvement is a significant contributing factor to anxiety, depression, low self-esteem, or psychosomatic complaints in children and adolescents. Epidemiological studies report that among children and adolescents, one in five suffer from some type of psychiatric disorder (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003; Costello, Copeland, & Angold, 2011), including conduct disorders, Attention Deficit Hyperactivity Disorders, panic disorders, and depression (Ford, Goodman, & Meltzer, 2003; Kessler et al., 2005). There is an increasing amount of literature investigating the particular relationship between screen time and depressive symptoms, and externalising behaviours, such as aggression, and social and emotional wellbeing.

3.4.3.1 Depression. Breland, Fox and Horowitz (2013) analysed a sample of overweight females from a minority group population and their results suggest that high amounts of screen time, defined as more than five hours a day of television viewing and computer use, posed an increased risk for depression. This association was also suggested for samples of adolescents; Schmitz and colleagues (2002) suggested a link between increased screen time and depressive symptoms among 11- to 15-year-olds (mean age 12). Another study suggested that increased television viewing during adolescence is associated with higher odds of depressive symptoms at young adulthood, especially for males (Primack, Swanier, Georgiopoulos, Land, & Fine, 2009). A recent longitudinal study found that more television viewing, and more screen time in general, at age 15 was associated with more depressive symptoms at age 21 (Grøntved et al., 2015).

A large study from Iceland (N = 10,829) asked 10- to 12-year-olds about their screen time habits. Screen time in this study included watching television and DVDs, general computer use, playing computer game online and offline, and using the internet for chatting (Yang et al., 2013). They found a linear dose-response relationship between all types of screen times and young people’s mental wellbeing. In their study, more screen time was associated with an increased likelihood of experiencing feelings of loneliness, lack of appetite, little interest in doing things, sadness, hopelessness, as well as sleep difficulties and wanting to cry. This association was especially evident for young people who spent more than four hours with various screen time activities. Houghton and colleagues (2018) found only minimal support for a causal link between screen time and depressive symptoms in adolescence. They found a significant association between increases in screen time and increases in depressive symptoms over a two-year period, especially for boys. Thus while there is no definite evidence for a causal relationship, a significant increase in screen time may be a sign of deteriorating mental health.

Some studies highlight that not all types of screen time are the same, and online activities, such as social media, or chatting, is often used to socialise and could therefore help young people to feel less lonely (e.g., Teppers, Luyckx, Klimstra, & Goossens, 2013). Furthermore, many studies do not include contextual information; watching television can be a solitary activity, but friends and families can also do this together. Some studies also point at potential mediators. One study, for example, found that the association between screen time and depressive symptoms only exists for individuals with exercise habits below the median, suggesting that physical activity might negate this relationship (Sanchez-Villegas et al., 2008). There are some studies that would support this; a meta-analysis found that increased sedentary time was associated with lower self-esteem scores (Tremblay et al., 2011). Mammen and Faulkner (2013), in their review of prospective studies, found consistent evidence that the risk of depression is elevated by physical inactivity.

3.4.3.2 Aggression. One issue that has been widely explored is the association between screen time and aggression or arousal for children and youth. Some studies are focused on television viewing but the majority focus on violent media content, specifically video games and playing for excessive amounts of time (Anderson, 2004; Anderson et al., 2003; Anderson et al., 2008; Browne, Hamilton-Giachritsis, 2005; Christakis & Zimmerman, 2007; Manganello & Taylor, 2009; Mistry, Minkovitz, Strobino, & Borzekowski, 2007). Anderson and Bushman (2001) suggest that the violent media content desensitises the viewer to on-screen and real-life violence.

In line with this, a study of roughly 600 14-year-olds found an association between video game violence and aggression (Gentile, Lynch, Linder, & Walsh, 2004). Young people exposed to more video game violence were more hostile, and more likely to report involvement in arguments with teachers and physical fighting with peers. However, they also found that youths who tend to be more hostile also play more violent video games, which emphasises the importance of not inferring causal links based on correlation-based evidence. A more recent study analysed a sample of 10- to 14-year-olds and found that time spent with internet communication, online gaming, and playing first-person shooting video games, can predict aggression and delinquency in young people (Holtz & Appel, 2011). They also found that while parent-adolescent communication about the internet correlated negatively with problem behaviour, the consideration of that did not alter or mediate the relationship between media violence and externalising behaviours.

There are, however, also studies that accredit video game playing with positive effects. They suggest that video games can contribute to a reduction in emotional disturbance, may offer a release to anger, or an opportunity to relax, destress, and forget about problems (Jones, Scholes, Johnson, Katsikitis, & Carras, 2014; Olsen et al., 2007). Furthermore, a meta-analysis of cognitive performance among action video game-playing adults found a medium sized effect in the domains of perception, spatial cognition, inhibition, top-down attention, task switching, verbal cognition, and problem solving (Bediou et al., 2018). Combined, these studies suggest that there is more to video games than the relationship with aggression; players can draw a range of benefits from playing that increase their wellbeing through a variety of pathways (see Jones et al., 2014). Bediou et al. (2018) note that action games can be violent games, but not all of them are; conversely, not all violent games are also action games.

3.4.3.3 Social and emotional wellbeing. Hinkley and colleagues (2014) report data from a sample of two- to six-year-olds (*N* = 3,604) from eight European samples. Parents were asked about their children's television viewing, computer gaming, and general computer use. This measure of screen time was compared with measures of social and emotional wellbeing at a follow-up two years later. Two associations were found to be significant; there was an increased risk for emotional problems for girls with elevated levels of computer use, and an increased risk for poor family functioning for children with elevated television viewing levels. The authors suggest that families with high levels of television viewing may not support the child's wellbeing sufficiently and that family relationships are not as well developed as they are in other families.

Holder and colleagues (Holder, Coleman, & Sehn, 2009) explored wellbeing with a sample of eight- to 12-year-old Canadian children (*N* = 375). In their study, they looked at children's happiness and self-concept. They found that there was a negative correlation between children's wellbeing and screen time (consisting of television viewing, computer use, video games, and talking on the phone). However, the correlations they found were weak. They also explored active leisure activities and found a positive association between physical activity and wellbeing, which was much stronger than the negative association with screen time.

A study based on data from the American National Survey of Children's Health explored television viewing, computer use, and combined media use with various health related outcome measure in a large sample (*N* = 54,863) of six- to 17-year-olds (Russ, Larson, Franke, & Halfon, 2009). Controlling for a range of sociodemographic factors, the authors found that each additional hour of television was associated with an increase in social emotional problems, concerns about self-esteem and lower social competence. Overall media use showed a similar pattern, but correlations were generally weaker. Increased computer use was not associated with socio-emotional problems.

Another large study with North American 10- to 17-year-olds (*N* = 22,084) found a modest but consistent association between screen time (defined as television and video viewing and computer use), quality of life, and family relationships (Iannotti, Kogan, Janssen, & Boyce, 2009). Around one third of the sample was Canadian; in this subsample they also found that screen time was associated with a poorer self-image. A study based on Scottish children (*N* = 1,486) between four and 12 years of age (mean age 8.5) found an association between screen time (defined as television and screen entertainment) and psychological distress (as measured by the SDQ) (Hamer, Stamatakis, & Mishra, 2009). Being in the highest group of daily screen time was associated with an increased risk of scoring abnormally high on the SDQ.

An Australian longitudinal study investigated the impact of screen time among two cohorts (Allen & Vella, 2015). Data were collected in 2010 and 2012; the younger cohort (*N* = 3,956) was six years old at baseline, the older cohort (*N* = 3,862) was 10. Screen time was measured by adding time spent watching television and playing electronic games during the week and on weekends. At baseline, high levels of screen time were associated with lower levels of prosocial behaviour, higher levels of hyperactivity, peer problems, and conduct problems in both cohorts. The associations were stronger for the older cohort. At the follow-up two years later, high screen time at baseline was associated with emotional problems in the younger cohort, and with hyperactivity, peer problems, and conduct problems in the older cohort.

Some studies also find gender differences in interactions between wellbeing and the use of technology. A large UK-based study with a sample of 10- to 15-year-olds found that adolescents' wellbeing was associated with levels of social media interactions at age 10, but only for girls (Booker, Kelly & Sacker, 2018). This would suggest that if there is a causal relationship between screen time engagement and socio-emotional outcomes, the mechanism by which this occurs varies by gender. This could be due to differences in content or interaction patterns.

Overall, many studies find an association between screen time and negative psychological, social, emotional, and behavioural outcomes for children. However, often these effects are mitigated, or mediated, by other contextual factors, such as the parent-child relationship or physical activity. When these issues are considered, it appears that some proximal processes in which children and young people are engaged in might act as a protective factor to some of the risks involved. Thus screen time might be more about dosage and most certainly about other contextual factors; therefore it is important to consider all of these other factors when investigating the relationship between screen time and children's outcomes.

3.4.4 Potential pathways. While many studies are correlational, there are a good number of longitudinal studies that suggest that the associations with screen time might be more than mere correlates. There are two approaches to explain why screen time might have a negative impact on children's physical, cognitive, and socio-emotional health. The first approach is based on the position that screen time *itself* is having a negative effect (e.g., Jackson et al., 2009; LeBourgeois et al., 2017; Pagani et al., 2010; Yang et al., 2013). The second approach argues that screen time *displaces* other activities, ones that would provide a more advantageous and enriching experience, such as reading, socialising with family and peers, or exercise (e.g., Anderson, Huston, Schmitt, Linebarger, & Wright 2001; Bickham & Rich, 2006; Brady & Matthews, 2006; Bushman & Huesmann, 2006; Grøntved et al., 2015; Hancox et al., 2005; Nathanson et al., 2014; Neuman, 1988; Teychenne et al., 2010; Valkenburg & Van der Voort, 1994). Environmental stimulation is an important factor for children's development, especially during the early years where there are substantial levels of brain development. Children benefit from the inputs they receive from the interactions with others across different social contexts (Christakis, 2009; Pagani et al., 2016). For example, the decrease in families eating meals together and children having a television in their bedroom limits the amount of proximal processes and familial interactions children have with their caregivers (Pagani et al., 2016).

These two approaches are not mutually exclusive; in fact, it might be the coming together of the two which creates the intersection of the Venn diagram. Some studies also suggest that relationships could be bi-directional (Hancox et al., 2005). In addition to the possibility that deleterious impacts might be a cumulated function of both approaches, each social, cultural, and environmental context potentially contains protective and risk factors that mediate the experience; thus it is important to include contextual factors in any analyses of screen time and children's outcomes.

3.5 Parents' Attitudes

Parents are a pivotal influence on the types of proximal processes that children encounter. Although their influence may wane as children grow older and are given more freedom in their choices, parents' attitudes and behaviour constitute substantial factors in determining the ways that children spend their time. For instance, parents' behaviour influences children's health behaviours (Norton, Froelicher, Waters, & Carrieri-Kohlman, 2003) and outdoor play is related to parental attitudes toward nature (McFarland, Zajicek, & Waliczek, 2014). While attitudes might be an indication of intention, many other factors play a role. Parental role construction is a complex phenomenon, involving both self- and outside-based verification, the consideration of expectations, responsibilities, social norms and expectations, meanings, and values (Hamilton, Spinks, White, Kavanagh, & Walsh, 2016).

Studies have also identified attitudes, normative perceptions and pressures as predictors of parents' rules around screen time (Bleakley, Piotrowski, Hennessy, & Jordan, 2013; Cingel & Krcmar, 2013; Hamilton, Hatzis, Kavanagh, & White, 2015). As already mentioned in Chapter 1, parents are likely to hold both negative and positive views about screen time. A study of parental beliefs and attitudes regarding the benefits media use might present to preschool children found that, if parents regard screen time (television, computer, smartphones, and tablets) as positive contributors to their child's physical, cognitive, and emotional development, they are more likely to promote children's use of digital technology (Cingel & Krcmar, 2013; Lauricella, Wartella, & Rideout, 2015). This suggests that similar to the influence of parental' attitudes regarding health behaviour and outdoor play, parents' view of screen time impacts on children's digital play.

One of the main draws of screen time are the perceived educational benefits (Baek, Lee, & Kim, 2013; Genc, 2014; Ortiz, Green, & Lim, 2011). Parents may feel that the use of technology is important for academic achievements and that it enhances their children's career prospects (Ortiz et al., 2011); they believe it is important to acquire these skills since technology is a part of modern life (Bentley, Turner, & Jago, 2016; Genc, 2014; Roy & Paradis 2015). Parents also mindful of the enjoyment that their children experience while interacting with technology or spending time with screens (Baek, Lee, & Kim, 2013; Bentley, Turner, & Jago, 2016; Roy & Paradis 2015). Further, screen time is often seen as "downtime", that is, as an opportunity for children to relax and calm down, or to be kept occupied while parents are busy with tasks (Bentley et al., 2016; De Decker et al. 2012; He, Irwin, Sangster Bouck, Tucker, & Pollett, 2005; Hesketh, Hinkley, & Campbell, 2012).

On the other end of the spectrum, parents are concerned about potentially negative effects caused by the use, and especially the excessive use, of digital technology (Wartella, Rideout, Lauricella, & Connell, 2013). One concern centres on potential adverse health outcomes due to the displacement of physical activity by sedentary screen time activities (De Decker et al. 2012, He, Piché, Beynon, & Harris, 2010; Hesketh et al., 2012; Wartella et al. 2014). A further worry is that screen time may impact negatively on social skills (Carson, Clark, Berry, Holt, & Latimer-Cheung, 2014; De Decker et al. 2012), mood and behaviour, demarcated by a lack of energy, slower movement, and the impression that children are “zoning out” while watching TV (Bentley et al., 2016; De Decker et al. 2012, Hesketh et al., 2012, Knowles, Kirk, & Hughes, 2015). Some parents have voiced concerns over the addictive nature of digital devices and engagement with technology as well (Bentley et al., 2016; Carson et al., 2014; Knowles et al., 2015). Finally, parents worry about the influence that inappropriate content, unwanted contact and conduct, or advertisement has on their children (Blum-Ross & Livingstone, 2016; De Decker et al. 2012; Hesketh et al., 2012).

3.5.1 Navigating children’s screen time. Some studies suggest that children of parents who have negative attitudes towards screen time tend to spend less time with screens (Nathanson, Eveland, Park, & Paul, 2002; Padilla-Walker, 2006) whereas, children of parents with positive attitudes toward screen time tend to spend more time with screens (e.g., Vaala & Hornik, 2014). However, the evidence is not quite so clear cut because there are variety additional factors that come into play. Many parents also use screen time as a behaviour management tool and value screen time as a digital babysitter, albeit accompanied with a sense of resignation (Bentley et al., 2016). Furthermore, even if parents intend to limit children’s engagement with digital technology, they may still struggle to implement rules to ensure reduced engagement (Jordan, Hersey, McDivitt, & Heitzler, 2006).

In addition, the relationship between parents’ attitudes and behaviour is not always consistent (He et al., 2010). This points to the complexity of family life and the factors that influence parents’ day-to-day decision-making, as opposed to their general philosophy regarding screen time. Many studies are also limited by their focus on very young children, who have fewer opportunities to engage with media that requires the ability to read. The majority of studies available are also focused on TV, since data from other screen media, especially in the form of substantial data sets, have only become available recently.

More recent studies suggest that the focus of concern has shifted from more time-based worries, and fears around the displacement of other activities, to content-based concerns. This is especially relevant to school-aged children, since they have access to a greater variety of digital devices and are more likely to have access to the internet. This change is reflected in parental concerns in more recent studies, which revolve around content and contact (Blum-Ross & Livingstone, 2016). Parents are concerned about their children's exposure to inappropriate content, such as violence and pornography, but also racism, fake news, and misleading content. Parents worry about the influence of advertisements and more hidden forms of marketing, along with the safekeeping of their children's personal information. Another concern relates to the contact children have online, the risks with strangers approaching their children in online spheres, as well as stalking, bullying, or harassment.

The broadened scope of perceived potential risks is reflected in the strategies parents use to mediate their children's screen time use (Blum-Ross & Livingstone, 2016; Livingstone et al., 2011). Parents tend to use the strategy that suits their family best, or may combine different strategies (Nevski & Siibak, 2016). Parents monitor and restrict time spent with digital devices, children's access to devices, and the content children are allowed to engage with (Blum-Ross & Livingstone, 2016; Livingstone et al., 2011). Oftentimes, parents impose time limits and curfews, as well as a restriction about the spaces in which children can use devices. On a more technical level, parents may use software that blocks, or filters, certain content and passwords to ensure that children cannot download apps independently. Parents may monitor children's activity by being physically present, or by accessing children's accounts or profiles. Others oversee children's activities retrospectively, for instance, by monitoring children's browser history. Other parents navigate their children's use of digital technology with discussions about content, its purpose, embedded power dynamics, persuasive messages, appropriate conduct, and other elements that aid children's digital competencies. One of the difficulties is that parents may not have sufficient knowledge about devices, apps, games, or systems, which makes the monitoring process more difficult (Kostyrka-Allchorne, Cooper, & Simpson, 2017).

The aim of this project is to investigate the relationship between screen time and socio-emotional outcomes, and to explore how parents navigate their children's screen time engagement. The mixed methods project utilises Bronfenbrenner's PPCT model (Bronfenbrenner & Morris, 2006) and Gibson's (1979) concept of affordances to situate screen time in the dynamic and interconnected spheres that shape children's lives and their development. To date there is no such analysis in the Irish context. The objective of the current project is to contribute to the evidence base regarding the associations between screen time and children's socio-emotional wellbeing, and the challenges parents navigate while adapting to the growing importance of digital devices in modern day life.

4 Methodology and Epistemological Positioning

This mixed methods project investigates the relationship between screen time and socio-emotional outcomes and explores how parents navigate their children's engagement with screen time. This chapter will outline the epistemological framework of the research, the general methodological approach, the overall design of the project, the methods of the four studies, analytical approaches, and ethical considerations.

4.1 Postpositivism

The research is rooted in a postpositivist approach, which provides a frame of reference and some valuable insights into the underpinnings, assumptions and logic of interpretations. It does so in the belief that science is not common sense, but involves the search for patterns in order to make sense of the world, and that the process can make a worthwhile contribution to the knowledge base with the aim of facilitating progress.

Postpositivism proposes that there is no such thing as a wholly secure foundation when it comes to human knowledge (Phillips & Burbules, 2000). It is a nonfoundationalist approach and accepts fallibilism; no claim can be made with absolute certainty; there is no belief that can be justified in a conclusive way. Rather than searching for a universal or ultimate truth, the aim is to get closer to the truth. Science endeavours to establish increasingly more accurate approximations to the truth while acknowledging researcher bias (Bronowski, 1956; Poole & Jones, 1996; Schumacher & Gortner, 1992). Postpositivism, like positivism, still posits that there is a need for evidence, precision, and logical reasoning in science (Bem & Looren De Jong, 2006). But there is no claim for a criterion that will reveal a truth like the radical positivists proposed.

From a postpositivist, or *postpositivistic* (Bisel & Adame, 2017), point of view, knowledge is regarded as conjectural (Phillips & Burbules, 2000). Knowledge claims are based on probability rather than certainty. We can express that something is likely *not to be wrong* based on the current evidence base. There is no verifiable objective truth, only statements that are supported by the best evidence available to us at a particular moment in time. There are no permanent *facts*; all knowledge base is subject to change. Knowledge conjectures may be reconsidered, altered, or falsified. For this reason, it is vital that no knowledge claim is accepted without further questioning. This means that the evidence base is to be examined with a critical eye which may mean replicating a certain study. This is very important because some evidence might be biased. The most prominent example of study bias is probably the area of drug research, where there is a suspiciously strong association between outcome and industry sponsorship (e.g., Bekelman, Li, & Gross, 2003). Thus the researcher should not only look for confirming evidence, but for disconfirming evidence, which may require going beyond the framework of the study to consider alternative explanations, counterarguments, and criticism. The idea of falsification demands that alternative ways to test a claim should always be sought, or at the very least considered.

A conclusion derived via the postpositivist approach can develop a case or an argument, but we must acknowledge and bear in mind that this is not a warranted fact; these conclusions are subject to change based on the researchers' own further work, or on the work of others. It is central to postpositivism to accept the imperfect nature of claims and to take biases and the fallibility of evidence into consideration. Seeing science as a communal activity means encouraging others to question our work, to share their results and experiences, and to have open discussions and peer review. This can act as an invaluable countermeasure. The researcher should aspire to have as little bias and influence as possible, but evidently can never be completely neutral. Everyone has their own preconceived notions, interests, beliefs and values, which in turn ensures that no investigation takes place in a vacuum; they are always encompassed in a contextual and historical setting.

Not all postpositivist approaches are identical and interpretations can therefore vary. With its admission that no claim can be proven true, postpositivism could be seen as being aligned with Popper's (1959) idea of falsification to some degree. Popper writes on the aim of science:

> Science never pursues the illusory aim of making its answers final, or even probable. Its advance is, rather, towards the infinite yet attainable aim of ever discovering new, deeper, and more general problems, and of subjecting its ever tentative answers to ever renewed and more rigorous tests (p. 281).

He highlights the need to re-examine evidence, and to devise new experiments that explore a phenomenon from a different angle, or in a different context. In order to investigate a relationship or the key variables contributing to a phenomenon, it can also be useful to consider additional variables that may have been omitted. This will reveal whether or not a claim holds in different circumstances and the contribution of other key variables. Popper acknowledges that science is an on-going investigation and that it is unlikely that an uncontested end point will ever be reached.

Some see postpositivism as a mere *revised* version of positivism that takes into consideration all shortcomings and criticisms. Phillips and Burbules (2000) write that it is a form neither of rationalism, nor empiricism, and hence not a form of positivism. Miller (2005) even argues that postpositivism could be seen as consistent with social constructivism, since social constructions are usually not random, but follow a pattern. As in a bioecological system, there will be common influences because of shared cultural values, the laws that are in place, and the schooling system that we are part of; there is therefore a certain commonality based on a shared context. For example, there has been much research into differences between predominately collectivist and individualistic cultures. This research demonstrates that they often differ on general descriptions of individual personality, based on the values perpetuated by the social context (Triandis, 2001).

Another example can be found in the domain of language; Boroditsky (2001) shows that native English speakers tend to think of time as horizontal, whereas native Mandarin speakers tend to think of time as vertical. She suggests that our habitual thoughts are partly shaped by our mother tongue and that these shared cultural characteristics engender a form of common understanding. Having said that, the scope of commonality may differ, and sometimes a specific context can elicit alternative understandings for different groups of people. Postpositivism does not deny individual agency, nor does it discount the individual's ability to resist seemingly prescribed social structures; rather it proposes that the expression of actions always follows some kind of pattern. This justifies a structured approach to exploring social realities (Bisel & Adame, 2017). In this way, postpositivism also acknowledges the context, the interconnectedness, and other organic influences that might be at play.

It also acknowledges that there is no true objectivity, as science is always subjective. For example, perception is not a direct process. What we perceive is a filtered version of the environment; we interpret sensory data as we are perceiving it (e.g., Palmer, 1975). We evaluate sensory information by means of hypothesis-testing based on past experiences (Bruner, 1957). We may also make mistakes during the interpretations of our findings, based on our current understanding (e.g., Brysbaert & Rastle, 2012; Glass & Morris, 2006). Therefore it is important to acknowledge that science is never a purely objective process.

Choosing the right method, or methods, to answer any given question needs careful consideration. The postpositivist paradigm allows for a rich and varied array of methods and is not restricted to purely quantitative approaches, nor is it merely a rebranded version of positivism. Knowledge is acquired gradually; the postpositivist interpretation claims that results are the most accurate approximation to the truth at a specific moment in time. Based on this, evidence is presented with a certain level of confidence. Considerations need to be given to influencing factors and biases, both those emerging from the research sample and the researcher themselves. At all times, it is important to keep in mind that things are not simply black and white; there is rather a research continuum that is as varied and colourful as human nature itself.

4.2 Mixed Methods

This project adopts a mixed methods approach. The combination of quantitative and qualitative research approaches allows for more diversified research questions and analyses, offering a "breadth and depth of understanding and corroboration" (Johnson, Onwuegbuzie, & Turner 2007, p. 123). A mixed methods approach intertwines the two pillars of postpositivism: the ascertainment of a probability based on the examination of data and the acknowledgement of subjective experiences in the shaping of reality. From this viewpoint, qualitative and quantitative paradigms are not on opposing sides and methodologies that focus on capturing the meaning or experience are not rejected, as would have been the case in an entirely positivist framework (Bronowski, 1956). Adopting a mixed methods approach acknowledges that both quantitative and qualitative approaches have advantages and disadvantages.

The inherent versability of mixed methods research presents both challenges and opportunities. There are rich discussions regarding conceptual stances and paradigms, ventures of progressive method choices, and issues pertaining to study designs, analyses, inference, integration, and language used to capture the essence of mixed methods reasearch (Teddlie & Tashakkori, 2010). Gorard (2010) argues that mixed methods is neither a research design nor a paradigm in itself, but a description of how most researchers go about investigating a specific topic. He uses the analogy of purchasing a house to illustrate how apparent fundamental differences between proponents of quantitative and qualitative research are based on a philosophical argument, and do not reflect the variety of processes that contribute to decision-making in the corporeal world. When considering the purchase of a house, Gorard argues, nobody would only consider the quantitative aspects, such as the size of the house, the mortgage needed, what the payment and interests would be and so on. Neither do we only pay attention to the qualitative parts; for example, the location of the house, its proximity to our work place, or neighbourhood cohesion. Instead, both types of information, or data, are considered, simply because it is the most appropriate approach for the given situation. Gorard suggests that research projects should be approached in the same way; the research questions should be the determining factors in choosing an appropriate methodology, and that the adoption of a purely quantitative or qualitative approach does a disservice to the overall research aim. The synthesis of methods provides a much larger range of research tools and, for Gorard, this is the most sensible and ethical way to proceed.

This approach allows for the exploration of what Johnson and Gray (2010) describe as subjective reality, intersubjective reality, and objective reality; this amalgamation combines subjective experiences, social structures, and physical aspects. As such, a mixed methods approach acknowledges concurrent realities and aims to synthesise findings to provide a picture of the dynamics at play. This fits with the postpositivist framework that recognises the dual significance of valuing data with the aim to establish a model of patterns, which can in turn illuminate the connections between variables while integrating the subjective reality inherent to the human perspective. It also mirrors the bioecological system, in which a multitude of influences come together, act, and react, in accordance with the dynamics of any given situation. The research questions become the starting point: screen time as a proximal process, and its dynamics within context. The aim is to ascertain the position screen time takes within children's daily lives (Study I), to explore its connections to process, person, contextual and temporal factors (Studies II and III), and explore the qualities of interactions around screen time in a family setting (Study IV). The use of multiple angles and multiple methods allows for a richer and more varied analysis. Both qualitative and quantitative methods offer complementary insights into this complex topic.

Capturing a rich and varied landscape of stakeholders' opinions is of crucial importance; indeed, this is the only way to ensure that issues can truly be explored. Open-ended questions may bring up issues that would have not come up otherwise. Gauging how something is perceived, or received, is a vital point to consider if something is to be applied to a wider and maybe differing context. A qualitative enquiry can yield details that allow for a plotting of complex interactions; these enquiries can also provide a deep understanding of motivations, sentiments, and thought processes.

Statistical analyses ascertain probabilities. While the variance within a variable is taken into account, associations that are drawn reflect a tendency that is present in the data; something that is likely to be accurate on average. Therefore, statistical analyses can be seen as a somewhat crude approach. Participants become a data point and join many other data points; however, statistics do enable us to provide an evaluation and to offer an estimation of the likelihood of a certain event. As such, they are useful in the development of programmes and have become a pillar for establishing policy.

The purpose of a data analysis is to investigate if there is a relationship between the variables examined. Analyses, especially those based on large data sets, allow us to detect tendencies, a sort of rule of thumb, something that is likely to be accurate on average. In principle, this also allows for a generalisation to the population from which the sample was taken. Regression analyses account for variations and many potentially mediating factors, and in a sense control for the influence of these additional variables, and give information of the magnitude of these influences. However, expressing something through numbers means that the individual stories typically get lost. It is often in individual narratives where alternative, and maybe unexpected, explanations can emerge. Furthermore, using averages as a measure means that exceptional cases will not be explored fully. Therefore this way of gathering and disseminating data might not capture the individual and contextualised case of each person contained within the sample, but it can nonetheless give guidance towards a certain direction and provide a foundation for recommendations. Many health recommendations are based on studies that look at averages; while smoking can cause cancer, for example, it does not always cause cancer for every smoker. Yet this connection is often a key message in health warnings regarding smoking. Taking the approach of looking at means allows for the search of patterns, regularities and potential causal relationships (Miller, 2005). There is no universal generalisability; nevertheless, suggestions can be made and comparisons to other studies can reveal whether or not a similar pattern would emerge in a different context (Bem & Looren De Jong, 2006).

Gathering qualitative data provides a very different kind of information that allows for a more in-depth view. Quantitative analyses often focus primarily on ascertaining factual knowledge; for example: how much television children watch on a school day. An interview is more likely to provide contextual factors about the same situation: what exactly children watch; or where they are when they are watching television; or if they are watching television alone. Interviews can also reveal whether there are rules around television viewing, why these rules might exist, benefits that parents see in children's use of digital technology, and their concerns regarding content or amount of television children are exposed to.

The subjective experience of parents contextualises activities, and easily identifies children as dynamic actors in an interconnected sphere. Here the objective is not to sample as many people from the population as possible, but rather to gather an understanding of the underlying mechanisms that guide parents in their decision-making. This is important, first and foremost, in order to understand the complexities of family life in which children's activities are embedded. It may help further to identify the concerns and struggles parents have, and the beliefs that underpin their decision-making. This information may potentially yield a building block in the construction of supports needed for parents. Since technology is such a fast-moving and rapidly developing medium, there is no tried and tested approach; therefore, both parents and children are forging new paths through the digital terrain. The qualitative component of the research project aims to explore that which a data point cannot express.

Brinkmann (2018) uses four key words to describe interviews as a technique: *purpose, descriptions*, *lifeworld*, and *interpretation of meaning*. With regard to *purpose*, Brinkmann stresses that, unlike a conversation, interviews are conducted for a specific purpose and with the aim of producing knowledge. He also acknowledges that when an interaction is framed as an act that serves a particular purpose, considerations around power and control need to be taken into account. Brinkmann highlights that the aim of an interview is usually to get solid *descriptions* from participants, rather than vague or abstract reflections. He suggests posing questions that invite concrete answers, as opposed to more abstract questions, especially at the beginning of an interview.

Building on Husserl's (1954, in Brinkmann, 2018) concept of *lifeworld*, interviews offer us the opportunity to get some insight into a first person account of lived experiences. Accounts of people's lived experiences are always open to *interpretation of meaning*; this may not be transparent, or what Brinkmann calls *monovocal*, indeed, it can be *polyvocal*. As the interviewer, we only get to know a small portion of a person's lived experience. Once the interview is conducted and the audio file transcribed, it becomes a text-based story that the researcher carries forth. Stories can be ambiguous, explanations can be vague, or hinge upon an assumed common cultural understanding. Thus there is a responsibility regarding the interpretation and the presentation of participants' narrative. This is especially the case when specific passages are selected from a text; it is important to uphold the integrity of the story as best as possible, and it would be unethical purposefully to misrepresent the sentiments expressed by the interviewee.

The combination of both approaches enables a more varied view; the qualitative interviews provide an insight into the reasons and rationale and the data analyses allow for an exploration of a very large sample and of associations that may not be on our subjective radar. It is important to consider the relationship and dynamic between subjectivity and objectivity. If meaning comes from our own experience, then it would be the more logical path of research to ascertain these meanings in solely qualitative ways. However, the relationship between our subjectively derived meaning and more objectively obtained measures is rather complex. Of course, it could be argued that there is no such thing as objectivity, but for the purpose of moving forward, objectivity describes the closest approximation that can be made.

The difficulty with subjective experiences is that, although they matter in our perception and subsequent actions, the judgements made based on subjectivity alone are not necessarily accurate. For example, it would be logical to assume that there is a strong relationship between our attitudes and our behaviour, but research shows that this is not actually the case (LaPierre, 1934). This poses a problem to the translation of subjective measures and outcomes, which needs to be taken into consideration when qualitative data are evaluated and suggestions are made. Descriptions of situations, opinions, and insights become conjectures; as such, they are not reliable sources to predict an outcome. Studies show that we actually perform poorly at introspection (Nisbett & Wilson, 1977) and there is a long list of biases that influence everyday thinking and acting. Ultimately, and put simply, what we think is good for us is not necessarily good for us, and what we believe is the best approach might not be a good solution after all. Thus exploring a cohort's *opinion* or *experience* cannot be equated with *measuring* the same with a behavioural measure.

Finding or developing an adequate measure that captures a picture not tainted by biases is very difficult and behavioural measures are not always available or often not feasible. Some researchers have turned to implicit measures in an attempt to measure automatic associations that participants have, but are not necessarily aware of (Greenwald, McGhee, & Schwartz, 1998). Any measures or methods that rely on self-reporting need to be analysed with caution, taking into account that these reports are probably influenced by biases. While eliminating biases is an impossible task, the utilisation of a well-established and tested measure allows for a comparison with other samples, and factors in a certain level of error.

When O'Neill and Sweetman (2013) explored the relationship between self-reported and objectively measured weight and height of female caregivers in the GUI data, they found that self-reported measures tended to report a lower weight than the measures obtained by the interviewer. However, the difficulty with error distributions arises if they are not evenly distributed. The authors found a non-classical measurement error distribution, which is to say that self-reported data from females with a higher BMI were more likely to be at odds with the objectively measured data. As there is not always data available to verify these kinds of things, it is important to be cautious with interpretations.

Schoonenboom & Johnson (2017) outline a number of primary factors to consider when designing a mixed methods study. These pertain to the purpose of the study, the theoretical drive, the timing, the point of integration and design approaches. Regarding purpose, the authors draw on Greene, Caracelli, and Graham (1989), who have described several different purposes a mixed method design may have. A study may aim to establish convergence via triangulation, elaborate or clarify results via a complementary design, utilise one method to develop another method, may seek for contradictions or new patterns, or expand the depths and breadth of a project by using different methods. Theoretical drive refers to the weight given to different components, and whether the main focus of the study is a quantitative element, a qualitative element, or an interactive approach, where both components have equal weight (Schoonenboom & Johnson, 2017). The timing of data collection and analyses of the different components may be concurrent or sequential. The point of integration of different components can take different forms; they may be joined together as one data set, can build on one another, may be embedded within one study, or can be bound together with a common framework (Creswell & Plano Clark, 2011).

These differences are echoed in the major mixed methods design forms: in convergent parallel designs, quantitative and qualitative aspects are carried out independently and integrated at the point of interpretation. Explanatory sequential design is a two-phased design, where qualitative data serve to shed more light on issues brought up in a quantitative study. Exploratory sequential designs are often used where there is no pre-existing framework or where there are unknown variables. Qualitative methods are used to provide guidance to build a more substantial quantitative measure. Embedded designs see the integration of a major and a minor method, where one supports the other. In transformative designs, a theoretical framework is used to shape the interactions between method modality at different stages. Furthermore, multiphase designs describe a project with more than two phases and may take on different combinations of strategies.

The purpose of the current project is to investigate screen time from different angles and in a contextualised setting. The mixed methods approach offers a rich perspective and aims to explore screen time within its context, embedded in children's daily lives, interconnected with other influencing factors, and interacting with diverse family dynamics. The GUI data offer the opportunity to explore screen time embedded in the PPCT model with the acknowledgement that contexts shape affordances. The qualitative interviews contextualise screen time as a proximal process. Considering the timing of the GUI data, the qualitative element also allows for a recognition of change in family practices around screen time.

4.3 Design

The starting point in the methodological consideration and the design of the enquiry are the research questions. Based on these questions, a design was chosen that offers a comprehensive and feasible exploration of children's screen time, the relationship with socio-emotional outcomes, and parents' strategies to navigate their children's engagement with screens. The project follows a convergent parallel design, as visualised in Figure 4.1. The design entails a concurrent order of the different elements (Creswell & Plano Clark, 2011). Data are analysed separately, then compared and integrated. The most overlap is between Studies II and III; both have a similar structure but each study provides an insight from a different angle.

Figure 4.1 Research Design

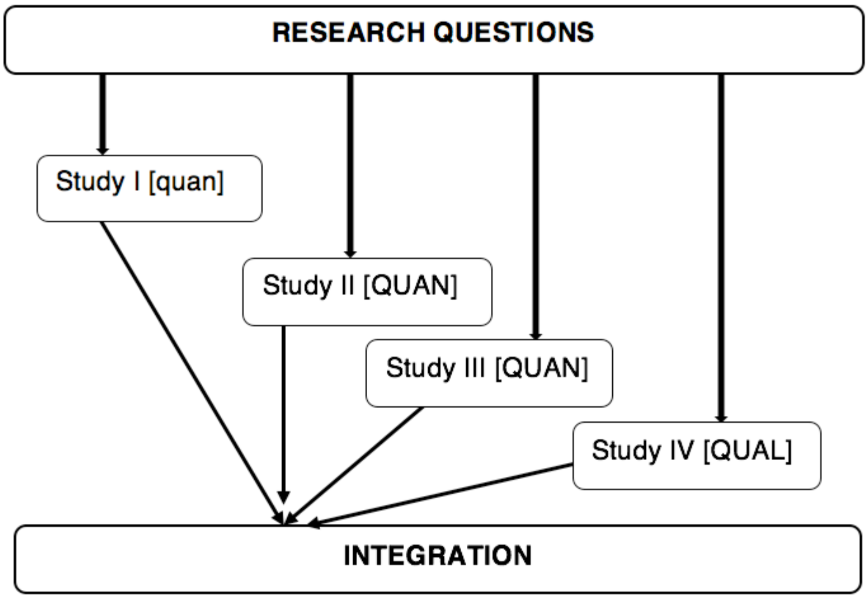

Figure 4.1. Visualisation of the convergent parallel design. The starting point are the research questions focued around screen time. Each study is independently conducted and discussed and integration of the findings of all four studies happens at the end.

The data analyses aim to (a) explore the nature of children's pastimes, (b) explore the relationship between screen time and children's socio-emotional outcomes and variations in screen time according to relevant contextual factors, (c) combine all relevant factors to explore the predictive power on outcomes, (d) explore how contextual factors at age nine are related to outcomes at age 13, and finally (e) explore how parents navigate the digital lives of their school-aged children. There are four studies in total, the first three are quantitative analyses based on GUI data; the fourth study is based on interviews conducted with parents of children in middle childhood. Each study is described in a separate chapter, containing a brief introduction, results or findings, and an initial discussion. The following section describes the methods and relevant details of the project.

4.3.1 Overall analytic strategy. Although tied together by the common theme of screen time, each study constitutes a separate unit and the majority of integration of results was left for the discussion. All statistical analyses were carried out with IBM Statistical Package for the Social Sciences (SPSS). Study I used descriptive statistics to explore children's time use, specifically their free time and time spent with digital devices. This was compared to children's stated preferred activities. Study II contained the creation and explanation of low, mid, and high screen time groups and used t-tests and ANOVAs to explore the association between screen time and device ownership. The association between screen time and the outcome measures (SDQ and Piers-Harris 2) was explored using ANOVAs. Associations between screen time group membership and PPCT variables were explored using ANOVA and chi-square analyses. Hierarchical regression models were built for each of the outcomes at age nine, split by gender. These models contained the PPCT characteristics which were analysed.

Study III used descriptive statistics to explore screen time at age 13, and ANOVAs to explore the association between screen time at age nine and outcomes (SDQ and Piers-Harris 2) at age 13. Again, hierarchical regression models were built, mirroring the structure of the models in Study II, but using age 13 outcomes. Finally, a cumulative risk score was calculated by summating negative and positive factors to create an overall risk level score, which was correlated with the outcome measures at age nine and age 13. Data gathered from semi-structured interview for Study VI was analysed thematically. Sections 4.4 and 4.5 describe the methods for each of the four studies in detail.

4.4 Quantitative Studies

This section will outline the methods of the quantitative studies. This includes information about the data and the sample, aims, research questions, approaches to data analyses of the three studies, and ethical considerations.

4.4.1 General Information about the data set. Growing Up in Ireland (GUI) is the National Longitudinal study of Children in Ireland, which follows two cohorts over regular intervals: one infant cohort, aged nine months during the first data collection period, and one child cohort, aged nine years during Wave 1 of data collection. This study's analyses are based on Waves 1 and 2 of the child cohort. At the time of Wave 2, the study children were 13 years old. The GUI study is the first Irish study that documents children's lives using such a large and representative sample. There are many other longitudinal studies across the world; for example in the United Kingdom, there are the National Survey of Health and Development, the 1970 British Cohort Study, and the Millennium Cohort Study. There are a range of American based studies; for example the Early Childhood Longitudinal Study, the Minnesota Longitudinal Study of Risk and Adaptation, and the Panel Study of Income Dynamics. Several "Growing Up in" studies exist; for example in Australia, New Zealand, and Scotland.

Longitudinal studies offer the opportunity to track certain aspects of the lives of individuals over a period of time. Unlike cross-sectional studies, which only capture one point in time, these types of studies allow us to explore associations over an extended time period and allow for a certain level of causal inference to be made. They also allow for a comparison of cohorts, which can give some insights into the impact of factors such as changes in economic prosperity and associated influences. Significant events can provide unique research conditions and are referred to as natural experiments. For instance, one example that has been studied extensively is the Dutch Hunger winter, a period between 1944 and 1945 when the Netherlands were occupied by Germany and there was an extreme food shortage for a few months (e.g., Lumey et al., 2007). There have been numerous studies that investigated the impact of food restriction in utero, and the cohort is still being followed today.

The GUI study is funded by the Department of Children and Youth Affairs, in association with the Department of Social Protection and the Central Statistics Office. The study is ongoing and is being carried out by a group of researchers led by the Economic and Social Research Institute (ESRI) and Trinity College Dublin (Williams et al., 2009). The GUI study is a pivotal element in the National Children's Strategy and has a very strong focus on policy. It includes a broad range of outcome measures that provide useful information and, by using standardised, widely used tests, allows for a comparison to other international studies. The objectives are to study the lives of children, their development, typical trajectories and potential problems, to identify factors that may aid or hinder development, to capture children's own experiences and to generate a database of knowledge that can be drawn on to create effective and responsive policies and services for families (Greene et al., 2010). At the time of data collection during Wave 1, the child cohort sample was representative of children of that age attending school in Ireland. This analysis utilises data from the child cohort from Waves 1 and 2.

4.4.2 GUI procedure, sampling, and data reweighing. This cohort was born between November 1997 and October 1998; Wave 1 of data collection took place between September 2007 and June 2008; data collection for Wave 2 took place between August 2011 and March 2012, when the former nine-year-olds were 13 (GUI, 2010b; Quail, Williams, Thornton, & Murray, 2014). In the 2006 Census of Population, there were 56,500 nine-year-olds registered in Ireland. In the first GUI Wave, the sample consisted of 8,568 children, which was approximately 14% of the overall population of nine-year-olds, or one in seven, and representative of all nine-year-old children living in Ireland at that time. At the time of Wave 2, 7,525 children were still living in Ireland. No additional participants were recruited to replace those who were no longer included; thus Wave 2 data were not necessarily a representative sample of children aged 13 living in Ireland. Sampling and recruitment was done via schools, data collection took place in schools and participants' homes (Murray et al., 2010). Data include questionnaire responses and measures of the primary and secondary caregiver, school principals, teachers (only at Time 1), child interviews, cognitive tests, physical measures and 'light' time use diaries (Quail & Williams, 2013).

For the questionnaire data of Wave 1, data were reweighted in two stages using a minimum information loss algorithm. At the school stage, the reweighting process accounted for the number of nine-year-olds in the school, the type of school, region, their social status, religious denomination, and co-educational status. At the family stage reweighing accounted for the child's sex, family structure, mother's age, parental economic status, educational attainment, social class, and household tenure. For the Wave 1 time use data, weights were calculated to adjust gender, family type, PC age, employment status, education, family social class, country of birth, and accommodation tenure (Quail & Williams, 2013). Overall, the data were reweighted so that they were representative of nine-year-olds living in Ireland at the time and accounted for the fact that response rates were lower for certain demographics.

For Wave 2, to maintain representativeness, a minimum information loss algorithm was used to create a new weight that corresponds to the population parameters at Time 1 (Quail et al., 2014). Thus, the sample remained representative of the profile of families with children aged nine at Time 1, not representative of families with children aged 13 at Time 2. Respective Wave 1 weights were applied for the first two studies (Chapters 5 and 6), Wave 2 weights were applied for the third GUI study (Chapter 7).

4.4.3 Participants. The exact number of participants varies from analysis to analysis. Cases with missing data were excluded pairwise, and under the assumption that data are missing at random.

4.4.3.1 Wave 1. Data from the main questionnaire of Wave 1 include information from the study children (N = 8,568) and their respective primary caregivers. This was typically the mother, however 2.2% (n = 187) of primary caregivers in the dataset were male.

4.4.3.2 Wave 1 Time use. Out of the 8,568 time use diaries distributed, 72.6% were returned. After excluding diaries with too much missing information or implausible information, 6,228 time use diaries were left.

4.4.3.3 Wave 2. Families who had taken part in Wave 1 of the GUI study were interviewed again when the study children were 13 years of age. From the original sample of 8,568 at Time 1, 7,525 were still living in Ireland at Time 2.

4.4.4 Study I: Analysis of time use data. The first study aimed to explore what Irish nine-year-olds spend their time with. Based primarily on Wave 1 time use diary data, the study focused on what type of activities children engage in during their free time. Furthermore, children's activities were compared to what children stated as their favourite activity. The research questions were:

- What do Irish nine-year-old children spend their time with?
- How much free time do they have?
- To what extent do children's activities reflect their preferences for play?

4.4.4.1 Approach to data analysis. The light time use diaries used in the GUI study required participants to tick a box indicating the type of activity they engaged in for every 15 minutes of a 24-hour day (Quail & Williams, 2013). Families were given a list of 22 pre-coded options and were asked to fill in the time use diaries with, or on behalf of, the study child. Time diary taking were recorded between August 2007 and July 2008. Participants were also asked to indicate if the day the diary was filled out was a weekday during term, a weekday out of term, or a weekend day. Furthermore, they were asked if the day was an ordinary day, or if any other event has coincided with the day; for example, a celebration, the absence of a family member, or if either the child or a parent was ill.

In order to create a measure of time use, all logged activities were summated and counted as 15 minutes spent on the respective activity, thus creating a variable indicating how much time was spent on any given activity, for each of the 22 options. The diary forms allowed for the option to tick multiple boxes for cases where two activities took place simultaneously; however, the amount of double-coded time slots was minimal. In cases where more than one activity was lodged, both activities were included in the total sum of time spent with respective activities, thus in this analysis; the total did not always add up to 24 hours. When more than one activity was ticked, participants were not asked to indicate which the primary activity was, thus counting all activities seemed to be the best way to capture children's activities.

In order to make the 22 categories more manageable, activities were grouped together into four categories for my analysis: personal time, school time, family time, and free time. Personal time included sleeping, resting and personal care; school time includes time spent in school, homework and the journey to and from school. Family time consisted of eating, chores, outings, shopping trips, visits to relatives, other travelling, and religious activity. Free time included physical and general play, board or card games, hobbies, reading, time spent with computers or game consoles, on the internet or the phone, and watching TV, DVDs or videos. This classification was loosely based on the categories used by Hofferth & Curtin (2003). The authors use a system suggested by Robinson and Godbey (1997) which organises adults' time into contracted time (i.e., work, or school in the case of children), committed time (household work or other obligations), personal time (sleeping, eating, personal care) and free time (all remaining activities).

Since this way of organising time was originally conceived for adults, when applied to children the lines between committed time and personal time are somewhat blurred. Children often do not have free reign over their own use of time. For example, if a parent needs to run an errand, children may not have the choice to stay home alone. The time spent accompanying parents could be seen as time spent with family and does not necessarily mean that children are under the same level of commitment or obligation as the errand running parent. Eating was also included in family time and not under personal time; sharing meals has become a measurement tool for family time and a proxy for favourable outcomes in some instances (Pagani et al., 2016).

4.4.5 Study II: Screen time, socio-emotional outcomes, and PPCT. The second study aimed to explore the relationship between screen time and socio-emotional outcomes, and the role PPCT factors play in mediating this relationship. The study is based on Wave 1 GUI data. The research questions were:

- Is there an association between screen time and socio-emotional outcomes?
- How is screen time related to person, process, and context variables?
- Can screen time predict outcome scores once these mediating factors are considered?

4.4.5.1 Approach to data analysis – bivariate analyses. The created screen time groups were compared on their Strengths and Difficulties Questionnaire (SDQ) scores as rated by the primary caregiver, their SDQ scores as rated by their teacher, and with children's self-rated scores on the Piers-Harris Self-Concept Scale 2. The aim was to explore the relationship between screen time and socio-emotional outcomes, and whether this relationship was the same for boys and girls. Subsequently, screen time groups were compared on the person, process, and context variables selected. The aim of this analysis was to explore what other characteristics correlate with screen time. This also aids the interpretation of the regression analyses, as it highlights the relationship between mediating variables and screen time.

4.4.5.2 Measurement of variables. Three groups of variables were included in the analyses: the focal variable, outcome variables, and mediating variables. The focal variable was screen time, the outcome variables were the measures of behavioural difficulties and self-concept, and mediating variables captured key dimensions of both control and mediating factors.

4.4.5.2.1 Focal variable – screen time. In the general GUI questionnaire, primary caregivers were asked about their children's screen time behaviour. In order to explore the association between screen time and outcomes, the total reported amounts of time children spend on average watching television/DVD/video, using the computer at home, and playing video games (for example with a game console) were summated. By adding up the three screen related activities, a screen time scale was created, ranging in scores from 3-15, with 3 indicating no screen time at all, and 15 indicating more than 15, but less than 21 hours of parent-reported screen time. The scale is not convertible into more discrete amounts of screen time, since the increments in each category in the questionnaire were rather large. The majority of scores were between 5 and 8, with 85.1% (n = 7,283) of cases falling within this range.

For the purpose of examining low and high groups of technology/media usage, the overall screen time scale was split into percentiles to allow a comparison between the lowest quartile, the highest quartile, and the mid 50%. Due to the nature of the scale, an exact split into these quartiles was not possible. The low screen time group (low ST) represents 23.8% of the sample (n = 2,039), the mid screen time group (mid ST) represents 54.5% (n = 4,664), and the high screen time group (high ST) represents 21.7% (n = 1,860).

The low screen time group has an average score of 4.7 (*SD* = 0.54) on the overall screen time scale, the mid group 6.5 (*SD* = 0.5) and the high group 8.6 (*SD* = 1).

4.4.5.2.2 Outcome variables. Measures of socio-emotional outcomes were chosen based on availability in the GUI data. Two outcome measures were selected: the Strengths and Difficulties Questionnaire and the Piers-Harris 2 Self-Concept scale. The Strengths and Difficulties Questionnaire is a 25-items behavioural screening questionnaire for children aged three to 16 years (Goodman, 1997), which can be filled out by children or young people themselves, parents, or teachers. Waves 1 and 2 include SDQ ratings from parents; Wave 1 also includes a rating from the study children's respective teacher. The SDQ has five subscales: Emotional Symptoms, Conduct Problems, Hyperactivity/Inattention, peer problems and Prosocial Behaviour. Each subscale contains five items, each item is a question that respondents rank on a three-point scale where 0 = not true, 1 = somewhat true, and 2 = certainly true. By adding the first four subscales, a total difficulty score can be calculated. The SDQ is a widely used tool and its psychometric properties are robust (e.g., Goodman, 2001; Stone, Otten, Engels, Vermulst, & Janssens, 2010). A confirmatory factor analysis by McCrory & Layte (2012) used the data of the GUI child cohort to compare the goodness of fit of different models that have been suggested in the literature. While they found that a six-factor model would fit the data a little better, the authors conclude that the current five-factor model is acceptable.

The SDQ is used in clinical and epidemiological contexts and has been used as a measure of behavioural outcomes and functioning (O'Connor et al., 2016), as a screening instrument for behaviour/ and emotional problems (Hysing, Elgen, Gillberg, Lie, & Lundervold, 2007), and as a measure of psychosocial wellbeing (Allen & Vella, 2015), psychological distress (Aggio, Smith, Fisher, & Hamer, 2015; Hamer et al., 2009), and psychological health in general (McMunn, Nazroo, Marmot, Boreham, & Goodman, 2001). It has also been used as a screening tool for psychopathology and to identify likely cases of mental disorders (Fagg, Curtis, Stansfeld, & Congdon 2006; Pitrou, Shojaei, Wazana, Gilbert, & Kovess-Masféty, 2010; Sourander et al., 2010).

The Piers-Harris Children's Self-Concept Scale (Second Edition, Piers-Harris 2) is a brief instrument used with children and adolescents measuring individual self-evaluative attitudes and behaviours which have a bearing on self-concept (Piers & Herzberg, 2002). This was filled out by the study children themselves, both at Waves 1 and 2. The test consists of 60 questions, each question asks respondents to indicate if a certain statement applies to them or not, by saying *yes* or *no*. The Piers-Harris 2 then provides an overall score which is a general measure of self-concept as well as six subscales: Behavioural Adjustment, Physical Appearance and Attributes, Freedom from Anxiety, Popularity, and Happiness and Satisfaction. A higher score indicates a more positive self-evaluation. In addition to the total score and the subscales, the Piers-Harris 2 also includes an inconsistent responding index designed to detect random response patterns. This response bias index measures the respondent's tendency to respond one way or another regardless of the content of an item.

The measure is widely used and is described as psychometrically robust, although this had been questioned (e.g., Guerin & Tatlow-Golden, 2018). One issue might be that some items feed into multiple subscales, and may be low in face validity. The development of the Piers-Harris 2 was built on the view that beliefs about oneself stay relatively stable over time within individuals. These beliefs make up a person's self-concept and develop during childhood. It refers to individuals' self-perceptions regarding meaningful aspects of their life. While these self-evaluative attitudes may change over time, due to environmental or developmental changes, these changes typically do not occur rapidly. The authors' conceptualisation of self-concept relies on a number of assumptions. First of all, self-concept is phenomenological in nature, i.e., it cannot be measured, but is inferred by measuring proxies, for example by observation of behaviour or self-report. Self-concept is made up out of global and specific components; global components encompass a variety of characteristics, e.g., abilities, skills, physical self-image; specific characteristics are more related to the value and importance attached to certain items and vary from person to person. They can be broad (e.g., morals and ethics) or specific (being good at a particular sport for example). Self-concept is relatively stable over time; even though influenced by experiences individuals are exposed to during their life time, changes in self-concept do not occur suddenly. There is both an evaluative and a descriptive component to self-concept; the accumulative judgement of oneself might be based on external factors and the comparison to others, or it might be based on more internally based factors and standards.

4.4.5.2.3 Mediating variables. Potential mediating and control variables were selected based on their relevance and availability in the dataset. These were grouped into three areas, corresponding to the layers of influence on child development as described by Bronfenbrenner and Morris (2006) and as discussed earlier: person, process, and context. Categorising elements of a dynamic model is not ideal, but it does lend some structure for analysis. Not all variables clearly fit into one category and variables from different categories are likely to be related. Process variables in particular are influenced both by person and context characteristics. Furthermore, it was not possible to capture micro-time and macro time, but meso-time is inherent to many of the questions in the GUI study, which were usually phrased in a way that asks for the average of something, or a typical pattern, thus indicating a process that is frequent and ongoing. Although the first P in PPCT stands for process, highlighting its key position, analyses are organised to list person characteristics first. The reason for this is to allow a tracing of influences, starting with the child, and ending with more distal contextual factors. This approach to structuring potentially mediating factors is commonly used, and there are a number of GUI data-based studies utilising this strategy (e.g., Byrne, 2016; Byrne & O'Toole, 2015; Cadogan et al., 2014).

Person characteristics pertain to elements of children's demand, resource, and force characteristics as described in subsection 2.1. These include:

- Children's health status (Question B10 in the *Mother or Lone Father Questionnaire*; ESRI, 2010), which requires parents to describe their child's health status over the past year as either very healthy with no problems, healthy with a few minor problems, sometimes quite ill, or sometimes/always unwell.
- Chronic illnesses (Question B11), which requires parents to make a binary choice indicating whether their child has any on-going chronic, physical, or mental health problem, an illness or a disability.
- Learning difficulties (Question J21), which requires parents to indicate whether they think that their child has a specific learning difficulty, a communication or co-ordination disorder.
- Physical activity levels (Questions D10 and D11), which requires parents to indicate how many times in the past two weeks their child has engaged in at least 20 minutes of exercise that made them breathe heavily and made their heart beat faster (hard exercise) and exercise that was not hard enough to exert the characteristics just described (light exercise). In both instances, parents are asked to include physical education classes, and have to choose between none, one to two days, three to five days, six to eight days, or nine or more days.
- BMI, which was calculated from the provided measures of children's height and weight using the guidelines outlined in Cole, Bellizzi, Flegal & Dietz (2000). This categorises BMI scores into normal range, overweight or obese (for boys, the cut-off point for classification as *overweight* was 19.45, cut-off point for classification as *obese* was 23.38; for girls the cut-off points were 19.45 and 23.47 respectively). It is important to acknowledge that these classifications are not without criticism.

However, for current purposes they serve as a very general but convenient way of capturing potential weight problems.

- Drumcondra reading and mathematics scores, which are contained as logit scores in the GUI data. The Dumcondra assessments are standardised measures of academic achievement.
- Aspects of children's temperament, as measured by the Emotionality, Activity, Sociability (EAS) Temperament Survey for Children (Buss & Plomin, 1984). The instrument consists of 20 items (Question H3) and measures four dimensions of temperament: (1) shyness, marked by a tendency to be inhibited, uncomfortable or awkward in social situations; (2) emotionality, a tendency to react easily and intensely, e.g., with fear and anger; (3) activity, referring to the extent to which the child prefers to be physically active; and (4) sociability, the tendency to prefer to be in the company of others rather than being alone. Each subscale is generated by the summation of five items, which are rated on a 5-point likert scale ranging from very typical to not typical at all for the child.

Process characteristics capture elements of proximal processes with family and peers and measures of quality of these interactions. These include:

- Engagement in structured activities (Question J6), which asks parents whether their child participates in any clubs or organisations during an average week outside of school hours. Specifically, parents were asked if their child takes part in a sports/fitness club (gym, GAA, soccer, hockey, etc.), a cultural activity (dance, ballet, music, arts, drama, etc.), a youth club, Scouts/Guides/Boys' Brigade/Girls' Brigade, a homework club, or any other activity.
- Children's peer relationship, by utilising number of close friends as a proxy measure for children's friendships. This is based on Question J16, which requires

parents to indicate how many close friends the study child has. The options are: none, one, two or three, four or five, and six and more.

- Experience of bullying (Question J18), which asks parents whether they have any knowledge of their child having being a victim of bullying in the previous year.
- Parenting style, as measured by an adapted version of the Parenting Style Inventory II (PSI-II; Darling & Toyokawa, 1997; GUI, 2010a), which asks children a range of questions concerning the emotional climate of the interactions they have with their caregivers, corresponding to the Responsiveness and Demandingness subscales of the PSI-II. These were then coded to provide a categorical variable of parenting style: authoritative, authoritarian, permissive, and neglectful (Baumrind, 1966, 1967; Maccoby & Martin, 1983). Authoritative parenting is perceived as the preferred style.
- Family time, measured by the amount of time they spent together as a family. This is based on Question K4, which asks parents how often the family sits down and eats together, how often they play sports or games together, talk about things, do household activities together or go on an outing together. The responses range from every day to rarely or never. The values of these five-point scale answers were added up and recoded to create a scale ranging from 0 to 20; a high score indicates more family time.
- Parent-child relationship, as measured by an adapted version of the Pianta Child-Parent Relationship Scale (Nixon, 2012; Pianta, 1992) completed by the primary caregiver. This is a scale consisting of three subscales measuring the level of conflict and closeness with the primary caregiver and the level of dependency in the parent-child relationship. There are no cut-off points available for this scale that would indicate what score might be problematic.

Context characteristics encompass characteristics that shape children's surroundings and their experiences and proximal processes within these structures. These include:

- Adverse life events, based on Question H1, which asks parents if the child as ever experienced one or more of 15 adverse life events; for example, moving house, or the death of a close friend or relative.
- Primary caregiver's level of depressive symptoms, as measured by the Center for Epidemiological Studies Depression Scale (CES-D) 8-item short version (Melchior, Huba, Brown, & Revack, 1993; Radloff, 1977). This scale is widely used as a screening tool for depression in the general population. A cut-off point of three or more was used to indicate a clinical diagnosis of depression corresponding to the cut-off point in the full CES-D20 version (Andresen, Malmgren, Carter, & Patrick, 1994; Blazer, Burchett, Service, & George, 1991; Radloff, 1977; Schane, Woodruff, Dinno, Covinsky, & Walters, 2008).
- Primary caregiver's highest level of education, based on Question L37, which asks parents to indicate the highest level of education they have completed to date.
- Household class, which is a measure derived from parents' occupation
- Household income, as captured by equivalised household income quintiles.
- Family type, which indcates whether children life in a single-parent or a two-parent household.
- Number of siblings, which is calculated from the household composition (Question A5). This measure technically captures the number of children living in the household with the study child, it includes full, half, and step siblings.
- Region, which indicates whether a family lives in an urban or a rural setting (derived from Question M6).
- Perceived neighbourhood safety (Questions M2 and M3), which asks parents to rate on a four-point scale how common it was in their area for there to be rubbish

and litter lying about, for homes and gardens to be in bad condition, if there were cases of vandalism, people being drunk or taking drugs, if it was safe to walk alone after the dark, safe for children to play outside during the day, and if there were safe parks, playgrounds and play spaces in this area. The addition of all items created a neighbourhood safety scale ranging from 0 to 22. Higher scores reflect that parents perceive their neighbourhood as safer.

4.4.5.3 Approach to data analysis - regression analyses. Regression analyses allowed for a more comprehensive analysis between screen time and outcomes by factoring in potentially mediating variables. Associations in bivariate analysis do not take into account the dynamic networks inherent in child development. For the regression analyses hierarchical models were built. Regression models for three outcome measures were conducted, each separate for boys and girls. The three measures were the SDQ (parent's rating at age nine), SDQ (teacher's rating at age nine), and the children's Piers-Harris 2 ratings at age nine. The regression analysis explores how much variance of the outcome variable is explained by the variables entered into the model. The full list of blocks is below; the first block related to the focal variable under investigation – screen time. For each layer added, there was another model, thus there are four models. This allows for a comparison of the relative influence of different blocks. Each model consists of the variables from the previous model plus the addition of the next block. All analyses were split for gender.

4.4.5.3.1 Structure of variables. For the regression analyses, all variables were converted into dummy variables. This binary coding technique uses a reference category as a comparison, e.g., for bullying, the reference category is 'no', thus the bullying variable in the model compares the outcomes for children who have been bullied to those who have not experienced bullying. For categorical variables with more than one level, the most frequently occurring variable was selected as the reference category; all the other variables are in comparison to the (omitted) reference category. In cases where there were more than two levels, the remaining categories were collapsed (e.g., general health, parenting style). For scale variables, the middle 50% comprise the reference category and the variables included in the model are the top and bottom 25%, e.g., low reading score (in the bottom 25%) and high reading score (top 25%).

Block 1: Focal variable - screen time

- screen time (reference: middle 54.5%): Low screen time (23.8%), High screen time (21.7%)

Block 2: Person variables

- Health – sometimes/always unwell (reference: very healthy, no problems or healthy, but a few minor problems)
- on-going chronic physical or mental health problem, illness or disability (reference: no)
- BMI classified as obese (reference: normal or overweight)
- specific learning difficulty, communication or co-ordination disorder (according to primary caregiver) (reference: no)
- EAS Temperament Scale (reference: middle 50%): Low EAS Shyness, High EAS Shyness, Low EAS Emotionality, High EAS Emotionality, Low EAS Sociability, High EAS Sociability, Low EAS Activity, High EAS Activity
- Drumcondra tests (reference: middle 50%): low reading score, high reading score, low maths score, high maths score

Block 3: Process variables

- number of structured activities the child is enrolled in (reference: 1-2 activities): no activity, 3+ activities
- number of close friends (reference: 2-6): 0-1 close friends, 6+ close friends

- bullying (reference: no): whether the parent says there child had been a victim of bullying
- parenting style (reference: authoritative): any other style (authoritarian, permissive, and neglectful)
- family time (reference: middle): low family time, high family time
- Pianta Scale (reference: middle 50% scorers): low conflict, high conflict, low closeness, high closeness, low dependence, high dependence

Block 4: Context variables

- adverse life events (reference: middle): high adverse life events (3 or more), low adverse life events (zero)
- PC Depression (reference: no): classified as depressed (scoring higher than 3 on the CES-D8 scale)
- PC's highest level of education (reference: Leaving Certificate, Diploma/Certificate (non-degree): low parental education (Primary or less, intermediate, junior, group certificate), high parental education (primary degree and postgraduate/higher degree)
- income quintiles (reference: 2nd quintile): Lowest quintile income, 3rd quintile income, 4th quintile income, Highest quintile income
- family structure (reference: two parent family): Single-Parent family
- siblings (reference: 1-2 siblings): no siblings, many siblings (3-5)
- region (reference: rural): urban
- perception of neighbourhood safety (reference: middle): high safety perception of neighbourhood, low safety perception of neighbourhood

There are six regression analyses in total, each containing the four models tracing the addition of the blocks just listed. The models were all constructed using the same predictor variables and only vary in the outcome variable they are trying to predict. Each model is presented and includes an overall description of how much variance was explained by each model (i.e., block) as they are added in, and how much variance blocks can explain when considered individually. The model details describe the outcomes for the focal variables (low and high screen time) and the contribution of variables in each block was considered.

The model does not assume a causal relationship, but assesses associations between variables. It allows for a prediction of a pattern, for instance, that children with learning difficulties tend to display more behavioural difficulties, on average. The more variance a model can predict, the more confident a researcher can be about estimating an individual's score on an outcome measure, given the value of predictor variables are known. By considering different levels of influences, the relative weight of factors is estimated. In this analysis, the first model only considers the relationship between screen time and socio-emotional outcomes. However, subsequent models introduce PPCT factors that may mediate or moderate any association between the two variables. Without taking into account other factors, the relationship between screen time and outcomes.

Problems with the accuracy of the models can be introduced due to endogeneity and multi-collinearity. Endogeneity, when the outcome variable is correlated with the error term, might be due to omitted variables, measurement error or simultaneity (Woolbridge, 2002). The risk of omitted variable is always present and needs to considered. Hierarchical models demonstrate the change of including omitted variables in a way. As mentioned above, subsequent models may alter the association between the key variables entered into the first block. Regardless of the volume of relevant variables included here, it is important to keep in mind that there may be another variable that could fully account for the variance in outcome variables, but has been omitted. Due to the nature and the quality of the data, it is assumed that measurement error is minimal, and that any measurement errors are random, which reduces the risk of systematic bias.

Simultaneity and multi-collinearity are somewhat related and present a tangible issue for all models that consider factors embedded in dynamic systems. It is not unlikely or unreasonable to assume some form of relationship between many of the variables. For example, children's temperament are likely to be associated with parent-child relationships, but also with quality of friendship, behaviour and self-concept. Furthermore, the use of dummy coding reduces the variance of variables, since the variable is now binary. Correlations are reduced by using the most frequent category as the reference, which is omitted from the model.

For a more conservative estimate, adjusted R^2 were used throughout all analyses. Furthermore, effect sizes were taken into consideration. To estimate the relative effect of individual variables, variables that reach the threshold of a 0.2 effect size are highlighted in bold in the final model. This is based on Cohen's *d* and was calculated by dividing the difference in means between the two groups (or the difference between those falling into the category described in comparison to the reference group in the case of a variable with more than two levels) by the standard deviation of the overall sample. The result describes the difference in standard deviation. A result of 0.2 was described as a small effect size, 0.5 is a medium effect size, and 0.8 is a large effect size (Cohen, 1988). Thus, 0.2 was selected as the effect size cut-off point to distinguish between variables that make a significant contribution.

4.4.6 Study III: Screen time at age nine and outcomes at age 13. The third GUI study includes data from Waves 1 and 2 of the GUI study. The aim was to explore the relationship of screen time at age nine with screen time at age 13. Furthermore, the aim was to investigate the relationship between screen time at age nine and socio-emotional outcomes at age 13, again with the consideration of mediating factors. Finally, to synthesise relative influences of PPCT variables, a cumulative risk score scale was created.

The research questions were:

- What is the relationship between screen time at age nine and screen time at age 13?
- Can screen time at age nine predict socio-emotional outcomes at age 13?
- To what extent do person, process, context, and time variables mediate that relationship?

4.4.6.1 Approach to data analysis - bivariate analyses. Screen time at age 13 and changes in amounts of screen time were explored. Mirroring the structure from Study II, the same age nine screen time groups (see subsection 4.4.5.2.1) were compared on their SDQ scores as rated by the primary caregiver at age 13, and on their self-rated scores on the Piers-Harris 2 scores at age 13.

4.4.6.2 Approach to data analysis - regression analyses. The hierarchical regression models in Study III aimed to explore if screen time at age nine could predict socio-emotional outcomes at age 13, once PPCT factors were considered. The models' structure was exactly the same as the structure from Study II with the variables described in 4.4.5.3.1. Outcome variables in the Study III analyses were the primary caregiver's SDQ rating, for both boys and girls, at age 13, and the children's Piers-Harris 2 rating at age 13. There was no SDQ obtained from the teachers in Wave 2.

4.4.7 Ethical issues pertaining to GUI analyses. Murray and colleagues (2010) cite the Data Protection Acts from 1988 and 2003, and the Statistics Act from 1993 in their technical report describing the study's methodology. They outline details concerned with fair obtaining and processing of data, informed consent and providing a clear outline of the purpose of the study. Details also include the nondisclosure of personal information with third parties, protection of data, the right to access personal data and limitation of the use of information gathered in the study. They also used the "Children First Guidelines" (Department of Health and Children (DOHC), 1999) to ensure that the team of data collectors were following best practice guidelines; for example, that interviewers did not have any physical contact nor were they ever alone with the children included in the study. During and after the GUI data collection, access to raw data was severely restricted and a number of safeguards were put in place to ensure data protection and confidentiality, such as password protected computers, numerical codes on questionnaires, encryption, limitation of internet access, and data was not shared within cases (e.g., parents did not have access to their children's teacher's data).

The data set accessed for these secondary analyses was the Anonymised Microdata File, which is a highly anonymised sample. In addition to the removal of identifying information, such as contact details, dates of birth, and occupation details, some questions were summarised or removed if they only applied to a small number of people in the sample. Finally, any information that was considered sensitive was also removed. The data were accessed via the Irish Social Science Data Archive (ISSDA). As part of the agreement with the ISSDA, there were several conditions, such as that data would only be used for the purposes stated, that data would not be passed on to any individuals not listed in the agreement, and that researchers would not try to identify individuals who are part of the data set. In addition to the contract with the ISSDA, ethical approval was obtained by the University's ethics committee. The studies were conducted in strict accordance with the code of ethics and conduct of the BPS (2009), the code of professional ethics of the Psychological Society of Ireland (PSI, 2010), and the Ethical Guidelines for Educational Research by the British Educational Research Association (2011).

Due attention was paid to the core principles of beneficence, non-maleficence, autonomy, and inclusivity. Since the GUI data are anonymised and the studies are secondary analyses, the main ethical issues surround dissemination. This includes the framing of language, and the power relationship between researchers and participants. While it is a researcher's duty to disseminate findings, it is imperative to ensure that no involved party is negatively affected by this process. Since the research is investigating potentially negative effects of screen time on children's outcomes, there is a potential that negative stereotypes of certain communities might be reinforced. Therefore, a concerted effort is needed to report findings in a respectful and culturally sensitive manner.

4.5 Study IV Analysis of Parents' Views

The aim of the qualitative study was to explore how parents navigate their children's screen time activities. This includes the types of screen time children engaged with, rules and decision-making around screen time, and influences on this process. The aim was also to explore affordances of screen time in different family settings. The research questions were:

- How do parents navigate the digital lives of their school-aged children?
- How do parents make decisions around screen time use? What kind of limits, rules, and restrictions are imposed and how?
- How do the affordances created by children's physical and social environments impact on children's pastimes?
- What are the key influences on parental views and behaviours?

Semi-structured interviews were conducted to capture parents' attitudes and subjective experience, as outlined in subsection 4.2. An interview schedule (see Appendix C) was designed based on the research questions and themes that emerged from the literature. Since screen time can be a contested issue, the study was framed in broader terms, and questions pertaining to children's pastimes as well as family characteristics were included for context. Prior to starting the interviewing process, a pilot interview was conducted with a colleague who has children falling into the age category under investigation. This interview was transcribed and questions were altered.

4.5.1 Participants and sampling strategy. Participants were recruited via a two-step progress and are best described as a convenience sample. In the first step, participants were approached by drawing on personal contacts, the second step involved a snowballing strategy, whereby participants provided further contacts of parents that expressed interest and willingness to participate in the study. The GUI data analyses are based on data representative of nine-year-olds and their families in Ireland at the time of the data collection. The aim of this study was to illuminate and further explore the rationale behind parental decision-making and family habits. Thus a non-probability sampling technique offered the opportunity to capture a range of different voices and opinions. The rationale was to explore the breadth of factors influencing decision-making rather than the most common types. The criterion for inclusion was that the parent or caregiver had a child between the ages of seven and 12. In total, 12 parents were interviewed, 10 mothers and two fathers. Interviews took place between April 2017 and April 2018. Just over half of the participants had children attending a main stream school (n = 7), five were parents of a child attending a Steiner school.

4.5.2 Procedure. Upon first contact, the nature and aim of the study was explained to the interviewees. Participants were free to choose a location convenient to them. Most interviews took place in the participant's home except for three. One interview took place in a café, one interview took place in a meeting room in Maynooth University, and another interview took place in the researcher's home. The information sheet explained that the aim of the study is to explore children's play and pastimes as well as parents' decision-making around children's (7-12 years of age) activities. Although my analysis focuses primarily around screen time, the interviews were framed more broadly. All pertinent information regarding the study, ethics, and data safekeeping was outlined, which is detailed in the Ethics section below. A copy of the information sheet can be found in Appendix A. Participants were also given a consent form, which briefly listed the main points already outlined in the information sheet and is reproduced in Appendix B. Furthermore, participants were given the option to provide an email address so they can be contacted with an overview of the study findings once all data has been analysed. Participants were given a copy of the information sheet and consent form to keep.

The semi-structured interviews were structured around a small number of questions which served as a general guide throughout the process, the full interview schedule can be found in Appendix C. The first few questions asked about family composition, demographics, neighbourhood, and family time. The next set of questions asked specifically about the child (or children, if the participants had more than one child between the ages of 7 and 12), their general character, preferred free time activities, and the structures around that. Participants were shown a series of prompt cards and asked to respond to whatever items they felt were relevant to them. The prompt cards were based on the activities listed in the GUI Time Use study. Further questions were asked around screen time, specifically around content, context, rules, restrictions, and the reasoning behind these. Participants were then asked about what kind of opportunities and restrictions their children encounter compared to what the parents themselves experienced as they were growing up. Finally, participants were asked about any resources that they might use as a guideline to make decisions and which decisions they perceived as most challenging.

4.5.3 Approach to qualitative analysis. Interviews were analysed with the help of MAXQDA software and Braun and Clark's (2006) guidance on thematic analysis, which suggests six steps: familiarisation with the data, generation of initial codes, searching for themes, reviewing themes, defining and naming themes, and producing a report. Braun and Clark (2006) suggest that there are two ways to conduct a thematic analysis, an inductive and a deductive approach. However, they also acknowledge that an approach is never purely inductive, since the analysis is always influenced by a theoretical framework (Clark & Braun, 2016). Due to the positioning of the qualitative study in the overall project, the interview guidelines and research questions were based on issues that arose as further questions from the quantitative studies. On the one hand, this added a major deductive component to the analysis of the qualitative data; on the other hand, semi-structured interviews lend themselves to an exploration of issues important to individual participants. These narratives and perspectives need to be approached with an open mind, thus favouring an inductive approach.

The first step of the analysis was the familiarisation with the data. All but one of the interviews were transcribed externally, so all interview transcripts were reviewed in conjunction with the audio recordings. All transcripts were imported into the software, each interview was read line by line, and segments were then coded with narrowly defined labels (Boeije, 2010). The first round of coding yielded 1654 coded segments and 304 different labels. In the next step, these labels were sorted according to commonalities and grouped into 23 topics. The next step involved going through the selected topics and reading through the coded segments as units rather than part of an individual interview. This process of narrowing down and selecting topics relevant to the research questions at hand led to the identification of four key areas: screen time, concerns around screen time, strategies used to alleviate or counterbalance concerns, and influences on decision-making. The themes are semantic, and aim to summarise, describe, and interpret participants' narratives. Throughout the analysis process, themes, labels and groupings were discussed with another researcher. These conversation offered another critical lens to the thematic analysis. The researcher's subjectivity in the analytic process is considered a resource, and is influenced by their personal ideologies and professional knowledge (Braun & Clarke, 2013; Braun, Clarke, Hayfield, & Terry, 2019). As such, the researcher is seen as actively involved in the knowledge production process.

4.5.4 Ethical issues pertaining to the qualitative study. The study was approved by the Maynooth University Ethics Committee. The Code of Professional Ethics from the PSI (2010), the BPS (2009) Code of Ethics and Conduct, and BERA (2011) Ethical Guidelines for Educational Research were consulted in the process of preparation, analysis and discussion of the study. Participants were aware of the aim and the nature of the study, and details pertaining to the safekeeping of data. Participants gave informed consent to take part in the study, to be voice recorded, and for their data to be included in the thesis and any subsequent publications.

Participants' consent forms containing their names and some case their email addresses were stored in a locked cabinet in the researchers' office. Data was stored in encrypted format in a password protected computer and a USB stick, which was stored in a locked cabinet. Audio data was transcribed. All mentions of names and places were given a pseudonym to protect the identity of the participant and their family. There are only a handful of Steiner schools in the country, so it was especially important to anonymise data given by participants connected to the school in order to avoid the possibility of being identified.

Participation was voluntary and no remuneration was given. To minimise the inconvenience to participants, the researcher tried to make it as convenient as possible for participants by letting them choose a location and time that suited them best and was least interruptive to their schedule. Although participants gained no immediate, tangible benefit from the interview, it was communicated clearly that their opinions and stories were valued.

An interview situation can introduce questions regarding the power relationship between the interviewer and the interviewee. It is only one person that asks questions typically and it is not a conversation in which both parties have equal possibility to steer the subject matter into a certain direction (Brinkmann, 2018). To minimise any potentially arising power issues, the researcher ensured that participants were fully informed before the interview regarding the nature and aim of the interview. Participants were also given the opportunity to ask further questions and were provided with contact details of a parent helpline, the researcher's supervisor, and the University's Ethics Committee in case participants had any concerns, or felt that the information they gave might be misused. Furthermore, participants were informed that they can withdraw their consent for their data to be used anytime prior to publication. Interviewees were also informed that they do not need to answer any questions that made them uncomfortable, without having to provide a justification for that decision.

Risk factors like psychological and emotional distress were deemed minimal. The parents' decision to take part in the study was fully informed and the topics discussed were not of a sensitive nature. One issue that was considered was whether parents might worry about how they compare to other families and if their decision-making would be seen to be in the interest of their child. Since screen time was one pivotal focus in the interview, there is a potential for participants to feel judged. The discourse in popular media is increasingly critical of the volume of time children spend with electronic devices, which may induce concerns in participants that they might be regarded as less capable parents if their children are engaging in a lot of screen time. Questions regarding access to activities for children or the levels of resources might evoke negative feelings for parents, if they perceive themselves as not providing as much as they would like to. During the interview process, care and consideration was given to take an open, interested, and empathetic approach, and to treat all participants in a respectful manner that reflects how their views and voices are appreciated and valued. An informal interview style was adopted to create a comfortable and safe environment for open communication and information sharing.

The conscious effort to be open to participants' stories also helped to minimise researcher bias during the interviewing process. During the analysis, I was aware that my own opinions and values may influence my interpretation of narratives. It is the interviewer that gets to interpret the qualitative data in the end, the interviewee is no longer involved and does not get to object if they feel their views have been misunderstood or misinterpreted (Brinkman, 2018). During the interviews, I occasionally returned to a point made by the participant earlier in the conversation if I did not fully understand it, or did not follow the rationale provided.

5 Study I: A Day in the Life of a Nine-Year-Old

The objective of the first GUI study was to set the scene for the subsequent studies. As has been discussed in Chapter 3, there are mounting discussions about the changes in how children spend their free time (e.g., Cooper et al., 2010; Elkind, 2008; Veitch et al., 2006). Research from the USA on time use report a decrease in free time, and an increase in sedentary time, which includes screen time, and structured time; the latter includes school activities and organised leisure activities (Hofferth, 2009; Hofferth & Sandberg, 2001). Furthermore, many children do not meet recommended levels of physical activity (Tremblay et al., 2014).

This study is based on data from the GUI time use diaries and one question from the main questionnaire, as outlined in subsection 4.4.4.1.The aim of the study was to get an overview regarding what Irish nine-year-olds spent their day with, how much free time they had, and what they spent their free time doing. In the main questionnaire, children were asked about their favourite thing to do, thus the aim was also to explore children's own preferences. Considering the PPCT framework and affordances, comparing time use with children's own preferences may offer some insight regarding the potential and actualised affordances.

Research questions:

- What do Irish nine-year-old children spend their time with?
- How much free time do they have?
- To what extent do children's activities reflect their preferences for play?

5.1 Results

Since the main imperative was to give an overview of a typical day in the life of a nine-year-old, only diaries which indicate that the diary day was an ordinary day were included. The final sample consisted of 4,640 diaries. The supplied weight was applied to the data, thus creating a subsample representative of the overall sample of children in the GUI study. Table 5.1 outlines the breakdown of diaries included in the current analysis.

Table 5.1

Breakdown of Time Use Diaries Included in the Current Analysis

Type of day	Weekday during term	Weekday out of term	Weekend
of the overall sample	66.7%	10.8%	22.5%
n^1	4,153	673	1,402
of n^1 ordinary day	83.7%	30.4%	68.6%
n^{Final}	3,474	204	962

Note. The overall sample here refers to the 6,228 diaries that were deemed usable.

About half of the 24 hour cycle was taken up by personal time. Figure 5.1 shows the distribution of activities in a 24 hour day; a full list of activities and associated descriptive statistics can be found in Appendices D, E, and F. During a normal school-term weekday, children spent 7 hours and 10 minutes with school related activities (*SD* = 66 mins); these only took up a small proportion of time on weekends and out of term days. On a school day, children were left with an average of 5 hours and 20 minutes (*SD* = 101 mins) between family and free time. This increased to 10 hours for weekdays out of term (*SD* = 174 mins) and 10 hours and 10 minutes on weekends (*SD* = 144 mins).

Figure 5.1 Children's Time Use

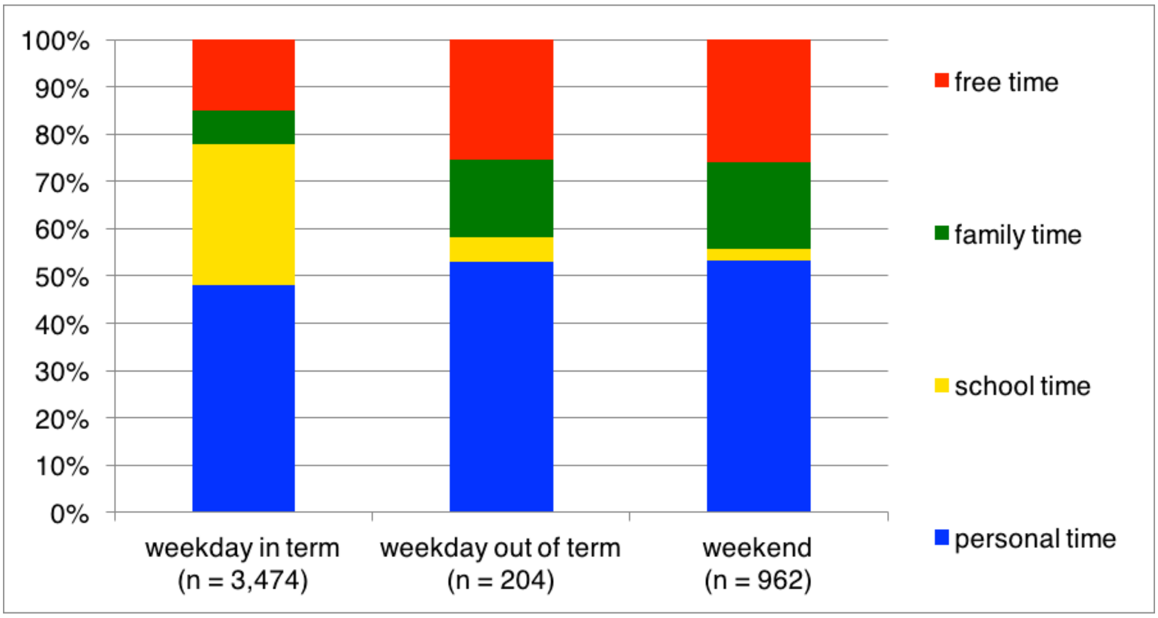

Figure 5.1. Proportions of a day (approx. 24 hours) spent with respective activities on an ordinary day during term, out of term, or a weekend day. Percentages refer to the relative amount, i.e., 10% is equivalent to 2 hours and 24 minutes.

On average, the activities that children spent most free time with on the day they completed the time diary were physical play and watching TV/DVD/video, followed by general play. On weekdays, both in and out of term, children spent the largest proportion of their free time with physical play, 64 minutes during term (*SD* = 62 mins) and 124 minutes out of term (*SD* = 142 mins). Children who filled out the time diary on the weekend spent an average of 98 minutes with physical play (*SD* = 157 mins). On a weekday during term, children spent 109 minutes with sedentary activities (*SD* = 62 mins; the upper five activities in Figure 5.2), 82 minutes of which was spend with screen time (*SD* = 59 mins). Out of term, children spent 173 minutes with sedentary time (*SD* = 102 mins), 131 minutes of which were screen time (*SD* = 88 mins). On weekends, children spent 195 minutes with sedentary time (*SD* = 109 mins), 160 minutes of which were screen time (*SD* = 98 mins). Figure 5.2 illustrates the distribution of activities across children's free time.

Figure 5.2 Children's Free Time

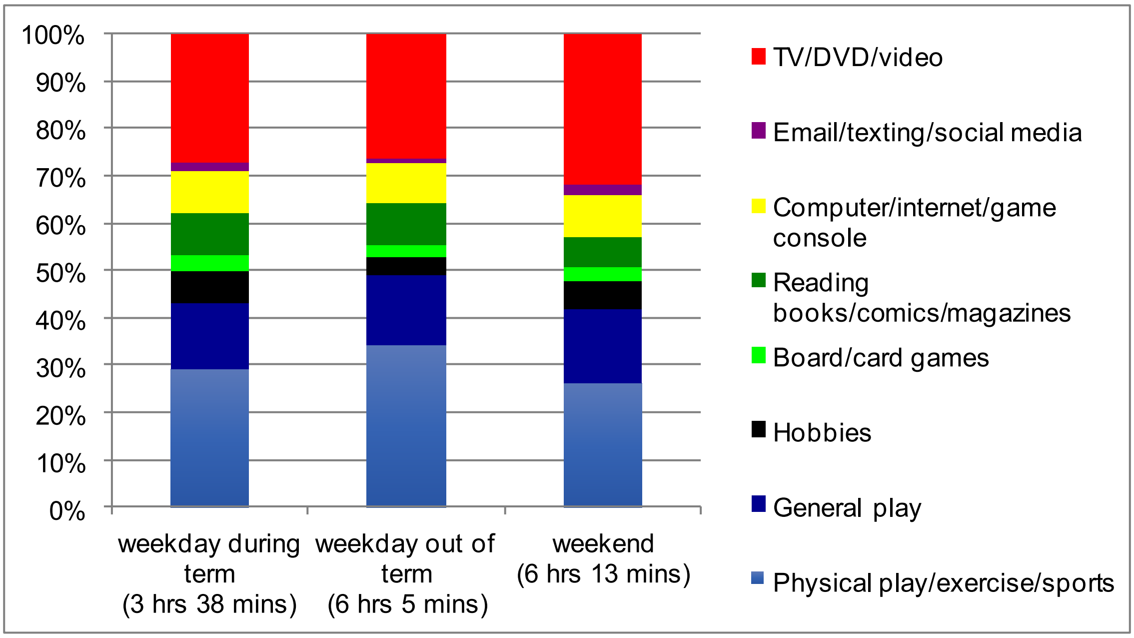

Figure 5.2. Pastimes children engaged with during their free time on an ordinary day during term, out of term, or a weekend day. Percentages refer to the relative amount time spent with a certain activity; the total amount of time varies according to the type of day. *N*(weekday in term) = 3,474. *N*(weekday out of term) = 204. *N*(weekend) = 962.

Within the main GUI questionnaire, children were asked about their favourite hobby or pastime. The majority of children listed a type of sport, or a physically engaging hobby, such as dancing or horse riding as their favourite activity. Table 5.2 provides an overview of activities listed by children who were also included in the time use analysis. Girls were less likely to list a sport as their favourite activity than boys but more than double the number of girls compared to boys listed a hobby as their favourite activity. Only one in twenty children listed screen time as their favourite activity, boys were twice as likely as girls to list screen time as their favourite activity.

Table 5.2

Children's Favourite Thing to do

Activity	Boys (*n* = 2,245)	Girls (*n* = 2,161)	Overall (*n* = 4,562)
Sport/active hobby	73.6%	68.5%	71.0%
Hobbies	5.8%	13.7%	9.7%
Play or home based activity	9.4%	9.9%	9.6%
Family	2.3%	1.6%	1.9%
Friends	2.1%	3.2%	2.7%
Screen time	6.9%	3.2%	5.0%

Note. Activities listed by children as being their favourite thing to do.

The gender differences were also evident in the time use data. Regardless of the type of day, girls spent more time sleeping on average. On weekdays during term time, girls tended to spend more time with personal care and shopping trips. On weekdays during term and weekends girls spent more time with general play, hobbies and other leisure activities, and reading. On weekdays out of term, girls spent more time watching TV/DVD/video and visiting relatives. In general, boys spent more time with computer/internet/game console. On weekdays during term and weekends boys spent more time with physical play than girls and, on weekdays out of term boys spent more time eating and drinking. A full list of gender differences including statistics can be found in Appendix G.

One of the issues regarding the use of means to ascertain and illustrate children's activities is that it disregards variance among children. As the full listing of activities and associated descriptive statistics in Appendices D, E, and F show, some variables had rather large variances. Table 5.3 presents the list of free time activities, the percentage of children who did not spend any time with that activity on an ordinary weekday during term and the median (i.e., the most middle value). If physical play is counted as the only potential source of exercise, 45.4% of children did not meet the recommended one hour of moderate to vigorous activity. When split for gender, fewer boys fell into this category (38.5%) than girls (52.5%).

Table 5.3

List of Activities on an Ordinary Day on a Weekday During Term

	Boys (*n* = 1,734)		Girls (*n* = 1,623)		Overall (*n* = 3,474)	
Activity	no time	median	no time	median	no time	median
Physical play	25%	1hr	38.8%	45 mins	31.4%	1hr
General play	63.0%	0 mins	51.1%	15 mins	57.4%	0 mins
Hobbies	81.1%	0 mins	68.2%	0 mins	74.7%	0 mins
Games	86.4%	0 mins	85.8%	0 mins	85.7%	0 mins
Reading	54.8%	0 mins	49.1%	15 mins	52.1%	15 mins
Computer	57.3%	0 mins	72.6%	0 mins	64.3%	0 mins
Email	93.5%	0 mins	91.5%	0 mins	92.4%	0 mins
TV	22.7%	1 hour	21.6%	1 hour	22.6%	1 hour

Note. Breakdown of the percentage of children who did not spend any time with certain free time activities and the median time spent with the respective activities.

5.2 Summary and Initial Discussion

During term time, nine-year-olds spent the majority of their waking hours in school or with school related activities. Irish children spend a lot of time in school. In a comparison of the compulsory instruction time of general education in 37 countries, Ireland ranked 9th. This is well above the OECD and the EU22 average (Organisation for Economic Co-operation and Development (OECD), 2017). Out of the three types of days, children had most family and free time on weekends. On weekdays out of term, this was slightly less. On any type of day, children spent more time playing (free time) than they spent with family. The ratio was largest during term, when children spent more than twice the amount of time playing. The ratio is smallest on weekends. This is probably also due to parents' work schedules; during the week, there is less time for activities like visits, or family outings. However, it is also likely that some of the free time activities are something children do with either friends or siblings, like playing a card game, general play, or physical play.

The nine-year-olds spent a considerable amount of time with sedentary activities. This is not surprising, considering that many children and adolescents do not reach recommended activity levels. A study from 2010 found that only 19% of Irish 10- and 11-year-olds engaged in enough exercise (Woods et al., 2010). On term days, at least half of their free time was taken up with activities that provide very little physical exercise; this was in addition to a long school day, which only offers limited opportunities for children to move around for prolonged periods of time. Furthermore, just over 30% of children did not engage in any physical play, or exercise, on the day that they filled in their time use diary.

Activities may have also been influenced by the season. Although the day was an ordinary day, thus ruling out that the child might have been sick that day, a large group of families has also filled out their diaries on a day during the winter months, when children might have had limited opportunity to engage in physical play due to the weather. It may also have been the one day of the week when they did not engage in any exercise, which would make it an exception rather than the norm. In addition, the data only provide rough estimates of what children were engaged in; it is therefore possible that children actually move around a lot more, but that this is not always definable as a distinct activity. Climbing up bunk beds, running in and out of the house, or up and down the stairs, would provide just as much physical exercise as playing football, but would have not always been labelled as such.

When comparing the data from the time use diaries to children's stated favourite activities, there seems to be a mismatch. Based on the children's preferences, one might expect that children would spend more time with physical play and less time with screen time, but this was not the case. There are a number of ways to interpret this apparent mismatch. One relates to affordances (Gibson, 1977). As mentioned above, a substantial number of time use diaries were completed during the winter months and, even for the summer months, we have no information about the weather outside. Thus it just might have been a very rainy day and children did not get a chance to go outside due to the weather. Affordances might also relate to space or a lack thereof. Physical play is typically associated with playing outside and, if children do not have adequate space to play outside, or cannot play unsupervised outside, their access and opportunity for such play would be hampered. Another reason could be a lack of playmates, either due to the neighbourhood or due to opposing schedules. With little time left after school, and the possibility that children are enrolled in after school activities, the opportunity to play with other children might not always present itself. If it is indeed the case that children cannot pursue preferred active free time activities, it would be important to investigate what the barriers to physical play are. Of course, it is also possible that screen time provides some down time. After a long and busy day, children might be exhausted and screen time offers a chance to relax. Furthermore, there may have been some element of social desirability at play, where children were aware that screen time is often criticised and that playing, or being active, is a more favourable activity to list when asked about what they enjoy doing.

Regarding affordances, screen time usually requires less effort and input, and is often readily available; thus it could be thought of as the *easy* option. Finally, if we use our memory of past activities to determine what we enjoy the most, we are likely to pick something special. It might be the memory of a fun-filled game out on the green on a sunny day that guided children's choices rather than their internal state of what they would like to do in this very moment and what is accessible. The gender differences zone in on stereotypical activities associated with boys and girls. While boys tend to be more active and interested in computer games, girls are interested in pretend play, and social aspects of family life (Goldstein, 2012).

Overall, children spent about half of their free time with sedentary activities, and the majority of this is taken up by screen time. Although children no not report screen time as their favourite activity, it seems to be a prominent feature of their every-day life. As such further analyses of the role screen time plays in the life of nine-year-olds are warranted, specifically in relation to socio-emotional outcomes.

6 Study II: Screen Time, Socio-Emotional Outcomes, and PPCT

As discussed in Chapter 3, concerns have been raised about potentially deleterious effects of screen time on children's social and emotional wellbeing (e.g., Hamer et al., 2009; Iannotti et al., 2009). However, associations are often modest or weak, and the methodological rigour of some studies has been questioned (Galpin & Taylor, 2018; Przybylski et al., 2018). It was also pointed out that some studies lack a consideration for potentially mediating factors.

This factors in the dynamic nature of family life and the inherent interconnectedness advocated by Bronfenbrenner's PPCT model. By examining one point in time, children are acknowledged as *beings* rather than *becomings*, as has been discussed in Chapter 3. The question regarding the timing of impact is one that has also been a topic in the play literature. Some researchers and theorists highlight the immediate benefits of play, while others emphasise deferred or delayed benefits (see e.g., Hendricks, 2008; Lafreniere, 2011; Piaget, 1962; Smith, 2010; Vygotsky, 1967). Many parents believe that this is central to good parenting and are invested in providing their children with opportunities that will maximise exposure to what they perceive to be the very best (Luthar, 2003; Luthar & Becker, 2002; Hirsh-Pasek & Golinkoff, 2003). Some highlight the functionality and benefits of play, others postulate that play has no specific goal other than itself (Huizinga, 1937).

Pinpointing associations and influencing is a difficult endeavour, since no process happens in isolation and processes are linked up. By examining screen time at age nine within the immediate context and examining the associations with outcomes at age nine, the relationship in the moment is explored, the next chapter provides the analysis of screen time at age nine and outcomes at a later stage.

This study is based on GUI Wave 1 data from the study children, their primary caregivers and teachers. The aim of this study was to explore associations between screen time and socio-emotional outcomes, while also considering a range of potentially mediating factors. Description of the methods can be found in subsections 4.4.5. to 4.4.5.3. All analyses were split for gender.

Research questions:

- Is there an association between screen time and socio-emotional outcomes? (RQ1)
- How is screen time related to person, process, and context variables? (RQ2)
- Can screen time predict outcome scores once these mediating factors are considered? (RQ3)

The focus of the analysis is screen time, therefore RQ2 is exploratory and serves as an exploration of PPCT variables contained in the regression model. Based on the literature, we expect to find an association between screen time and socio-emotional outcomes, therefore RQ1 and RQ3 test the following general hypotheses:

$\mathbf{H_A}^{\mathbf{Bivariate}}$: There is an association between screen time groups and socio-emotional outcomes.

$\mathbf{H_A}^{\mathbf{Rregression}}$: Screen time group affiliation can predict socio-emotional outcomes once PPCT factors are considered.

Since there are two SDQ outcome measures available and one Piers-Harris 2 rating, and analyses are split for gender, each general hypothesis relates to six specific alternative hypothesis, which are listed in Appendix H with their respective null hypotheses.

6.1 Results: Screen Time and Socio-Emotional Outcomes

Parents were asked about how much time their nine-year-old child spends on average per day with different screen time activities. Figure 6.1 and Figure 6.2 describe the average daily hours of all three categories, as well as reading for pleasure as a comparison, for boys (n = 4,221) and girls (n = 4,040).

Figure 6.1 Screen Time Activities of Boys

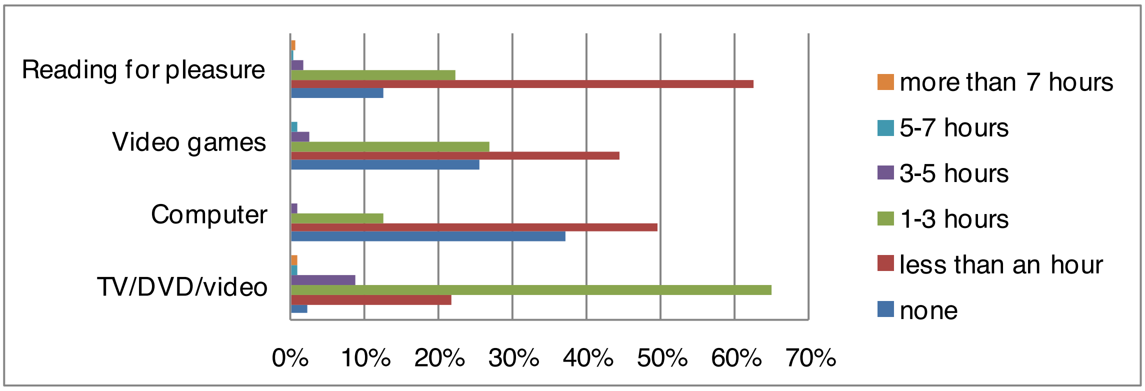

Figure 6.1. Frequency distribution of screen time activities of boys as well as reading for pleasure.

Figure 6.2 Screen Time Activities of Girls

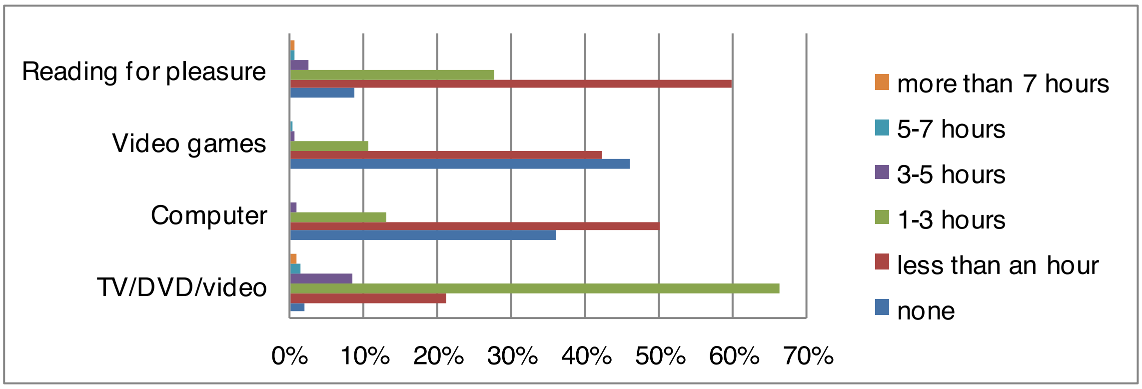

Figure 6.2. Frequency distribution of screen time activities of girls as well as reading for pleasure.

Out of the four activities, children spent most time per day with watching TV/DVD/videos, followed by reading, and then playing video games. The least amount of time was spend with computers. The mode (most frequent response) was less than an hour for all except for TV/DVD/video, where the mode was 1-3 hours per day. Overall, boys spent significantly more time than girls playing video games ($t(8,215) = 24.55$, $p < .001$, $d = 0.50$, medium effect size), whereas girls spent significantly more time reading for pleasure ($t(8,151) = -15.45$, $p < .001$, $d = -0.29$, small effect size). Time spent watching TV/DVD/video and using computers was approximately the same for both genders. Table 6.1 shows the average amount of time spent with different activities per day.

Table 6.1

List of Activities on an Ordinary Day on a Weekday During Term

	Activity	N	Mean	SD
Boys				
	Reading for pleasure	4221	2.17	0.73
	Video games	4221	2.09	0.83
	Computer	4219	1.77	0.69
	TV/Videos/DVD	4221	2.87	0.71
Girls				
	Reading for pleasure	4040	2.40	0.74
	Video games	4038	1.67	0.71
	Computer	4040	1.80	0.69
	TV/Videos/DVD	4040	2.89	0.70

Note. Time spent with different activities per day broken down by gender. Time is displayed as fractions of an hour where 0.5 is 30 minutes.

The created screen time scale, subsequently split by quartiles, produced three screen time groups: the low screen time group, scoring in the lowest quartile on the scale, the mid screen time group, representing the mid 50%, and the high screen time group, who scored in the highest quartile on the scale (see 4.4.5.2.1 for details). Figure 6.3 shows the average screen time scale values according to the different groups and split by gender. Boys were more likely to be in the high screen time group compared to girls. More than half of the children classified as being in the high screen time group were boys (62.4%). In comparison, 55.6% of children in the low screen time group were girls. There was a statistically significant association between gender and overall screen time with $\chi^2(2, 8{,}562) = 9.48$, $p < .01$, Cramér's V = .03, very small effect size.

Figure 6.3 Composition of Screen Time Groups

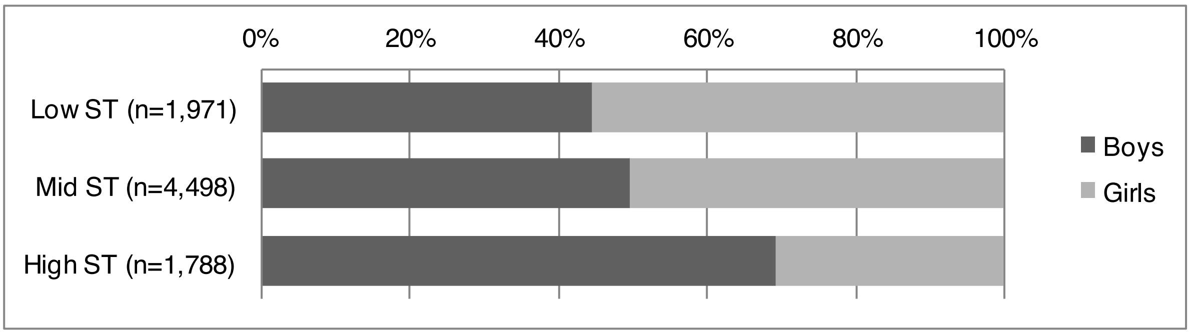

Figure 6.3. Gender breakdown of the three screen time groups.

6.1.1 Technology ownership. Screen time was also reflected in technology ownership. Just under half (44.6%) of all nine-year-olds in the sample had their own television in their bedroom (boys: 45.9%, girls: 42.7%), 35.6% had their own video/DVD player (boys: 31.7%, girls: 39.1%), and 35% had a game console (boys: 43.4%, girls: 25.8%). Only a small proportion of children had their own computer or laptop (7.6%; boys: 7.4%, girls: 7.6%). Those with a TV in their bedroom watched more television per day on average than those who did not have one in their room ($t(7{,}674) = 16.76$, $p < .001$, $d = 0.31$, small effect size). Those who had a computer in their bedroom spent more time using it ($t(5{,}667) = 4.97$, $p < .001$, $d = 0.12$, very small effect). Those who had a game console in their bedroom spent more time using the specific device ($t(5{,}957) = 29.44$, $p < .001$, $d = 0.62$, medium effect size). More boys than girls had a TV set and a game console in their bedroom, but more girls had a video/DVD player.

Just over half (52.8%, $n = 4{,}513$) of all nine-year-olds owned between one and three items of technology, only 3% of children owned all four items. Table 6.2 lists the average number of items owned according to the created screen time groups. There was a statistically significant association between ownership and overall screen time with Welch's $F(2, 4{,}090) = 260.08$, $p < .001$. Children who owned more items scored higher on the created screen time scale. All three groups were significantly different from each other with the low screen time group owning the least items ($M = 0.82$ $SD = 1.09$), followed by the mid group ($M = 1.22$, $SD = 1.25$, d(low-mid) = -0.31, small effect size). Children in the high screen time group owned most items on average ($M = 1.71$, $SD = 1.34$, d(low-high) = -0.70, medium effect size; d(mid-high) = -0.39, small effect size). There was a significant difference between ownership and gender with $t(8{,}239) = 4.97$, $p < .001$, $d = 0.10$, very small effect. Boys owned slightly more items on average ($M = 1.1$, $SD = 1.26$) than girls ($M = 0.97$, $SD = 1.17$).

Table 6.2

Number of Technological Devices Owned

Groups	N	Mean	SD
Boys low ST	875	0.74	1.07
Boys mid ST	2221	1.24	1.28
Boys high ST	1114	1.80	1.34
Girls low ST	1096	0.84	1.07
Girls mid ST	2269	1.18	1.22
Girls high ST	669	1.55	1.32

Note. Average Number of items owned across the three screen time groups, broken down by gender.

6.1.2 Strengths and Difficulties Questionnaire (P9). Mean SDQ scores for boys and girls in the three screen time groups are presented in Figure 6.4. There were significant differences between screen time groups, thus we can reject the null hypothesis that there is no association between screen time and parents' overall SDQ ratings. Among boys, there were significant differences between the screen time groups and overall SDQ scores with Welch's $F(2, 1{,}931) = 14.65$, $p < .001$. Post tests showed that the high screen time group scored significantly higher, indicating more difficulties ($M = 9.04$, $SD = 5.72$), than both the mid ($M = 7.97$, $SD = 5.14$, d(mid-high) = -0.20, small effect size) and the low screen time group ($M = 7.98$, $SD = 5.80$, d(low-high) = -0.19, very small effect size). However, the difference was small. The difference between the mid and low screen time groups was not statistically significant. This result was echoed in the proportion of boys in each screen time group reaching SDQ levels that are considered borderline or abnormal. Overall, 7.9% of boys fell within this range. From the low screen time group, 8.9% ($n = 78$) of boys fell into the bracket, 6.6% of the mid screen time group ($n = 146$), and 10% of the high screen time group ($n = 110$).

There were also significant differences between the screen time groups and girls' SDQ scores with Welch's $F(2, 1{,}587) = 25.68$, $p < .001$. Post tests showed that all three group were significantly different from each other, with the high screen time group scoring the highest ($M = 9.02$, $SD = 5.60$) than both the mid ($M = 7.67$, $SD = 4.96$, d(low-mid) = -

0.11, very small effect size; *d*(mid-high) = -0.26, small effect size) and the low group (M = 7.11, SD = 5.24, *d*(low-high) = -0.37, small effect size). Overall, 6.6% of girls fell within the borderline or abnormal category of SDQ scores. Among the low screen time group, 5.1% could be categorised that way (n = 56), 5.9% of the mid screen time group (n = 132), and 11.6% of girls in the high screen time group (n = 77).

Figure 6.4 P9 Mean SDQ Scores and Screen Time Groups

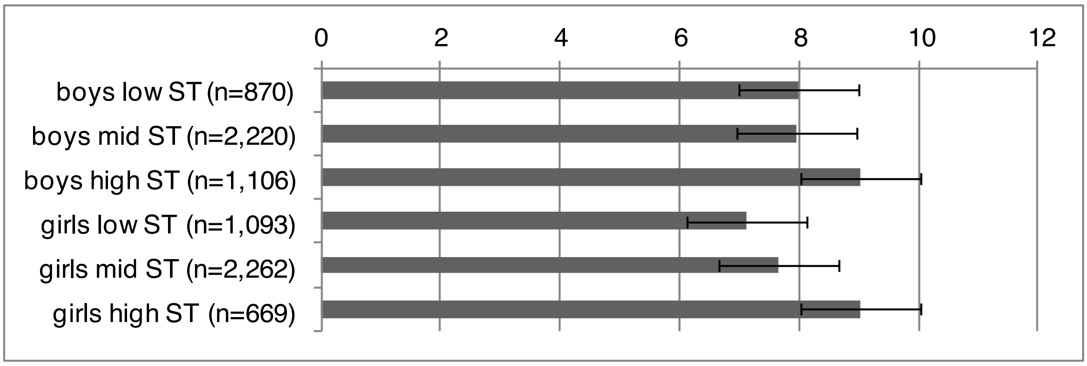

Figure 6.4. Average SDQ scores (parental rating) broken down by screen time group and gender. Higher scores indicate more difficulties. P9 = primary caregiver's rating at Wave 1. Error bars represent ± 1 *SD*.

The overall SDQ scores are made up of the four subscales relating to difficulties: Emotional Symptoms, Conduct Problems, Hyperactivity/Inattention, and Peer Relationship Problems. The scale also contains a Prosocial Behaviour subscale, but this scale is excluded from the total SDQ score utilised, as it does not measure difficulties.

Figures of the SDQ subscales and associated statistics can be found in Appendix I. There were significant differences between the screen time groups and scores on the SDQ Emotional Symptoms, Conduct Problems, and Peer Relationship Problems subscales for boys. The high screen time group scored significantly higher than both the low and the mid screen time groups. There were no significant differences between the screen time groups and scores on the SDQ Hyperactivity/Inattention and prosocial subscales for boys.

All three girls screen time groups scored significantly different from each other on the SDQ Emotional Symptoms and Conduct Problems subscales. The low screen time group scored lowest, the mid group in the middle, and the high screen time group scored highest. On the SDQ Hyperactivity/Inattention and the Peer Relationship Problems subscales, the high screen time group scored significantly higher than the low and the mid screen time groups. On the SDQ Prosocial Behaviour subscale all three of the girls screen time groups were significantly different from each other. The low screen time group scored highest, the mid group in the middle, and the high screen time group scored lowest.

6.1.3 Strengths and Difficulties Questionnaire (T9). On the overall score of teacher's SDQ ratings, boys in different screen time groups did not differ significantly. Figure 6.5 shows that boys in the low screen time group had a slightly higher mean score, but the differences between the three groups did not reach statistical significance (p = .059). Thus, in this case, we cannot reject the null hypothesis that there is no association between screen time and teacher's overall SDQ scores for boys.

We can reject the null hypothesis for girls. In this sample, there were significant differences among girls between the screen time groups and their SDQ scores, with Welch's $F(2, 4{,}021) = 4.29$, $p = .014$. Figure 6.5 shows that the high screen time group's scores were higher ($M = 5.65$, $SD = 5.43$), and post tests showed that their scores were significantly different from the low ($M = 5.03$, $SD = 5.12$, d(low-high) = -0.12, very small effect size) and the mid screen time group ($M = 4.99$, $SD = 5.27$, d(mid-high) = -0.13, very small effect size).

Figure 6.5 T9 Mean SDQ Scores and Screen Time Groups

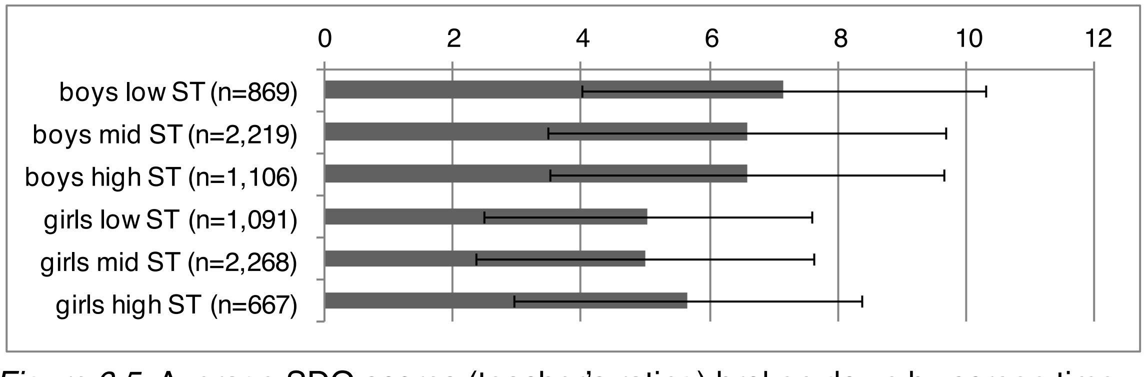

Figure 6.5. Average SDQ scores (teacher's rating) broken down by screen time group and gender. Higher scores indicate more difficulties. T9 = teacher's rating at Wave 1. Error bars represent ± 1 *SD*.

Figures and associated statistics comparing the screen time groups on the teacher's ratings of SDQ subscales can be found in Appendix J. There were significant differences between the boys' screen time groups and scores on the SDQ Emotional Symptoms subscale for boys. The high screen time scored significantly higher than the low and the mid screen time groups. The opposite pattern was found on the SDQ Conduct Problems subscale for boys; here the high screen time group scored significantly lower than the low screen time group. This trend was also seen for the SDQ Hyperactivity/Inattention subscale for boys; the low screen time group scored significantly higher than both the mid and the high screen time groups. There were no significant differences between the screen time groups and scores on the SDQ Peer Relationship Problems and the Prosocial Behaviour subscales for boys.

For girls, there was a significant difference on the SDQ Emotional Symptoms subscale. The high screen time group scored significantly higher than the low screen time group. There were no differences among screen time groups for the SDQ Conduct Problems and Hyperactivity/Inattention subscales for girls. There was a significant difference between the screen time groups and scores on the SDQ Peer Relationship Problems subscale for girls. The highs screen time group scored significantly higher than the mid screen time group. Finally, on the SDQ Prosocial Behaviour subscale, the mid screen time group scored highest and their average score differed significantly from the low screen time group.

6.1.4 Piers-Harris Self-Concept Scale (C9). There were no significant differences in mean Piers-Harris 2 scores for the different screen time group for either boys or girls, thus we cannot reject the null hypothesis stating that there is no association between screen time and children's overall Piers-Harris 2 scores. Means are shown in Figure 6.6. There was a tendency for boys in the low screen time group and girls in the high screen time group to score lower on the self-concept scale. Considering the individual subscales, there was a difference between screen time groups on two subscales for boys and one subscale for girls.

Among boys, there was a difference between screen time groups on the Physical Appearance and Attributes and the Freedom from Anxiety subscales. For the Physical Appearance and Attributes subscale, there was a significant difference between the mid and the high screen time group. The high screen time scored highest on average (high: M = 7.78, SD = 2.34, mid: M = 7.54, SD = 2.44, d(mid-high) = -0.10, very small effect size), which indicates more confidence in that domain. On the Freedom from Anxiety subscale, the low screen time group had the lowest scores (M = 10.96, SD = 2.94) and was statistically different from the mid group (M = 11.27, SD = 2.64, d(low-mid) = -0.11, very small effect size), which had the highest scores overall.

Among girls, the high screen time group (M = 9.97, SD = 3.01) differed significantly from the other two groups on the Freedom from Anxiety subscale. Girls in that group tended to score significantly lower than girls in either the mid (M = 10.34, SD = 3.01, d(mid-high) = 0.12, very small effect size) or the low screen time group (M = 10.33, SD = 2.95, d(low-high) = 0.12, very small effect size).

Figure 6.6 C9 Mean Piers-Harris 2 Scores and Screen Time Groups

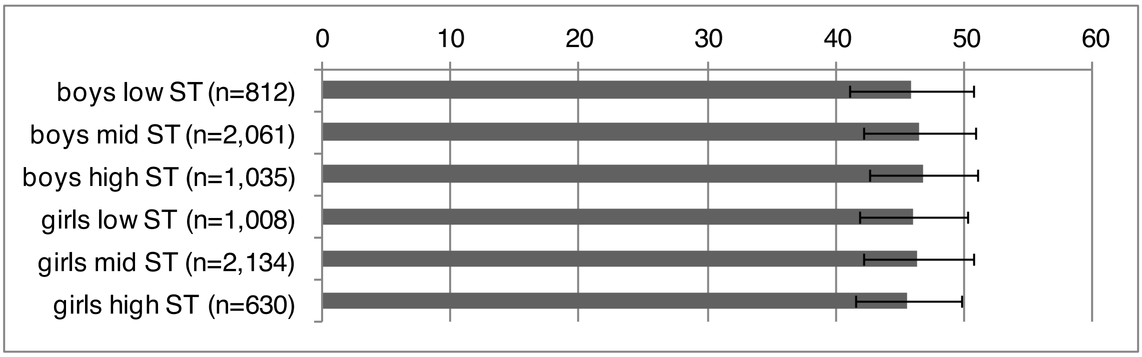

Figure 6.6. Average Piers-Harris 2 scores broken down by screen time group and gender. Higher score indicate more self-confidence. C9 = children's rating at Wave 1. Error bars represent ± 1 *SD*.

6.2 Screen Time and Person Characteristics

Associations between different screen time groups were explored with regard to the study children's health, chronic illnesses, learning difficulties, physical activity levels and BMI, scholastic performance, and temperament as described in subsection 4.4.5.2.3.

6.2.1 Health. There was a statistically significant association between health and screen time groups overall with $\chi^2(4, n = 8{,}562) = 54.30$, $p < .001$, Cramér's V = .06, very small effect size. This was significant for boys with $\chi^2(8, n = 4{,}217) = 44.25$, $p < .001$, Cramér's V = .07, very small effect size, and girls with $\chi^2(8, n = 4{,}038) = 14.68$, $p = .005$, Cramér's V = .04, very small effect size. Overall, around three quarters of children were very healthy with the remaining quarter only reporting minor problems. Only a small percentage of children had major health issues. Differences in health status were seen between screen time groups, only about 67% of children in the high screen time group were very healthy (mid screen time group: 74%; low screen time group: 76.7%). The breakdown of reported health statuses is detailed in Figure 6.7.

There were fewer boys in the high screen time group with no health problems at all; girls in the low screen time group were more likely to report near to perfect health compared to the other two groups. There was no significant association between health and gender.

Figure 6.7 Children's Health Status and Screen Time Groups

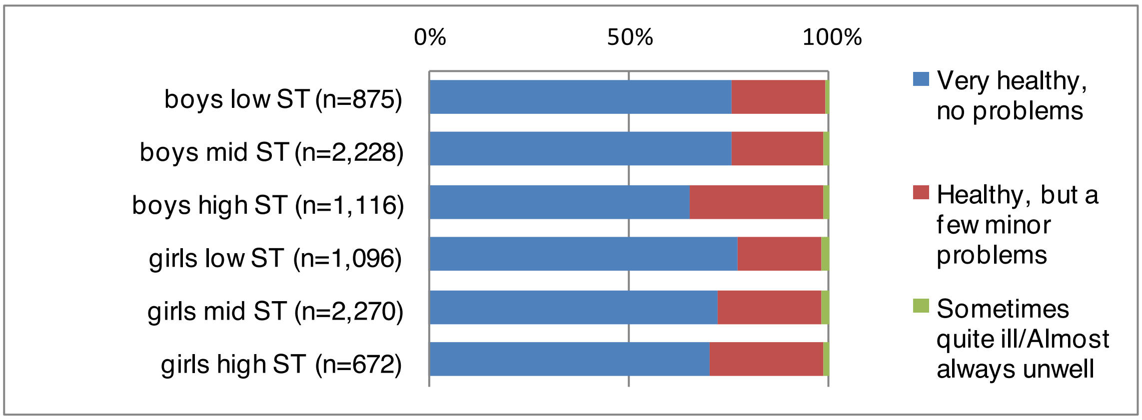

Figure 6.7. Health status over the past year broken down by gender and screen time group. *N* refers to the total sample of the group.

6.2.2 Chronic illnesses. There was a statistically significant association between ongoing chronic illness and screen time groups overall with $\chi^2(2, n = 8{,}563) = 10.13$, $p < .01$, Cramér's V = .03, very small effect size. When split for gender, however, this difference was only significant for boys with $\chi^2(2, n = 4{,}219) = 11.47$, $p = .003$, Cramér's V = .05, very small effect size. There were higher proportions of boys with chronic illnesses in the low and the high screen time group compared to the mid group. Figure 6.8 shows the breakdown of chronic health problems or disabilities.

Figure 6.8 Chronic Illnesses and Screen Time Groups

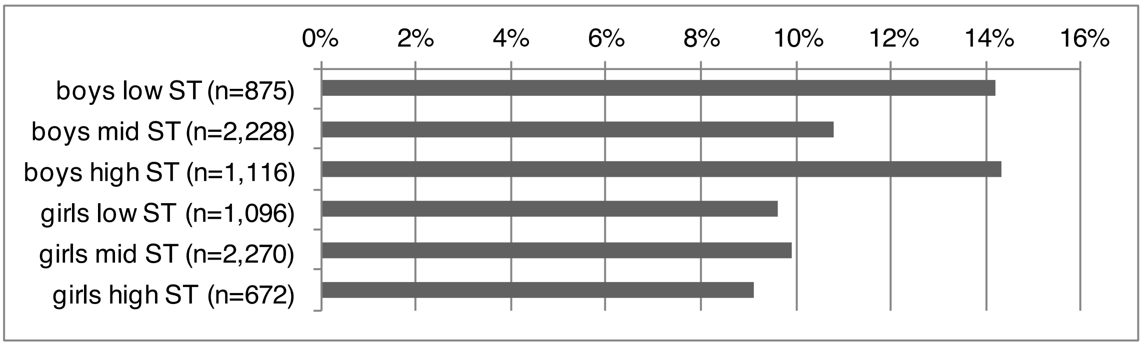

Figure 6.8. Percentage of boys and girls with an ongoing chronic, physical or mental health problem, illness or disability. *N* refers to the total sample of the group.

6.2.3 Learning difficulties. Of the 906 parents that indicated that their child had a specific learning difficulty, communication or co-ordination disorder, 69.3% ($n = 627$) indicated that this had been diagnosed formally, 30.7% ($n = 278$) stated that this was not a formal diagnosis or that they were still awaiting consultation results. There was no statistically significant association between having a specific learning difficulty, communication or co-ordination disorder, and screen time group overall. When split for gender, however, there was a difference among boys with $\chi^2(2, n = 4{,}219) = 11.47$, $p = .003$, Cramér's V = .05, very small effect size. As can be seen from the distribution in Figure 6.9, there were more boys in the low screen time group identified with a learning difficulty, whereas the difference between the girls' groups was minimal. There was a significant association between learning difficulties and gender with $\chi^2(1, n = 8{,}256) = 52.86$, $p < .001$, $phi = -.08$, very small effect size.

Figure 6.9 Learning Difficulties and Screen Time Groups

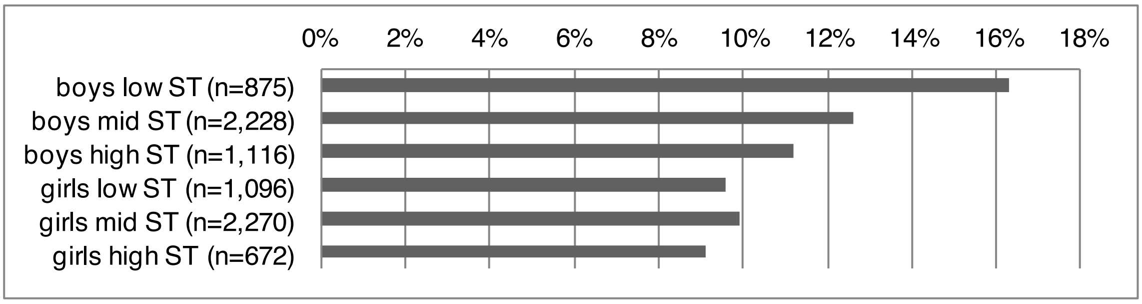

Figure 6.9. Proportion of boys and girls whose parents report a specific learning difficulty, a communication or co-ordination disorder broken down by screen time group and gender. *N* refers to the total sample of the group.

6.2.4 Vigorous exercise. There was a statistically significant association between the number of times children engaged in hard exercise and screen time group with $\chi^2(8, n = 8{,}558) = 56.92$, $p < .001$, Cramér's V = .06, very small effect size. This was significant for boys with $\chi^2(8, n = 4{,}219) = 66.93$, $p < .001$, Cramér's V = .09, very small effect size, and girls with $\chi^2(8, n = 4{,}036) = 35.02$, $p < .001$, Cramér's V = .07, very small effect size. There was a clear trend in the association between exercise and screen time group affiliation with children in the low screen time group participating in more exercise compared to the high screen time group. Figure 6.10 shows the breakdown of hard exercise frequency. Two-thirds of boys in the low screen time group exercised nine days in a two-week period; girls in the high screen time group had the smallest proportion of high activity levels. There was a statistically significant association between the number of times children did hard exercise and gender with $\chi^2(4, n = 8{,}565) = 16.03$, $p < .05$, Cramér's V = .04, very small effect size. Caregivers of boys were more likely to report high levels of exercise than caregivers of girls.

Figure 6.10 Hard Exercise and Screen Time Groups

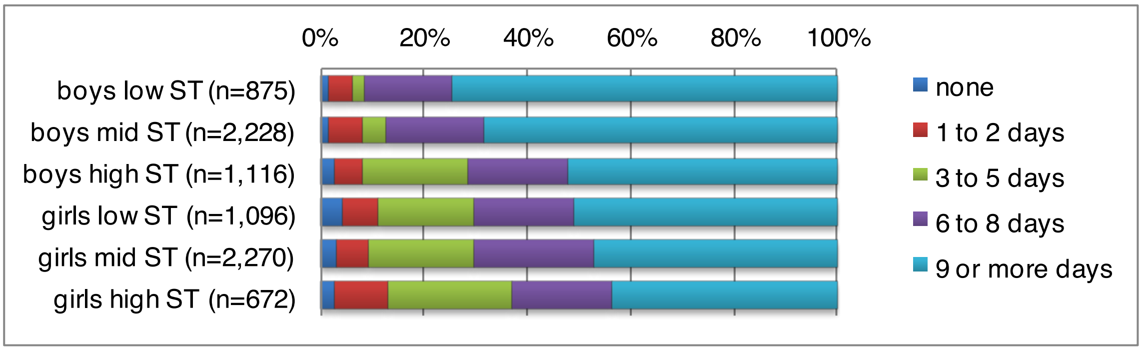

Figure 6.10. Number of times child engaged in at least 20 minutes of hard exercise in the past 14 days, broken down by screen time group and gender. Hard exercise was defined as hard enough to make the child breathe heavily and make his/her heart beat faster (e.g., playing football, jogging, or fast cycling, includes time in physical education class).

6.2.5 Light exercise. There was a statistically significant association between the number of times children did light exercise and screen time group with $\chi^2(8, n = 8{,}561) = 66.76$, $p < .001$, Cramér's V = .06, very small effect size. This was significant for boys with $\chi^2(8, n = 4{,}219) = 57.14$, $p < .001$, Cramér's V = .08, very small effect size, and girls with $\chi^2(8, n = 4{,}038) = 41.30$, $p < .001$, Cramér's V = .07, very small effect size. Figure 6.11 shows the breakdown of light exercise frequency. Both boys and girls in the high screen time groups tended to do less light exercise than children in the low or mid screen time groups. There was also a significant association between light exercise and gender with $\chi^2(4, n = 8{,}561) = 17.37$, $p < .05$, Cramér's V = .05, very small effect size. Again, boys engaged in more exercise than girls.

Figure 6.11 Light Exercise and Screen Time Groups

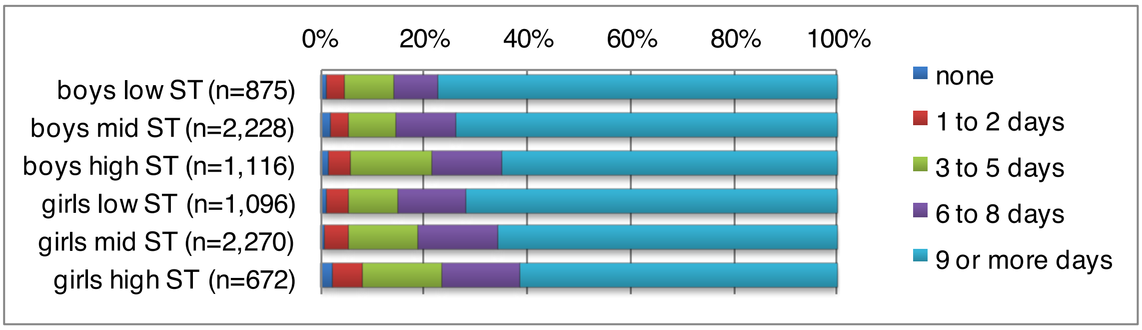

Figure 6.11. Number of times child engaged in at least 20 minutes of light exercise in the past 14 days broken down by screen time group and gender. Light exercise was defined as exercise that was not hard enough to make the child breathe heavily and make his/her heart beat faster (e.g., walking or slow cycling).

6.2.6 Body Mass Index. More children in the high screen time group were exceeding the cut-off point for obesity, and BMI was higher on average compared to those in the low and the mid screen time groups. Figure 6.12 shows the breakdown of BMI groups according to screen time groups and gender. There was a statistically significant association between BMI group and screen time group with $\chi^2(4, n = 7{,}821) = 15.89$, $p = .003$, Cramér's V = .03, very small effect size. When split for gender, however, the difference was only significant for boys with χ^2 $(4, n = 4{,}008) = 33.76$, $p < .001$, Cramér's V = .07, very small effect size. The high screen time group ($M = 18.06$, $SD = 3.09$) had significant higher BMI scores than the mid group ($M = 17.71$, $SD = 2.90$) and the low screen time group ($M = 17.43$, $SD = 2.44$). Boys had a lower BMI on average than girls with $t(7{,}824) = 5.88$, $p < .001$, $d = 0.13$, very small effect size. The average BMI score of boys was 17.74 ($SD = 2.87$); the girls' mean was 18.15 ($SD = 3.21$).

Figure 6.12 Body Mass Index Groups and Screen Time Groups

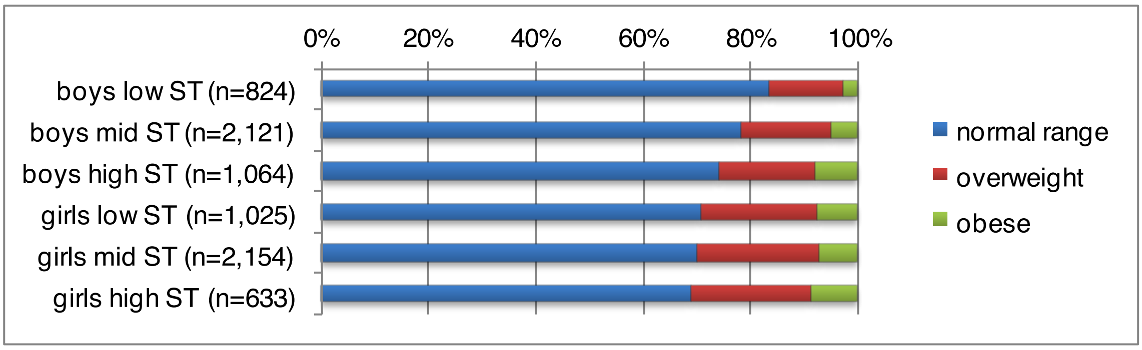

Figure 6.12. Body Mass Index groups broken down by screen time group and gender. Cut-off points were calculated using the guidelines outlined in Cole et al. (2000).

6.2.7 School performance. All children completed the Drumcondra tests for reading and maths. These scores were transformed into logit scores to account for different children taking different tests. Overall, there were no significant differences in maths and reading score between the screen time groups. When split for gender, there was a significant difference for girls' reading score with Welch's $F(2, 1{,}601) = 4.02$, $p = .018$. Post tests showed that the low screen time ($M = -.06$, $SD = 1.01$) scored significantly lower than the mid screen time group (*M* = .04, *SD* = 0.02, *d*(low-mid) = -0.10, very small effect size). On average, boys scored higher than girls on the maths Drumcondra test with $t(8{,}138) = 5.62$, $p < .001$, $d = 0.12$, very small effect size.

6.2.8 Temperament. Boys and girls differ on all four subscales. Girls score higher on average on the shyness subscale with $t(8{,}236) = -5.11$, $p < .001$, $d = -0.11$, very small effect size, on the emotional subscale, with $t(8{,}244) = -4.76$, $p < .001$, $d = -0.10$, very small effect size, and on the sociability subscale $t(8{,}195) = -4.63$, $p < .001$, $d = -0.10$, very small effect size. Boys score higher on average on the activity subscale with $t(8{,}245) = 7.71$, $p < .001$, $d = 0.02$, very small effect size.

There were statistically significant differences between the screen time groups and their EAS subscale scores among both boys and girls. For boys, there was a statistically significant difference for shyness with Welch's $F(2, 1{,}960) = 7.17$, $p = .001$. The high screen time group tended to be shyer on average (*M* = 2.20, *SD* = 0.77) compared to both the mid (*M* = 2.19, *SD* = 0.72, *d*(mid-high) = -0.14, very small effect size) and the low screen time group (*M* = 2.22, *SD* = 0.81, *d*(low-high) = -0.11, very small effect size).

Among girls, there was also a significant association between the screen time groups and the EAS shyness subscale with $F(2, 4{,}023) = 7.99$, $p < .001$. Post tests showed that all three groups were significantly different from each other, with the low screen time group scoring the lowest (*M* = 2.25, *SD* = 0.74). The mid group was in between (*M* = 2.32, *SD* = 0.75, *d*(low-mid) = -0.09, very small effect size; *d*(mid-high) = -0.11, very small effect size) and the high screen time group scores highest on shyness (*M* = 2.40, *SD* = 0.79, *d*(low-high) = -0.19, very small effect size). The average scores on the EAS shyness subscale are displayed in Figure 6.13.

Figure 6.13 EAS Shyness Subscale and Screen Time Groups

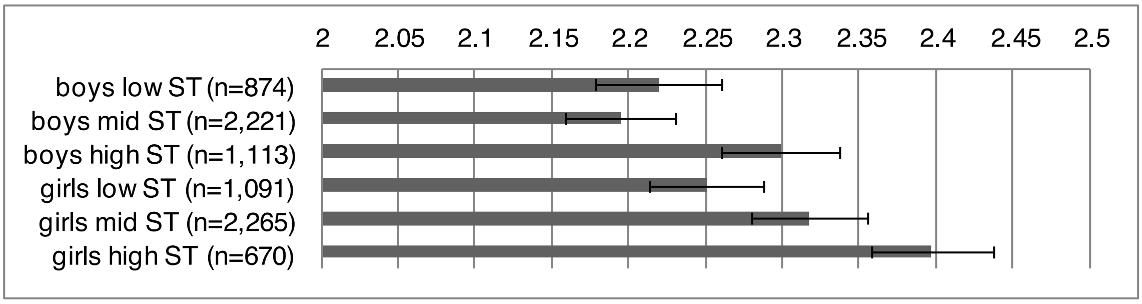

Figure 6.13. Average scores on the EAS shyness subscale broken down by screen time group and gender. Error bars represent ± 1 SD.

For boys, there was a significant effect for emotionality with Welch's $F(2, 1{,}948) = 7.13$, $p = .001$. Post tests showed that the high screen time group scored significantly higher ($M = 2.21$, $SD = 0.95$) on the emotionality scale than the mid screen time group ($M = 2.08$, $SD = 0.86$, d(mid-high) = -0.14, very small effect size).

The same trend was observed among girls, where there was also a significant association between screen time group and emotionality with $F(2, 4{,}025) = 17.74$, $p < .001$. Post tests showed that the high screen time group scored significantly higher ($M = 2.40$, $SD = 0.96$) than both the mid ($M = 2.20$, $SD = 0.91$, d(mid-high) = -0.20, small effect size) and the low screen time group ($M = 2.14$, $SD = 0.94$, d(low-high) = -0.28, small effect size). The average scores on the EAS emotionality subscale are displayed in Figure 6.14.

Figure 6.14 EAS Emotionality Subscale and Screen Time Groups

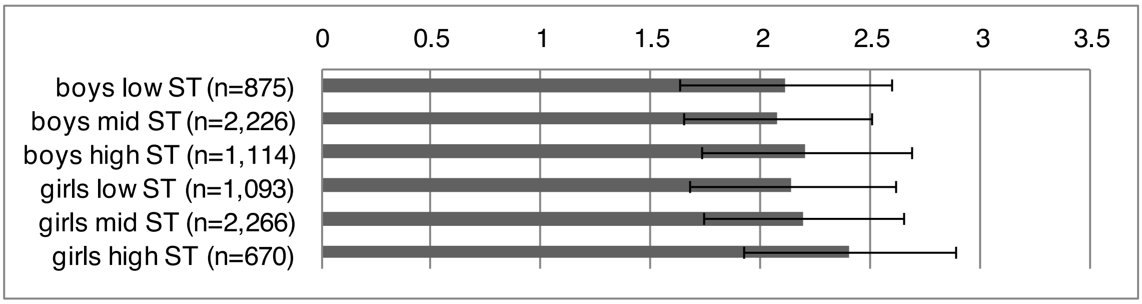

Figure 6.14. Average scores on the EAS emotionality subscale broken down by screen time group and gender. Error bars represent ± 1 SD.

Among boys, there was an interaction between the activity subscale and screen time group with Welch's $F(2, 2{,}022) = 17.67$, $p = .001$. The high screen time group tended to be less active (M = 4.02, SD = 0.81) compared to the low (M = 4.22, SD = 0.73, d(low-high) = 0.26, small effect size) and the mid screen time group (M = 4.16, SD = 0.74, d(mid-high) = 0.17, very small effect size).

All three girls screen time groups differed significantly on the activity subscale with Welch's $F(2, 1{,}623) = 9.90$, $p < .001$. Post tests showed that the low screen time group was most active on average (M = 4.08, SD = 0.76), followed by the mid group (M = 3.99, SD = 0.76, d(low-mid) = 0.10, very small effect size; d(mid-high) = -0.12, very small effect size), and the high screen time group, which was least active (M = 3.91, SD = 0.82, d(low-high) = -0.01, very small effect size). The average scores on the EAS activity subscale are displayed in Figure 6.15.

Figure 6.15 EAS Activity Subscale and Screen Time Groups

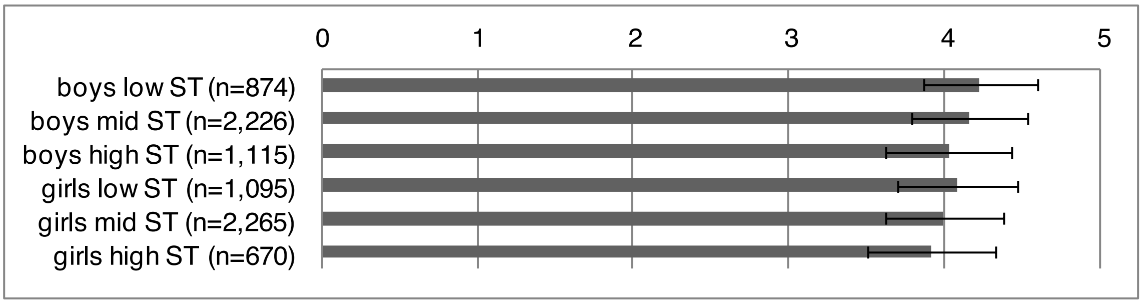

Figure 6.15. Average scores on the EAS activity subscale broken down by screen time group and gender. Error bars represent ± 1 SD.

For boys there was a statistically significant difference among screen time groups on the sociability subscale with $F(2, 4{,}182) = 13.\ 15$, $p < .001$. The high screen time group had lower scores on average (M = 3.62, SD = 0.66) than both the low (M = 5.52, SD = 0.68, d(low-high) = 0.16, very small effect size) and the mid screen time group (M = 3.64, SD = 0.63, d(mid-high) = 0.19, very small effect size).

The association between screen time groups and the sociability subscale was also significant for girls with Welch's $F(2, 1{,}622) = 3.08$, $p = .049$). The low screen time group score significantly higher (M = 3.70, SD = 0.60) than the high screen time group (M = 3.62, SD = 0.68, d(low-high) = 0.13, very small effect size). Figure 6.16 shows the average scores on the EAS sociability subscale. Among boys and girls, there was an overall tendency for the high screen time group to score higher on shyness and emotionality and lower on activity and sociability.

Figure 6.16 EAS Sociability Subscale and Screen Time Groups

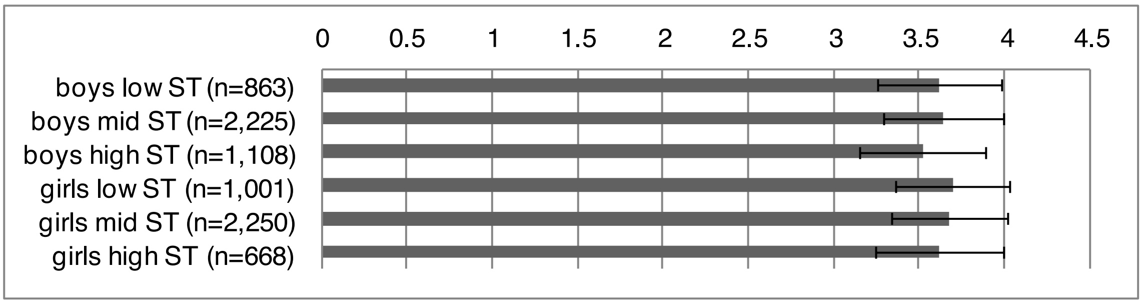

Figure 6.16. Average scores on the EAS sociability subscale according to screen time group and gender. Error bars represent ± 1 SD.

6.3 Screen Time and Proximal Processes

Associations between different screen time groups were explored with regard to children's pastimes, number of close friends, whether they had been a victim of bullying, the primary caregiver's parenting style, the amount of time they spent together as a family, and the parent-child relationship.

6.3.1 Structured activities. The majority of children (89.6%) were enrolled in some form of structured activity outside of school. Most children (78.2%) were enrolled in one or two activities. The most common activity was a sports or fitness club, followed by a cultural activity. Girls tended to be enrolled in more activities with an average of 1.64 (SD = 0.90) compared to boys (M = 1.41, SD = 0.81). This difference was statistically significant with $t(8,259) = -11.67$, p < .001, d = -0.25, small effect size.

There was a statistically significant association between screen time group and number of structured activities for boys with $F(2, 4,216) = 12.41$, $p < .001$. Post tests showed that all three groups were significantly different from each other. Boys in the low screen time group were enrolled in more activities on average (M = 1.51, SD = 0.82) than the mid (M = 4.16, SD = 0.79, d(low-mid) = 0.11, very small effect size), d(mid-high) = 0.11, very small effect size) and the high screen time group (M = 1.33, SD = 0.85, d(low-high) = 0.22, small effect size).

There was also a statistically significant association between screen time group and number of structured activities for girls with $F(2, 4{,}034) = 6.37$, $p = .002$. Girls in the high screen time group tended to do fewer activities on average ($M = 3.62$, $SD = 0.66$) than those in the mid ($M = 5.52$, $SD = 0.68$, d(mid-high) = 0.14, very small effect size) and the low screen time group ($M = 3.64$, $SD = 0.63$, d(low-high) = 0.16, very small effect size). Figure 6.17 illustrates the amount of different structured activities children were enrolled in.

Figure 6.17 Number of Structured Activities and Screen Time Groups

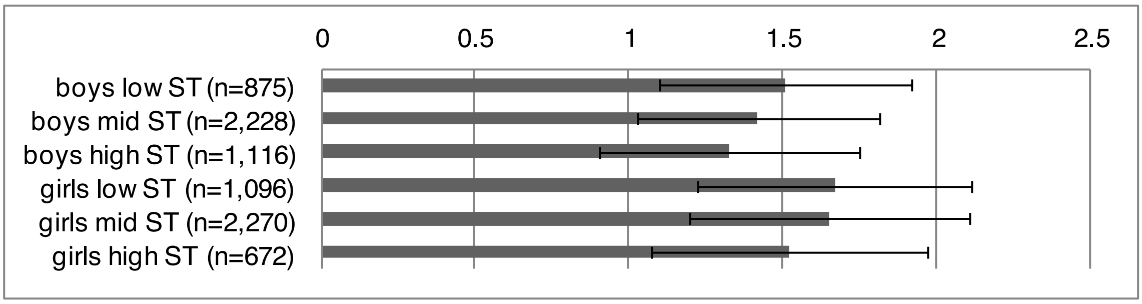

Figure 6.17. Average amount of different activities children were enrolled in broken down by screen time group and gender. Error bars represent ± 1 *SD*.

6.3.2 Friends. The majority of primary caregivers reported that their child had 2-5 friends (74.3%). Only 2% of parents said that their child had no close friends. This was higher for boys (2.6%) than girls (1.2%). There was no statistically significant difference between the three screen time groups and the amount of close friends children had. Figure 6.18 displays the number of close friends reported by primary caregivers.

Figure 6.18 Close Friends and Screen Time Groups

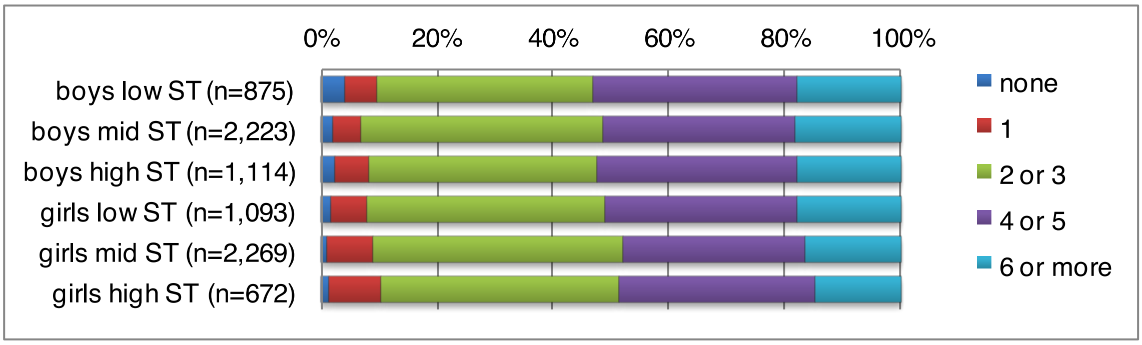

Figure 6.18. The number of close friends the children had according to their primary caregiver, broken down by screen time group and gender.

6.3.3 Bullying. Parents were asked if their child had been a victim of bullying over the past year. Overall, 23.4% of primary caregivers reported that their child had been bullied over the past year (23% of boys and 23.8% of girls). The most frequently listed mean of bullying was verbal (21.2%), followed by physical (9%), exclusion (8.6%), written messages (1.1%), electronic (0.6%) and other (0.5%). There was a statistically significant association between a report of bullying and screen time group with $\chi^2(2, n = 8{,}553) = 13.49$, $p = .001$, Cramér's V = .04, very small effect size. When split for gender, however, this difference was only significant among boys with χ^2 $(2, n = 4{,}033) = 5.01$, $p = .02$, Cramér's V = .04, very small effect size. As can be seen in Figure 6.19, there was a higher percentage of boys in the high screen time group who had been a victim of bullying; the mid group had the lowest proportion overall.

Figure 6.19 Bullying and Screen Time Groups

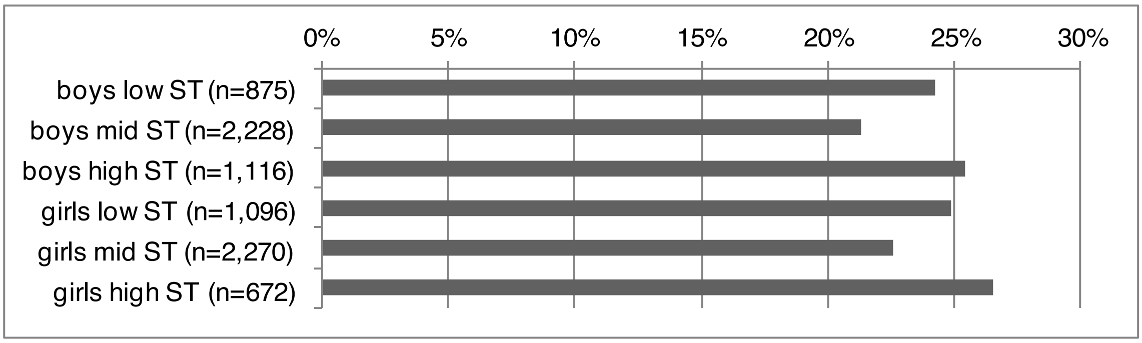

Figure 6.19. Percentage of children who had been a victim of bullying over the past year according to the primary caregiver, broken down by screen time group and gender. *N* refers to the total sample of each group.

6.3.4 Primary caregiver's parenting style. The most prevalent parenting style overall and in all groups was an authoritative parenting style, followed by permissive. Only a small percentage of children perceived their parents to be either authoritarian or neglectful. For boys there was a statistically significant association between parenting style and screen time group with $\chi^2(6, n = 3{,}913) = 13.79$, $p = .033$, Cramér's V = .04, very small effect size. There was also a significant association among girls with $\chi^2(6, n = 3{,}725) = 17.34$, $p = .008$, Cramér's V = .05, very small effect size. As can be seen in Figure 6.20, there was a slightly higher percentage of children in the low screen time group who perceived they had authoritative parents and higher numbers of parents of children in the high screen time group who were permissive or neglectful.

Figure 6.20 Parenting Style and Screen Time Groups

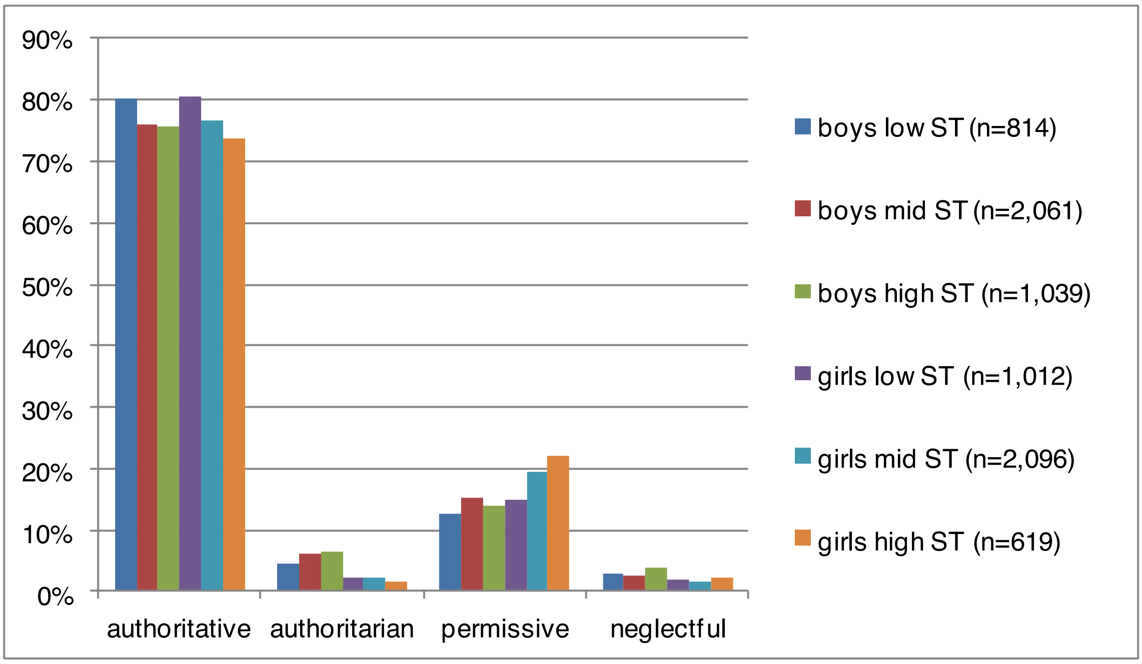

Figure 6.20. Percentage of parents classified in the respective parenting style based on children's replies, broken down by screen time group and gender.

6.3.5 Family time. Figure 6.21 shows the breakdown of family quality time. Higher scores indicate more time spent together as a family. There was a significant difference between the screen time groups and family time overall with Welch's $F(2, 3{,}890) = 27.45$, $p < .001$. For boys, this was significant with Welch's $F(2, 1{,}978) = 9.92$, $p < .001$. Post tests showed that the low screen time group scored significantly higher ($M = 14.02$, $SD = 2.67$) than the mid ($M = 13.62$, $SD = 2.50$, d(low-mid) = 0.15, very small effect size) and the high screen time group ($M = 13.51$, $SD = 2.74$, d(low-high) = 0.20, small effect size). For girls, this was significant with Welch's $F(2, 1{,}602) = 15.09$, $p < .001$. Post tests showed the same trend was observed for girls, again the low screen time group scored significantly higher ($M = 14.56$, $SD = 2.53$) than the mid ($M = 14.12$, $SD = 2.41$, d(low-mid) = 0.17, very small effect size) and the high screen time group ($M = 13.94$, $SD = 2.67$, d(low-high) = 0.25, small effect size).

Figure 6.21 Family Time and Screen Time Groups

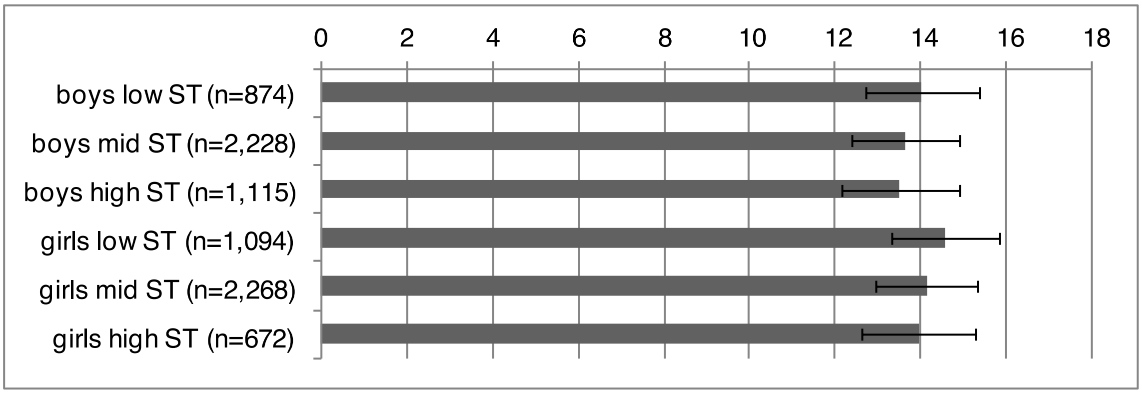

Figure 6.21. Amount of time spent together as a family, broken down by screen time group and gender. A higher score indicates more time spent together. Error bars represent ± 1 *SD*.

6.3.6 Parent-child relationship. Most parents reported a good relationship, so the results were positively skewed overall (see also Nixon, 2012). Among boys there was a statistically significant difference in the level of conflict with the primary caregiver with Welch's $F(2, 1{,}997) = 7.86$, $p < .001$. Post-tests showed that the high screen time group scored significantly higher ($M = 22.60$, $SD = 8.98$) than the low ($M = 21.09$, $SD = 8.65$, d(low-high) = -0.18, very small effect size) and the mid high screen time group ($M = 21.62$, $SD = 8.35$, d(mid-high) = -0.11, very small effect size).

In the girls' sample, there was a statistically significant difference for the level of conflict with the primary caregiver with Welch's $F(2, 1{,}603) = 21.47$, $p < .001$. All three groups were different from each other with the high screen time group scoring highest ($M = 24.20$, $SD = 9.53$), followed by the mid group ($M = 22.20$, $SD = 8.55$, d(mid-high) = -0.23, small effect size; d(low-mid) = -0.11, very small effect size). The low screen time group scored lowest ($M = 21.24$, $SD = 8.62$, d(low-high) = -0.34, small effect size). Figure 6.22 illustrates the scores on the conflict subscale.

Figure 6.22 Conflict and Screen Time Groups

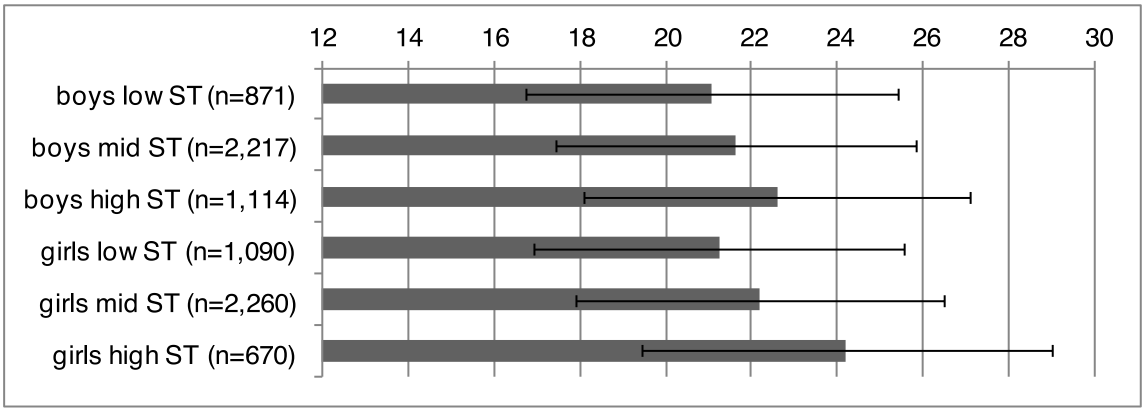

Figure 6.22. Level of conflict broken down by screen time group and gender. Error bars represent ± 1 *SD*.

Among boys, there was no statistically significant difference between the groups regarding the level of closeness with the primary caregiver. As can be seen in Figure 6.23, there was a difference among girls with Welch's $F(2, 1{,}578) = 10.13$, $p < .001$. All three groups were different from each other. The high screen time group scored lowest on closeness ($M = 44.64$, $SD = 4.03$), followed by the low screen time group ($M = 45.32$, $SD = 3.66$, d(low-high) = -0.19, very small effect size; d(low-mid) = -0.03, very small effect size). The mid screen time group had the highest scores ($M = 45.42$, $SD = 3.49$, d(mid-high) = -0.21, small effect size).

Figure 6.23 Closeness and Screen Time Groups

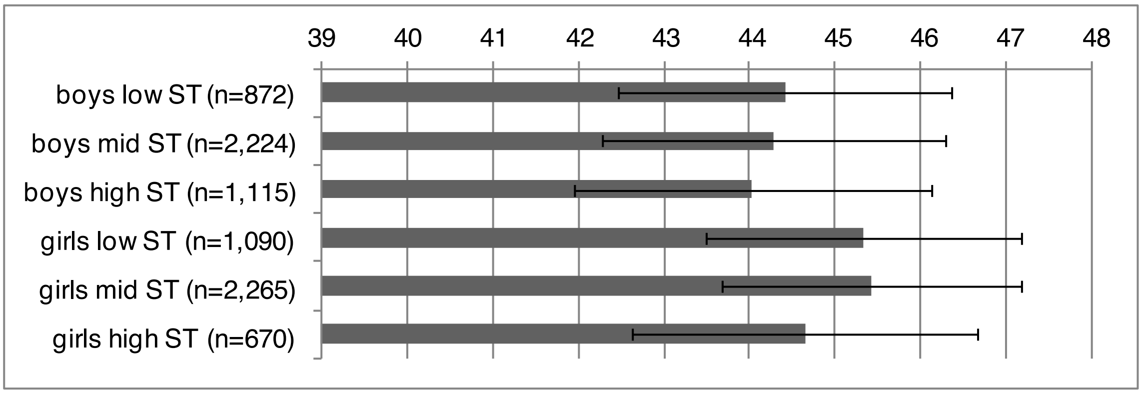

Figure 6.23. Level of closeness broken down by screen time group and gender. Error bars represent ± 1 *SD*.

Among boys, there was a significant difference among groups for the level of dependence with the primary caregiver with $F(2, 4{,}208) = 2.51$, $p < .001$. As can be seen in Figure 6.24, the high screen time group scored highest on the level of dependence (*M* = 10.81, *SD* = 3.60), followed by the mid group (*M* = 10.09, *SD* = 3.46, *d*(mid-high) = -0.21, small effect size; *d*(low-mid) = -0.06, very small effect size). The low screen time group scored lowest (*M* = 9.64, *SD* = 3.35, *d*(low-high) = -0.34, small effect size).

There was also a significant difference among girls with $F(2, 4{,}023) = 18.14$, $p < .001$. The high screen time group scored highest on the level of dependence (*M* = 11.41, *SD* = 3.47), followed by the mid group (*M* = 10.79, *SD* = 3.45, *d*(mid-high) = -0.18, very small effect size; *d*(low-mid) = -0.12, very small effect size). The low screen time group scored lowest (*M* = 10.37, *SD* = 3.66, *d*(low-high) = -0.29, small effect size).

Figure 6.24 Dependence and Screen Time Groups

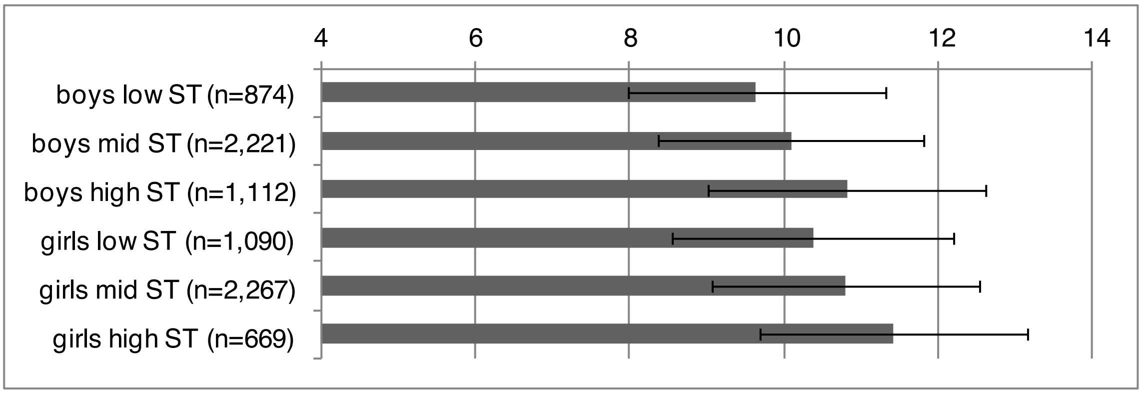

Figure 6.24. Level of dependence broken down by screen time group and gender. Error bars represent ± 1 *SD*.

6.4 Screen Time and Context Variables

Associations between different screen time groups were explored with regard to adverse life events children had experienced, the primary caregiver's depressive symptoms, highest level of education, household class, household income, family type, siblings, and region perceived neighbourhood safety.

6.4.1 Adverse life events. Some adverse life events had been experienced by a large number of children. The most prevalent incidences were the death of a close family member and moving house. A detailed list of the percentage of children who had experienced either of these adverse life events can be found in Appendix K. Only 22% of children never experienced any of the events probed for, 58% of children had experienced one or two events. Figure 6.25 gives the breakdown of the number of adverse life events experienced by children.

Figure 6.25 Number of Adverse Life Events Experienced

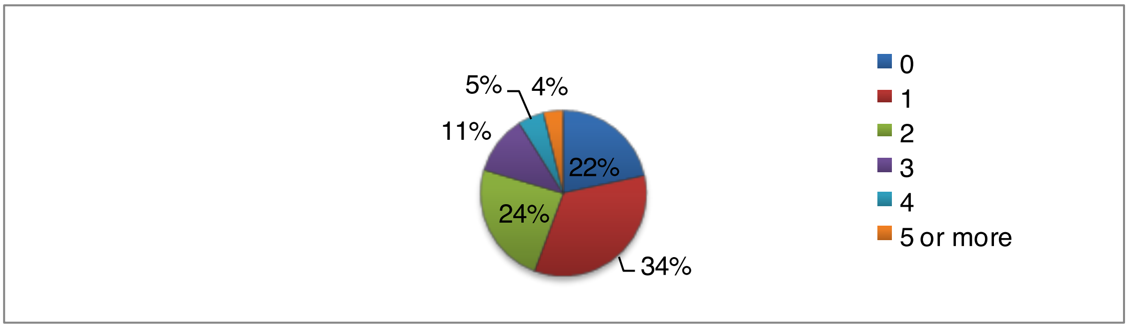

Figure 6.25. Frequency breakdown of adverse life events experienced by children.

There was a statistically significant difference between the screen time group and the mean adverse life events experienced with Welch's $F(2, 3{,}937) = 4.67$, $p = .009$. When split for gender, however, the difference was only significant for girls with $F(2, 4{,}034) = 5.74$, $p = .003$. As can be seen in Figure 6.26, girls in the low screen time group ($M = 1.54$, $SD = 1.38$) had experienced significantly fewer adverse life events than girls in the high screen time group ($M = 1.63$, $SD = 1.40$, d(low-high) = -0.17, very small effect size).

Figure 6.26 Adverse Life Events and Screen Time Groups

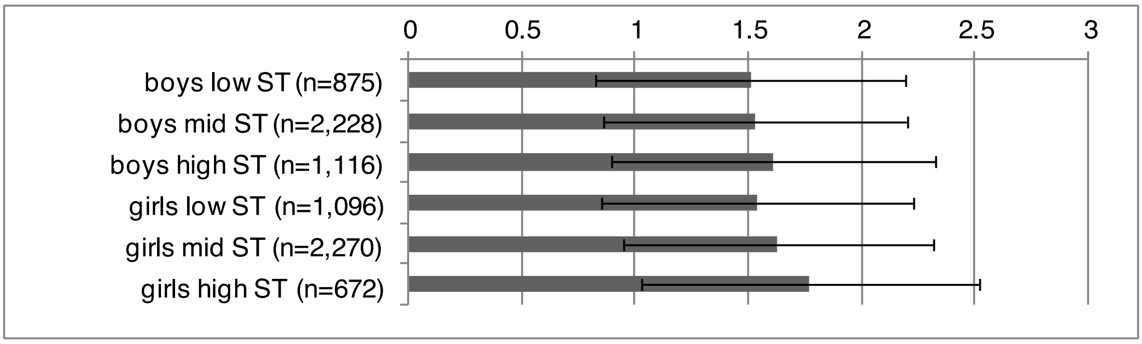

Figure 6.26. Number of adverse life events experienced by children as reported by their primary caregiver broken down by screen time group and gender. Error bars represent ± 1 *SD*.

6.4.2 Depressive symptoms. The primary caregivers of children in the high screen time group were significantly more likely to meet this cut-off point. There was a statistically significant association between parental depression and screen time group with

$\chi^2(2, n = 7{,}696) = 13.49$, $p = .001$, Cramér's V = .04, very small effect size. When split for gender, however, this was only significant for boys with $\chi^2(2, n = 3{,}804) = 10.33$, $p = .006$, Cramér's V = .06, very small effect size. As Figure 6.27 shows, more boys in the high screen time group had a primary caregiver who scored above the CES-D8 cut-off point.

Figure 6.27 Parental Depression and Screen Time Groups

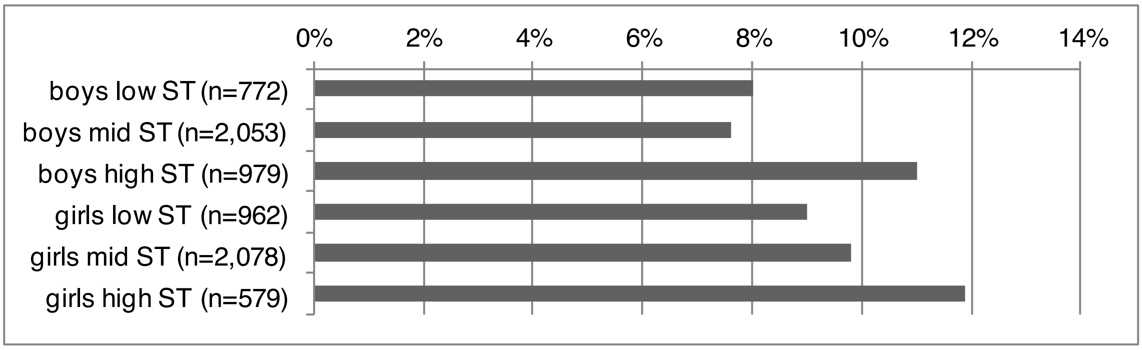

Figure 6.27. Proportion of primary caregivers meeting the cut-off point for depressive symptoms broken down by screen time group and gender.

6.4.3 Primary caregiver's highest level of education. There was a statistically significant association between screen time group and primary caregiver education level with $\chi^2(10, n = 8{,}563) = 112.26$, $p < .001$, Cramér's V = .08, very small effect size. Primary caregivers of children in the low screen time group tended to have a higher level of education. This was significant for boys with $\chi^2(10, n = 4{,}221) = 73.64$, $p < .001$, Cramér's V = .09, very small effect size and girls $\chi^2(10, n = 4{,}037) = 51.68$, $p < .001$, Cramér's V = .08, very small effect size. Figure 6.28 displays the distribution of education levels.

Figure 6.28 Highest Level of Education and Screen Time Groups

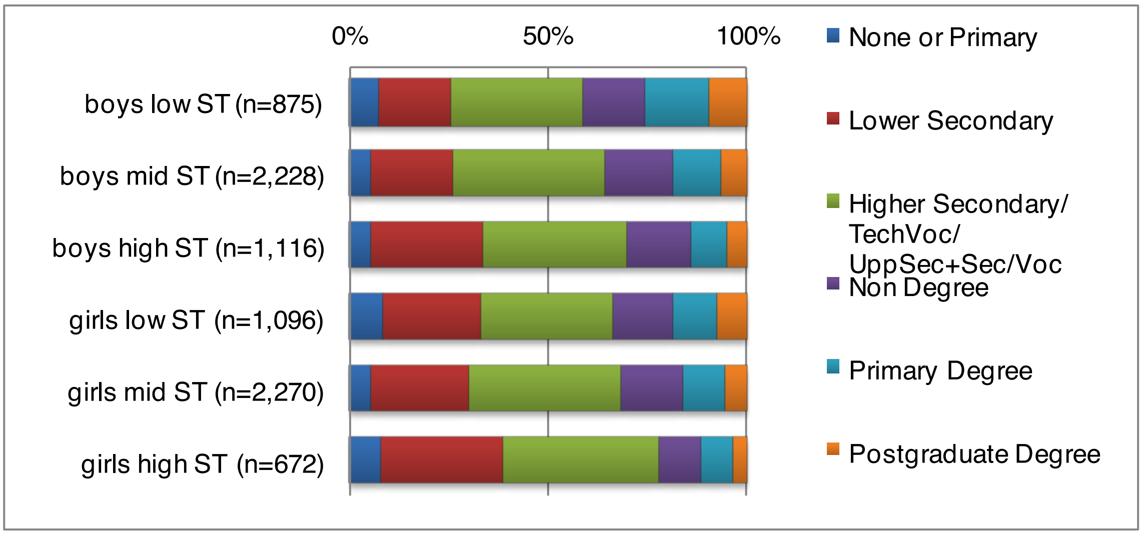

Figure 6.28. The primary caregiver's highest level of education broken down by screen time group and gender.

6.4.4 Household class. In the low screen time group there were more professional managers and managerial and technical workers whereas there were more semi-skilled manual in the high screen time group. Figure 6.29 illustrates the breakdown of household class. There was a statistically significant association between screen time group and household class overall with $\chi^2(10, n = 3{,}748) = 31.00$, $p < .001$, Cramér's V = .05, very small effect size. There was a statistically significant difference among boys with $\chi^2(10, n = 7{,}525) = 33.60$, $p < .001$, Cramér's V = .09, very small effect size, and among girls with $\chi^2(10, n = 3{,}509) = 39.29$, $p = < .001$, Cramér's V = .10, very small effect size. More children in the low screen time groups had parents who were professional managers, and managerial and technical workers. More parents of children in the high screen time group were classified as non-manual workers. The highest percentage of parents in the unskilled manual worker group was among the girls' low screen time group, followed by the girls' high screen time group.

Figure 6.29 Household Class and Screen Time Group

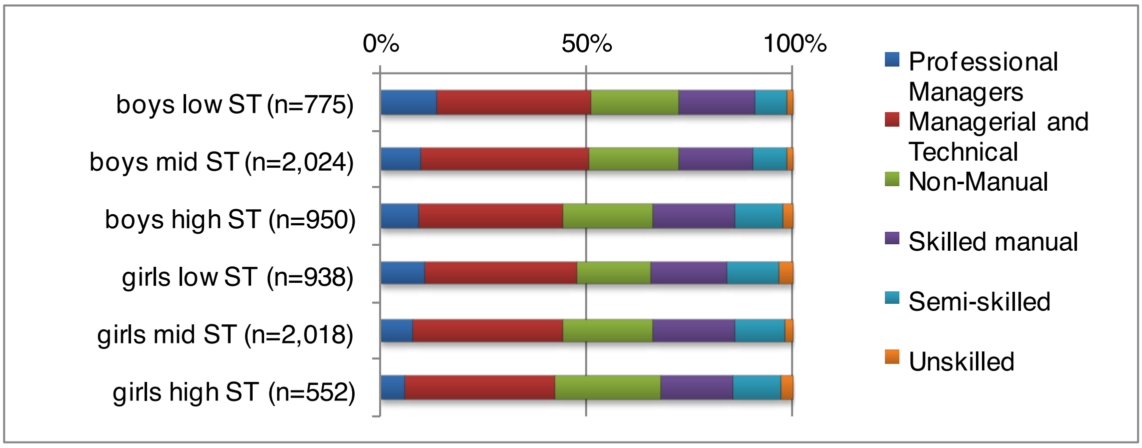

Figure 6.29. Household class broken down by screen time group and gender.

6.4.5 Equivalised annual household income quintiles. There was a statistically significant association between screen time group and equivalised household annual income overall with $\chi^2(8, n = 8{,}002) = 37.50$, $p < .001$, Cramér's V = .05, very small effect size. This was significant for boys with $\chi^2(8, n = 3{,}932) = 23.01$, $p = .003$, Cramér's V = .05, very small effect size and girls with $\chi^2(8, n = 3{,}793) = 27.33$, $p = .001$, Cramér's V = .06, very small effect size.

As can be seen in Figure 6.30, the lowest proportions of children whose families were in the highest quintile were in both high screen time groups. The highest proportion of families in the lowest quintile was among the girls' high screen time group.

Figure 6.30 Equivalised Annual Household Income and Screen Time Groups

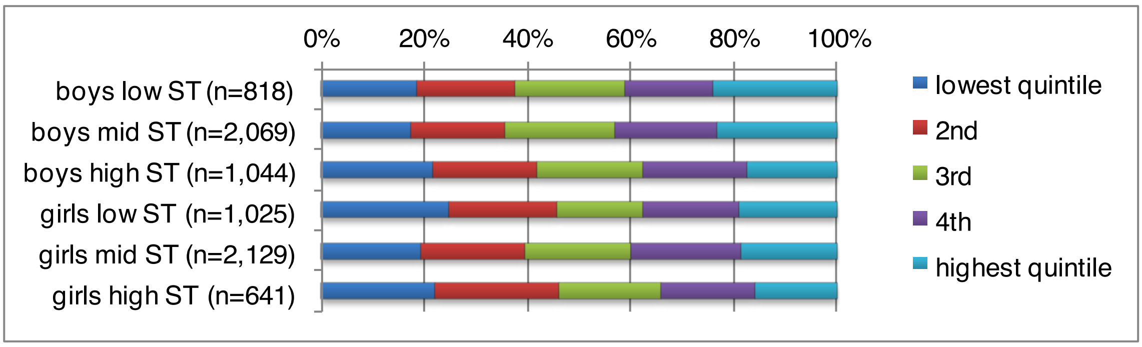

Figure 6.30. Annual household income in quintiles broken down by screen time group and gender.

6.4.6 Family type. Overall, 81.9% of children lived in a two parent household, 18.1% of children lived in a single-parent household. There were more girls than boys in single-parent families (19.4% and 17.1%). Figure 6.31 shows the breakdown of family type. There was a statistically significant association between screen time group and household type overall with $\chi^2(6, n = 8{,}561) = 65.90$, $p < .001$, Cramér's V = .06, very small effect size. This was significant for boys with $\chi^2(6, n = 4{,}219) = 39.99$, $p < .001$, Cramér's V = .07, very small effect size. The same trend was seen for girls with $\chi^2(6, n = 4{,}037) = 30.82$, $p < .001$, Cramér's V = .06, very small effect size. As can be seen in Figure 6.31, there was little difference between the low and the mid screen time groups, but there were more children in the high screen time group living in single-parent families.

Figure 6.31 Family Type and Screen Time Group

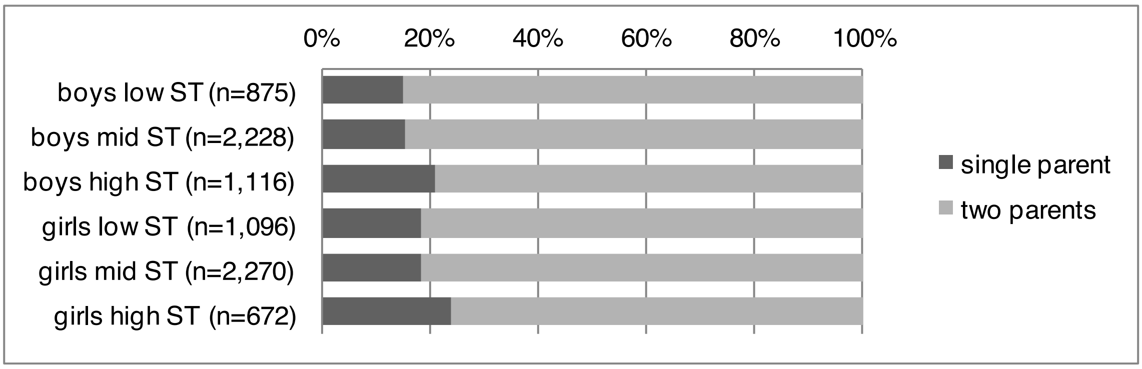

Figure 6.31. Breakdown of family type broken down by screen time group and gender.

6.4.7 Siblings. On average, nine-year-olds who took part in the GUI study had 1.82 siblings (SD = 1.10; boys M = 1.84, SD = 1.08; girls M = 1.80, SD = 1.11). There was a significant association between siblings and screen time group overall with $\chi^2(6, n = 8{,}564) = 38.63$, $p < .001$, Cramér's V = .05, very small effect size. This was significant for boys with $\chi^2(6, n = 4219) = 34.91$, $p < .001$, Cramér's V = .06, very small effect size, and for girls with $\chi^2(6, n = 4037) = 17.10$, $p = .009$, Cramér's V = .05, very small effect size. As can be seen in Figure 6.31, there were more children in the low screen time group with three or more siblings on average, and children in the high screen time groups tended to have fewer siblings.

Figure 6.32 Siblings and Screen Time Groups

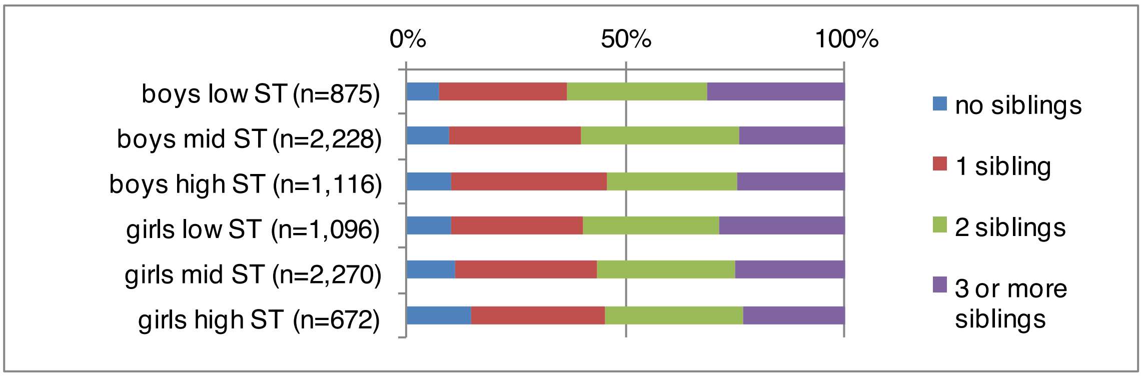

Figure 6.32. The number of siblings that were living in the house with the study child, broken down by screen time group and gender. This included full siblings, half siblings, and stepsiblings.

6.4.8 Region. There was a difference in region between the three screen time groups. The main difference was that the higher screen time group was more urban, the low screen time was more rural. Figure 6.33 displays the regional distribution. There was a statistically significant association between region and screen time groups overall with $\chi^2(2, n = 8{,}547) = 31.39$, $p < .001$, Cramér's V = .06, very small effect size. There was a significant association for boys with $\chi^2(2, n = 4{,}212) = 14.86$, $p < .001$, Cramér's V = .06, very small effect size. Living in an urban area seemed to be associated with an increase in screen time, the smallest percentage of boys' living in an urban area was within the low screen time group. The largest proportion was within the high screen time group.

There was also a significant association between region and screen time groups among girls with $\chi^2(2, n = 4{,}029) = 31.43$, $p < .001$, Cramér's V = .09, very small effect size. Here, the mid and high screen time group were very similar; among the low screen time group there were more girls living in an urban area.

Figure 6.33 Region and Screen Time Groups

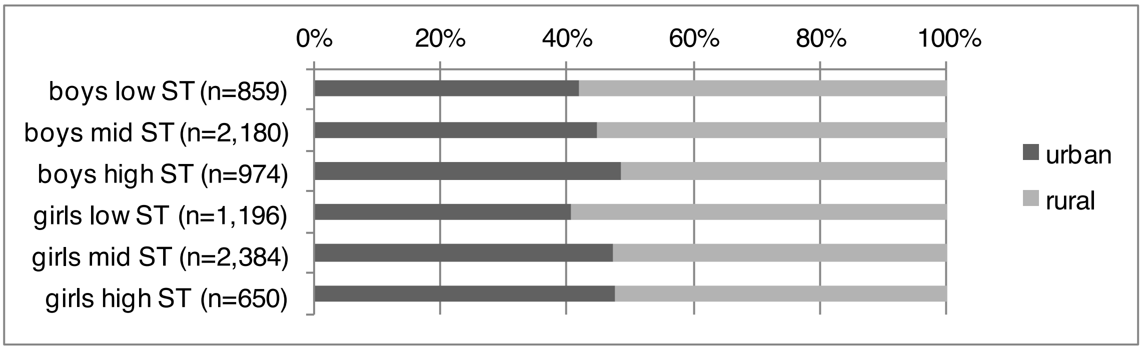

Figure 6.33. Area type according to screen time groups and gender.

6.4.9 Perceived neighbourhood safety. Figure 6.34 shows the scores on the created perceived neighbourhood safety scale. There was a statistically significant association between screen time group and safety perception with Welch's $F(2, 8{,}521) = 8.76$, $p < .001$. This was significant for boys with $F(2, 4{,}194) = 7.042$, $p = .001$. Post tests showed that the high screen time group scored significantly lower ($M = 15.14$, $SD = 3.53$) than the mid ($M = 15.59$, $SD = 3.41$, d(mid-high) = 0.13, very small effect size) and the low screen time group ($M = 15.63$, $SD = 3.63$, d(low-high) = 0.14, very small effect size). The association between the perception of neighbourhood safety and screen time groups was also statistically significant for girls with $F(2, 4{,}019) = 3.94$, $p = .020$. Post tests showed that the high screen time group scored significantly lower ($M = 14.72$, $SD = 3.47$) than the low screen time group ($M = 15.22$, $SD = 3.56$, d(low-high) = 0.14, very small effect size).

Figure 6.34 Perceived Neighbourhood Safety and Screen Time Groups

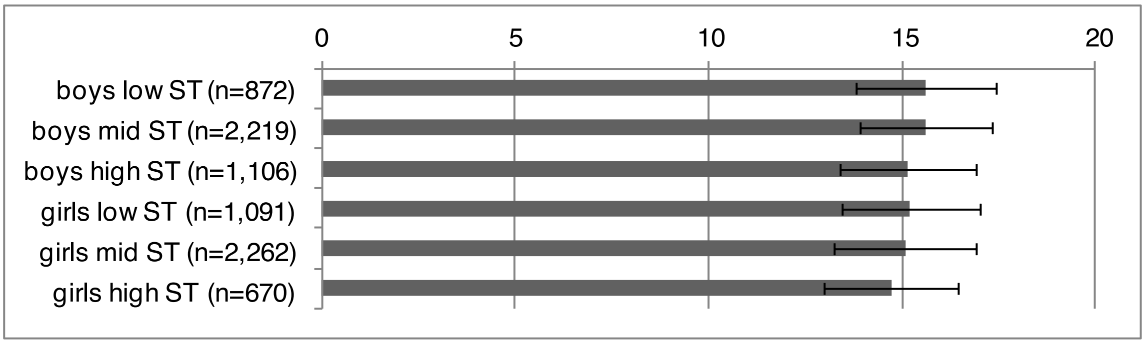

Figure 6.34. Perceived safety of the neighbourhood the family lives in broken down by screen time group and gender. Higher score indicate a higher safety perception. Error bars represent ± 1 *SD*.

6.5 Regression – Parents' SDQ Ratings for Boys (P9)

The regression models used the primary caregiver's SDQ scores of boys as an outcome and the boys' model is presented in Table 6.3. Each model was statistically significant and each block made a significant contribution when added. When blocks are considered individually, the strongest block of predictors was the process block, which accounted for 40.7% of variance in boys' SDQ scores, followed by the person block (37.8%). The context block had a smaller impact and could explain 12.6% of variance individually. Crucially, this highlights the amount of overlap between the person and process blocks, which is not evident when only the hierarchical modelling in Table 6.3 is considered. Descriptive statistics for all variables included in the regression model can be found in Appendix L.

Table 6.3

P9 Boys' SDQ Scores

Model	Adjusted R^2	*SE* of the Estimate	Sig. *F* change	R^2 change
1	0.007	5.44	$p < .001$	0.007
2	0.379	4.31	$p < .001$	0.352
3	0.537	3.72	$p < .001$	0.158
4	0.557	3.63	$p < .001$	0.020

Note. Model 1 relates to screen time. In Model 2, the person block was added, in Model 2, person characteristics were added, in Model 3 the process block was added, and Model 4 includes context variables. P9 = primary caregiver's rating at Wave 1.

6.5.1 Screen time. The low screen time variable was not significant. High screen time was significant throughout all four models, therefore we can reject the null hypothesis that screen time group affiliation cannot predict overall SDQ scores once PPCT factors are considered. In Model 1, being in the high screen time group predicted a 1.07 points higher score in the SDQ ($p < .001$) than the reference (middle) group. The addition of the subsequent blocks absorbed some of the variance explained by high screen time ($B = 0.31$ in the final model, $p < .05$); thus when all factors were considered, the association between high screen time and behavioural difficulties was very small. Details from all four models are displayed in Table 6.4.

6.5.2 Person characteristics. Boys with a learning difficulty, or a chronic, physical, or mental illness tended to score higher on the SDQ (Cohen's d = 0.47 and 0.21 respectively). Being obese also predicted higher scores, but the difference was very small. From the EAS scale, high shyness, high emotionality, and low sociability were statistically significant predictors of higher SDQ scores, indicating that boys scoring within these quartiles tended to have more difficulties. Low emotionality was a significant positive predictor; boys within the bottom 25% of the emotionality subscale had lower SDQ scores, indicating fewer difficulties. Those in the lowest quartile of reading and maths test scores tended to have higher SDQ scores. Boys in the highest quartile of maths test scores tended to have lower SDQ scores. High reading scores were not significant. The four variables with an effect size of 0.2 or higher were learning difficulty, high emotionality, low emotionality, and chronic illness. These are highlighted in bold in Table 6.4.

6.5.3 Process characteristics. Boys with few (0-1) close friends and those whose parents report that the study child had been a victim of bullying tended to have higher SDQ scores. The same tendency applied to boys who spent little time with their family, but the effect was minimal. For the Pianta subscales, the highest coefficients were the two conflict variables. Being in the lowest scoring 25% equated to a reduced SDQ score (fewer difficulties); being in the highest quartile equated to a higher SDQ score (more difficulties). Both dependency subscale groups were statistically significant, with low dependency decreasing the SDQ score and high dependency increasing scores. Only low closeness was statistically significant, with boys in the lowest quartile scoring higher on the SDQ on average. Reaching the threshold of a 0.2 effect size were high conflict, being bullied, having 0-1 close friends, and low conflict.

6.5.4 Context characteristics. Having experienced no adverse life events was a positive predictor for boys. Boys whose parents met the cut-off point for depressive symptoms tended to have more difficulties. Both low and high parental education were statistically significant; low education was associated with more behavioural difficulties; high parental education was associated with fewer difficulties. The only statistically significant income group was the 4th income quintile, which was associated with higher SDQ scores. Being in a perceived unsafe neighbourhood was a negative predictor and was associated with an increased SDQ score. The only variable reaching the 0.2 effect size threshold was PC depressive symptoms.

Table 6.4

SDQ P9 Boys Hierarchical Regression

	M1	M2	M3	M4
	B(*SE*)	B(*SE*)	B(*SE*)	B(*SE*)
(Constant)	7.97(0.13)***	6.58(0.20)***	5.44(0.21)***	5.17(0.27)***
Screen time (ref:mid 50%)				
Low screen time	0.02(0.24)	-0.11(0.19)	0.04(0.16)	0.10(0.16)
High screen time	1.07(0.22)***	0.68(0.17)***	0.47(0.15)**	0.31(0.15)*
Health: Sometimes/always unwell		0.25(0.66)	-0.42(0.57)	-0.77(0.56)
Chronic, physical, or mental illness		1.87(0.24)***	1.15(0.21)***	**1.12(0.20)*****
Obese (according to BMI)		0.89(0.33)**	0.71(0.29)*	0.62(0.28)*
Learning difficulty		3.21(0.24)***	2.44(0.21)***	**2.51(0.21)*****
Temperament (ref:mid 50%)				
Low shyness		-0.20(0.18)	-0.05(0.16)	-0.01(0.15)
High shyness		0.77(0.19)***	0.50(0.16)**	0.53(0.16)**
Low emotionality		-2.57(0.17)***	-1.26(0.16)***	**-1.21(0.15)*****
High emotionality		3.54(0.19)***	2.34(0.17)***	**2.20(0.16)*****
Low sociability		1.31(0.18)***	0.92(0.16)***	0.94(0.16)***
High sociability		-0.15(0.19)	-0.24(0.16)	-0.20(0.16)
Low activity		0.08(0.20)	-0.13(0.18)	-0.12(0.17)
High activity		0.28(0.18)	0.31(0.15)*	0.29(0.15)
Drumcondra test scores (ref:mid 50%)				
Low reading score		0.70(0.20)***	0.56(0.17)**	0.36(0.17)*
High reading score		-0.30(0.19)	-0.42(0.16)*	-0.24(0.16)
Low maths score		1.14(0.20)***	0.86(0.17)***	0.69(0.17)***
High maths score		-0.69(0.18)***	-0.59(0.16)***	-0.48(0.16)**

	M3	M4
	B(*SE*)	B(*SE*)
Structured activities (ref:1-2)		
No activity	0.36(0.21)	0.16(0.21)
3+ activities	-0.20(0.23)	-0.27(0.23)
Number of close friends (ref:2-5)		
0-1 close friends	1.80(0.25)***	**1.66(0.24)*****
6+ close friends	-0.03(0.17)	-0.18(0.17)
Victim of bullying	2.40(0.16)***	**2.23(0.15)*****
Parenting style other than authoritative	0.11(0.15)	0.11(0.15)
Family time (ref:mid 50%)		
Low family time	0.43(0.15)***	0.37(0.15)*
High family time	-0.15(0.16)	-0.15(0.16)
Parent-child relationship (ref:mid 50%)		
Low conflict	-1.38(0.16)***	**-1.38(0.15)*****
High conflict	3.23(0.16)***	**3.05(0.16)*****
Low closeness	0.85(0.16)***	0.91(0.15)***
High closeness	0.06(0.17)	0.06(0.16)
Low dependence	-0.42(0.16)**	-0.38(0.16)*
High dependence	0.79(0.16)***	0.74(0.16)***

	M4
	B(*SE*)
Adverse life events (ref:1-2)	
No adverse life events	-0.44(0.15)**
3+ adverse life events	0.21(0.18)
PC meets depression cut-off point	**1.19(0.23)*****
PC level of education (ref:mid 50%)	
Low PC education	0.91(0.15)***
High PC education	-0.67(0.17)***
Household income (ref:2nd quintile)	
Lowest quintile	0.13(0.21)
3rd quintile	0.20(0.20)
4th quintile	0.43(0.20)*
Highest quintile	-0.02(0.21)
Single-parent family	0.30(0.20)
Siblings (ref:1-2 siblings)	
No siblings	0.24(0.23)
3-5 siblings	0.18(0.15)
Urban area	-0.07(0.13)
Neighbourhood safety (ref:mid 50%)	
Low safety	0.47(0.16)**
High safety	-0.25(0.15)

Note. Positive values indicate the variable was a negative predictor, negative values indicate a positive effect. Values in Model 4 highlighted in bold reached a 0.2 effect size. P9 = primary caregiver's rating at Wave 1. M = model. *SE* = standard error.
$^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

6.6 Regression – Parents' SDQ Ratings for Girls (P9)

The regression model summary for parental ratings of girls' SDQ scores is presented in Table 6.5. When blocks are considered individually, the strongest blocks are the person and the process blocks, both could explain 36.6% of variance. The context block had a smaller impact and could explain 13.8% of variance on its own. Again, there was a significant overlap between the person and the process blocks. Descriptive statistics for all variables included in the regression model can be found in Appendix M.

Table 6.5

P9 Girls' SDQ Scores

Model	Adjusted R^2	*SE* of the estimate	Sig. *F* change	R^2 change
1	0.014	5.14	p < .001	0.014
2	0.371	4.11	p < .001	0.357
3	0.504	3.65	p < .001	0.133
4	0.530	3.55	p < .001	0.026

Note. Model 1 relates to screen time. In Model 2, the person block was added, in Model 2, person characteristics were added, in Model 3 the process block was added, and Model 4 includes context variables. P9 = primary caregiver's rating at Wave 1.

6.6.1 Screen time. The low screen time variable was significant across all models. Therefore we can reject the null hypothesis that screen time group affiliation cannot predict overall SDQ scores once PPCT factors are considered. In the first model, girls in this group tended to score 0.56 points lower on the SDQ; in the final model, the difference was 0.33. High screen time was only significant in the first two models. Thus there was a tendency for a negative association between screen time and SDQ, more screen time was predictive of more difficulties.

6.6.2 Person characteristics. Overall health status was not a statistically significant predictor, but chronic, physical or mental illness, learning difficulties, and being classified as obese were predictors for higher SDQ scores, indicating more difficulties. Girls in the lowest quartile of reading and maths test scores tended to have higher SDQ scores. Girls in the highest quartile of reading and maths test scores tended to have lower SDQ scores, but high maths scores are not significant in the final model. High shyness, high emotionality, low sociability, and high activity were statistically significant predictors of higher SDQ scores, indicating more behavioural difficulties. Low emotionality was a significant positive predictor, with girls scoring low on this scale also scoring lower on the SDQ. The strongest predictors in the model (reaching an effect size of 0.2) were high emotionality, learning difficulty, low emotionality, chronic illness, and low sociability.

6.6.3 Process characteristics. Girls not enrolled in any structured activity, those with 0-1 close friends, and those who had been a victim of bullying tended to score higher on the SDQ, indicating more difficulties. Low family time was also a predictor of a higher score. High conflict, low closeness, and high dependence were negative predictors; low conflict and low dependence were positive predictors. Contributors reaching the threshold of at least a 0.2 effect size were high conflict, being bullied, low conflict, and low closeness.

6.6.4 Context characteristics. Girls who had experienced three or more adverse life events throughout their lives tended to score higher on average, indicating more behavioural difficulties than those who had experienced one or two events. Girls whose primary caregiver met the cut-off point for depressive symptoms tended to have more difficulties. Again, both low and high parental education were statistically significant; low education was associated with more behavioural difficulties, and high parental education was associated with fewer difficulties. Girls with no siblings tended to have more behavioural difficulties, girls with three or more siblings tended to have fewer behavioural difficulties than those with one or two siblings. Living in an urban area and a neighbourhood that was perceived as very safe by the primary caregiver was a predictor for fewer behavioural difficulties, but living in an unsafe neighbourhood was a predictor for higher SDQ scores. The only variable reaching the effect size threshold was the no siblings variable. All variables are listed in Table 6.6.

Table 6.6

SDQ P9 Girls Hierarchical Regression

	M1	M2	M3	M4
	B(*SE*)	B(*SE*)	B(*SE*)	B(*SE*)
(Constant)	7.67(0.12)***	5.94(0.18)***	4.74(0.21)***	5.02(0.28)***
Screen time (ref:mid 50%)				
Low screen time	-0.56(0.21)**	-0.47(0.17)**	-0.33(0.15)*	-0.33(0.15)*
High screen time	1.36(0.25)***	0.75(0.20)***	0.31(0.18)	0.15(0.17)
Health: Sometimes/always unwell		0.21(0.53)	-0.03(0.47)	-0.32(0.47)
Chronic, physical, or mental illness		1.59(0.25)***	1.38(0.22)***	**1.09(0.22)***
Obese (according to BMI)		1.15(0.27)***	0.88(0.24)***	0.71(0.24)**
Learning difficulty		2.36(0.28)***	1.81(0.25)***	**1.77(0.24)***
Temperament (ref:mid 50%)				
Low shyness		0.03(0.19)	0.06(0.17)	0.08(0.16)
High shyness		0.88(0.17)***	0.74(0.16)***	0.70(0.15)***
Low emotionality		-2.16(0.18)***	-1.24(0.16)***	-1.16(0.16)***
High emotionality		3.96(0.18)***	2.52(0.17)***	**2.38(0.16)***
Low sociability		1.19(0.18)***	1.04(0.16)***	**1.03(0.16)***
High sociability		0.17(0.18)	0.20(0.16)	0.26(0.15)
Low activity		0.42(0.18)*	0.15(0.16)	0.24(0.16)
High activity		0.18(0.19)	0.42(0.17)*	0.39(0.16)**
Drumcondra test scores (ref:mid 50%)				
Low reading score		0.56(0.20)**	0.48(0.18)**	0.37(0.18)*
High reading score		-0.80(0.19)***	-0.84(0.17)***	-0.75(0.16)***
Low maths score		1.10(0.19)***	0.79(0.17)***	0.59(0.17)***
High maths score		-0.53(0.19)**	-0.38(0.17)*	-0.21(0.17)

	M3	M4
	B(*SE*)	B(*SE*)
Structured activities (ref:1-2)		
No activity	0.90(0.21)***	0.75(0.21)***
3+ activities	0.01(0.18)	0.18(0.18)
Number of close friends (ref:2-5)		
0-1 close friends	1.07(0.23)***	0.99(0.22)***
6+ close friends	0.08(0.17)	-0.05(0.17)
Victim of bullying	1.86(0.15)***	**1.72(0.15)*****
Parenting style other than authoritative	-0.17(0.15)	-0.14(0.15)
Family time (ref:mid 50%)		
Low family time	0.83(0.16)***	0.77(0.16)***
High family time	0.11(0.15)	0.02(0.15)
Parent-child relationship (ref:mid 50%)		
Low conflict	-1.25(0.16)***	**-1.28(0.16)*****
High conflict	2.69(0.16)***	**2.57(0.16)*****
Low closeness	1.14(0.17)***	**1.11(0.17)*****
High closeness	0.05(0.15)	0.06(0.14)
Low dependence	-0.54(0.18)**	-0.49(0.17)**
High dependence	0.76(0.15)***	0.72(0.14)***

	M4
	B(*SE*)
Adverse life events (ref:1-2)	
No adverse life events	-0.25(0.16)
3+ adverse life events	0.71(0.17)***
PC meets depression cut-off point	0.61(0.21)**
PC level of education (ref:mid 50%)	
Low PC education	0.64(0.15)***
High PC education	-0.51(0.19)**
Household income (ref:2nd quintile)	
Lowest quintile	0.36(0.20)
3rd quintile	-0.11(0.20)
4th quintile	-0.25(0.20)
Highest quintile	-0.34(0.22)
Single-parent family	-0.16(0.19)
Siblings (ref:1-2 siblings)	
No siblings	**1.29(0.21)*****
3-5 siblings	-0.48(0.15)**
Urban area	-0.56(0.13)***
Neighbourhood safety (ref:mid 50%)	
Low safety	0.37(0.15)*
High safety	-0.46(0.15)**

Note. Positive values indicate the variable was a negative predictor, negative values indicate a positive effect. Values in Model 4 highlighted in bold reached a 0.2 effect size. P9 = primary caregiver’s rating at Wave 1. M = model. *SE* = standard error.
$^*p < .05$, $^{**}p < .01$, $^{***}p < .001$.

6.7 Regression – Teachers' SDQ Ratings for Boys (T9)

Table 6.7 gives the model summary for the regression analysis using the teacher's rating of boys' SDQ scores as the outcome variable. Considered individually, the person block was the strongest block of predictors and can explain 17.7% of variance. The process block could explain 13.2% by itself, the context block explained 7.7%. Descriptive statistics for all variables included in the regression model can be found in Appendix N.

Table 6.7

T9 Boys' SDQ Scores

Model	Adjusted R^2	*SE* of the estimate	Sig. *F* change	R^2 change
1	0.001	6.19	*ns*(p = .091)	0.001
2	0.173	5.63	$p < .001$	0.172
3	0.233	5.42	$p < .001$	0.060
4	0.262	5.32	$p < .001$	0.029

Note. Model 1 relates to screen time. In Model 2, the person block was added, in Model 2, person characteristics were added, in Model 3 the process block was added, and Model 4 includes context variables. T9 = teacher's rating at Wave 1.

6.7.1 Screen time. Screen time explained very little variance in the teacher's SDQ rating and thus Model 1 does not show a statistically significant *F* change. High screen time was not significant across any of the models; low screen time was only significant in the first model ($B = 0.57$, $p < .05$). Little screen time was associated with more behavioural difficulties; however, the association was not significant once person, process and context variables were included. Here we cannot reject the null hypothesis that states that screen time group affiliation cannot predict teacher's overall SDQ scores for boys once PPCT factors are considered.

6.7.2 Person characteristics. There was no significant effect for health status, but chronic, physical or mental illness, and learning difficulties were predictors for higher SDQ scores, indicating more difficulties. Boys classified as obese tended to have a lower SDQ rating than those who were not. Low shyness, high emotionality, and low sociability were statistically significant predictors of higher SDQ scores, indicating that boys scoring within these quartiles tended to have more difficulties. Boys in the lowest quartile of reading and maths test scores tended to have higher SDQ scores. Those in the top quartile of maths score tended to have lower SDQ scores. The two predictors reaching the 0.2 effect size threshold were learning difficulty and high maths scores.

6.7.3 Process characteristics. Enrolment in three or more structured activities was an indicator for more behavioural difficulties. Both boys with 0-1 close friends and those who had experienced bullying tended to score higher on the SDQ. Having six or more friends was a significant positive predictor; teachers rated boys with a lot of friends as having fewer difficulties on average. Spending a lot of time with family was associated with a higher score on the SDQ. Low closeness and high conflict were significant predictors of higher SDQ scores; low conflict was a significant predictor of lower SDQ scores and fewer difficulties. The only variable meeting the cut-off point was bullying.

6.7.4 Context characteristics. The primary caregiver's highest level of education was a significant predictor; high parental education was associated with fewer behavioural difficulties and low parental education was associated with more behavioural difficulties. Boys whose families were in the lowest income quintile and boys from a single-parent family also tended to score higher. Boys with no siblings, or more than three siblings, tended to have more behavioural difficulties on average than boys with one or two siblings. Boys from urban areas and those living in perceived safe neighbourhoods tended to score higher on the SDQ, indicating more difficulties. The two predictors meeting the cut-off point were being in the lowest equivalised income quintile, and no siblings. Table 6.8 shows the details of all models.

Table 6.8

SDQ T9 Boys Hierarchical Regression

	M1	M2	M3	M4
	B(*SE*)	B(*SE*)	B(*SE*)	B(*SE*)
(Constant)	6.58(0.14)***	5.37(0.26)***	4.63(0.31)***	3.81(0.40)***
Screen time (ref:mid 50%)				
Low screen time	0.57(0.27)*	0.37(0.25)	0.35(0.24)	0.36(0.24)
High screen time	0.01(0.25)	-0.04(0.23)	-0.20(0.22)	-0.35(0.22)
Health: Sometimes/always unwell		0.25(0.86)	-0.18(0.83)	-0.33(0.82)
Chronic, physical, or mental illness		1.64(0.31)***	1.10(0.30)***	0.97(0.29)**
Obese (according to BMI)		-0.60(0.43)	-0.99(0.42)**	-1.01(0.42)*
Learning difficulty		3.53(0.32)***	2.92(0.31)***	**3.03(0.30)*****
Temperament (ref:mid 50%)				
Low shyness		0.87(0.23)***	0.98(0.23)***	0.96(0.22)***
High shyness		-0.26(0.24)	-0.43(0.24)	-0.39(0.23)
Low emotionality		-0.78(0.22)***	-0.02(0.23)	0.01(0.22)
High emotionality		1.30(0.25)***	0.69(0.24)**	0.54(0.24)*
Low sociability		1.04(0.24)***	0.70(0.23)**	0.77(0.23)**
High sociability		-0.06(0.25)	-0.11(0.24)	-0.07(0.24)
Low activity		-0.14(0.27)	-0.22(0.26)	-0.16(0.26)
High activity		0.14(0.23)	0.28(0.22)	0.25(0.22)
Drumcondra test scores (ref:mid 50%)				
Low reading score		1.18(0.26)***	1.16(0.25)***	0.98(0.25)***
High reading score		-0.02(0.25)	-0.15(0.24)	-0.04(0.24)
Low maths score		1.23(0.26)***	0.94(0.25)***	0.76(0.25)**
High maths score		-1.80(0.24)***	-1.69(0.23)***	**-1.49(0.23)*****

	M3	M4
	B(*SE*)	B(*SE*)
Structured activities (ref:1-2)		
No activity	1.15(0.31)***	0.50(0.31)
3+ activities	1.01(0.33)**	0.92(0.33)**
Number of close friends (ref:2-5)		
0-1 close friends	1.08(0.36)**	0.87(0.35)*
6+ close friends	-0.75(0.25)**	-0.92(0.24)***
Victim of bullying	2.51(0.23)***	**2.37(0.23)*****
Parenting style other than authoritative	0.47(0.22)*	0.40(0.22)
Family time (ref:mid 50%)		
Low family time	-0.09(0.22)	-0.19(0.21)
High family time	0.60(0.23)*	0.55(0.23)*
Parent-child relationship (ref:mid 50%)		
Low conflict	-1.03(0.23)***	-1.07(0.22)***
High conflict	0.95(0.24)***	0.95(0.24)***
Low closeness	0.69(0.23)**	0.82(0.22)***
High closeness	-0.01(0.24)	-0.16(0.24)
Low dependence	-0.34(0.23)	-0.43(0.23)
High dependence	0.25(0.23)	0.20(0.23)

	M4
	B(*SE*)
Adverse life events (ref:1-2)	
No adverse life events	-0.26(0.23)
3+ adverse life events	0.32(0.26)
PC meets depression cut-off point	-0.46(0.33)
PC level of education (ref:mid 50%)	
Low PC education	0.55(0.22)*
High PC education	-0.58(0.25)*
Household income (ref:2nd quintile)	
Lowest quintile	**1.53(0.30)*****
3rd quintile	-0.04(0.29)
4th quintile	-0.24(0.30)
Highest quintile	-0.08(0.30)
Single-parent family	0.82(0.29)**
Siblings (ref:1-2 siblings)	
No siblings	**1.30(0.33)*****
3-5 siblings	0.63(0.22)**
Urban area	0.54(0.19)**
Neighbourhood safety (ref:mid 50%)	
Low safety	0.12(0.23)
High safety	0.67(0.22)**

Note. Positive values indicate the variable was a negative predictor, negative values indicate a positive effect. Values in Model 4 highlighted in bold reached a 0.2 effect size. T9 =teacher's rating at Wave 1. M =model. *SE* =standard error.
*$p < .05$, **$p < .01$, ***$p < .001$.

6.8 Regression – Teachers' SDQ Ratings for Girls (T9)

Table 6.9 is the model summary for the teacher's rating of girls' SDQ scores. The strongest block of predictors individually was the person block, explaining 18.2% of variance in SDQ scores. This was followed by the context model with 11.3%. Unlike in previous models, the process block on its own explained just 7.1% of variance in SDQ scores. Descriptive statistics for all variables included in the regression model can be found in Appendix O.

Table 6.9

T9 Girls' SDQ Scores

Model	Adjusted R^2	*SE* of the estimate	Sig. *F* change	R^2 change
1	0.002	5.26	$p = .028$	0.002
2	0.179	4.77	$p < .001$	0.177
3	0.203	4.70	$p < .001$	0.024
4	0.243	4.58	$p < .001$	0.040

Note. Model 1 relates to screen time. In Model 2, the person block was added, in Model 2, person characteristics were added, in Model 3 the process block was added, and Model 4 includes context variables. T9 =teacher's rating at Wave 1.

6.8.1 Screen time. As was the case with teacher's rating of boys' SDQ score, screen time only accounted for a small amount of variance. In the first model (Table 6.10), high screen time was a negative predictor for behavioural difficulties ($B = 0.66$, $p < .01$). In models 3-5, none of the screen time variables were statistically significant. Therefore, we cannot reject the null hypothesis stating that screen time group affiliation cannot predict teacher's overall SDQ ratings for girls once PPCT factors are considered.

6.8.2 Person characteristics. Girls with a chronic illness, or a learning difficulty, scored higher on the SDQ on average, indicating more difficulties. Mirroring the results for the boys, low shyness, high emotionality, and low sociability were statistically significant predictors of higher SDQ scores and thus more behavioural difficulties. All Drumcondra variables were statistically significant; girls in the highest quartile of reading and maths scores tended to have fewer behavioural difficulties, and girls in the lowest quartile had more difficulties compared to those scoring in the mid 50%. Three of the person characteristics predictors reached the 0.2 effect size threshold: low reading scores, learning difficulty, and chronic illness.

6.8.3 Process characteristics. Girls whose parents reported that their child had been a victim of bullying, and girls scoring in the lowest quartile of the Pianta closeness scale, tended to be rated as displaying more behavioural difficulties by their teachers. Girls scoring low on conflict and high on dependence were rated more favourably. As with the boys, the only variable that met the cut-off point was bullying.

6.8.4 Context characteristics. No adverse life events was a positive predictor; girls who had not had any such experience tended to score lower on the teacher's SDQ ratings of behavioural difficulties. Low parental education, single-parent family status, and being in the lowest income quintile were negative predictors; all income categories above the 2^{nd} income quintile (reference category) were significant positive predictors. Not having any siblings was a predictor for more behavioural difficulties among girls. This was also the only variable reaching the 0.2 effect size threshold.

Table 6.10

SDQ T9 Girls Hierarchical Regression

	M1	M2	M3	M4
	B(*SE*)	B(*SE*)	B(*SE*)	B(*SE*)
(Constant)	4.99(0.12)***	3.27(0.21)***	2.83(0.27)***	3.01(0.36)***
Screen time (ref:mid 50%)				
Low screen time	0.04(0.21)	-0.13(0.19)	-0.15(0.19)	-0.16(0.19)
High screen time	0.66(0.25)**	0.48(0.23)	0.34(0.23)	0.16(0.22)
Health: Sometimes/always unwell		-0.33(0.62)	-0.48(0.61)	-0.93(0.60)
Chronic, physical, or mental illness		1.80(0.29)***	1.63(0.29)***	**1.32(0.28)*****
Obese (according to BMI)		0.95(0.32)*	0.77(0.31)*	0.51(0.31)
Learning difficulty		2.25(0.32)***	2.08(0.32)***	**1.99(0.31)*****
Temperament (ref:mid 50%)				
Low shyness		0.85(0.22)***	0.78(0.21)***	0.78(0.21)***
High shyness		0.20(0.20)	0.21(0.20)	0.21(0.20)
Low emotionality		-0.25(0.20)	0.02(0.21)	0.08(0.20)
High emotionality		1.36(0.20)***	0.98(0.21)***	0.83(0.21)***
Low sociability		0.67(0.21)**	0.58(0.21)**	0.49(0.20)*
High sociability		0.04(0.21)	0.10(0.20)	0.12(0.20)
Low activity		-0.05(0.21)	-0.19(0.21)	-0.10(0.20)
High activity		0.26(0.22)	0.38(0.22)	0.41(0.21)
Drumcondra test scores (ref:mid 50%)				
Low reading score		2.32(0.23)***	2.31(0.23)***	**2.05(0.23)*****
High reading score		-0.50(0.22)*	-0.52(0.21)*	-0.43(0.21)*
Low maths score		1.23(0.22)***	1.07(0.22)***	0.82(0.22)***
High maths score		-0.64(0.23)**	-0.62(0.22)**	-0.44(0.22)*

	M3	M4
	B(*SE*)	B(*SE*)
Structured activities (ref:1-2)		
No activity	0.42(0.27)	0.04(0.26)
3+ activities	0.21(0.24)	0.42(0.23)
Number of close friends (ref:2-5)		
0-1 close friends	0.25(0.29)	0.08(0.29)
6+ close friends	0.31(0.22)	0.04(0.22)
Victim of bullying	1.58(0.20)***	**1.38(0.19)*****
Parenting style other than authoritative	0.11(0.20)	0.14(0.19)
Family time (ref:mid 50%)		
Low family time	0.25(0.21)	0.15(0.21)
High family time	-0.04(0.19)	-0.21(0.19)
Parent-child relationship (ref:mid 50%)		
Low conflict	-0.53(0.21)*	-0.57(0.20)**
High conflict	0.30(0.21)	0.20(0.21)
Low closeness	0.87(0.23)***	0.83(0.22)***
High closeness	-0.04(0.19)	-0.06(0.19)
Low dependence	0.06(0.23)	0.003(0.22)
High dependence	-0.27(0.19)	-0.37(0.19)*

	M4
	B(*SE*)
Adverse life events (ref:1-2)	
No adverse life events	-0.44(0.21)*
3+ adverse life events	0.36(0.22)
PC meets depression cut-off point	0.23(0.28)
PC level of education (ref:mid 50%)	
Low PC education	0.81(0.19)***
High PC education	-0.06(0.24)
Household income (ref:2nd quintile)	
Lowest quintile	0.59(0.25)*
3rd quintile	-0.87(0.26)**
4th quintile	-0.93(0.26)***
Highest quintile	-0.91(0.28)**
Single-parent family	0.83(0.24)**
Siblings (ref:1-2 siblings)	
No siblings	**1.24(0.27)*****
3-5 siblings	-0.21(0.20)
Urban area	0.16(0.17)
Neighbourhood safety (ref:mid 50%)	
Low safety	0.19(0.19)
High safety	0.15(0.20)

Note. Positive values indicate the variable was a negative predictor, negative values indicate a positive effect. Values in Model 4 highlighted in bold reached a 0.2 effect size. T9 =teacher's rating at Wave 1. M = model. *SE* = standard error.
**p* < .05, ***p* < .01, ****p* < .001.

6.9 Regression – Boys' Piers-Harris 2 Ratings (C9)

Table 6.11 gives the model summary of the regression analysis with boys' Piers-Harris 2 scores as the outcome variable. Very little variance in Piers-Harris 2 scores was explained by the blocks individually. The main contributor was the person model with 9.1%, followed by the process model (5.1%). The context block variables could only explain 2.2% of variance. Descriptive statistics for all variables included in the regression model can be found in Appendix P.

Table 6.11

C9 Boys' Piers-Harris 2 Scores

Model	Adjusted R^2	*SE* of the Estimate	Sig. *F* change	R^2 change
1	0.001	8.81	*ns*(p = .092)	0.001
2	0.092	8.40	$p < .001$	0.091
3	0.116	8.28	$p < .001$	0.024
4	0.122	8.26	$p = .002$	0.006

Note. Model 1 relates to screen time. In Model 2, the person block was added, in Model 2, person characteristics were added, in Model 3 the process block was added, and Model 4 includes context variables. C9 = children's rating at Wave 1.

6.9.1 Screen time. High screen time was not significant across any of the four models (Table 6.12). Low screen time was a negative predictor in models 2-4 with B = -0.87 (p < .05) in the final model. Boys in the lowest quartile of screen time use tended to have a lower self-concept compared to those in the mid 50%. In this analysis, we can reject the null hypothesis stating that screen time group affiliation cannot predict boys' overall Piers-Harris 2 scores once PPCT factors are considered.

6.9.2 Person characteristics. Unlike in previous models, having a chronic illness was a positive predictor for boys' outcomes in this model, with boys in this group scoring higher on the Piers-Harris 2 than boys without such a difficulty. Boys with learning difficulties tended to score lower on the self-concept scale. Low shyness and low activity were negative predictors for self-concept; low emotionality was a positive predictor. All four Drumcondra scales were statistically significant. Boys in the low reading and maths scores quartiles tended to score lower on average; those in the highest quartile tended to score higher on the Piers-Harris 2 scale, indicating more self-confidence. The only variable reaching the effect size threshold was learning difficulty.

6.9.3 Process characteristics. Boys who had been bullied, and those whose parents do not follow an authoritative parenting style, tended to score lower on self-concept. Both high and low closeness were significant predictors; low closeness was a negative predictor and high closeness was a positive predictor. Bullying and parenting style reached the effect size threshold.

6.9.4 Context characteristics. Only two context variables reached significance; low parental education was a positive predictor for boys' Piers-Harris 2 scores, and being in the lowest income quintile was a negative predictor. Neither variable reached the effect size threshold.

Table 6.12

Piers-Harris 2 C9 Boys Hierarchical Regression

	M1	M2	M3	M4
	B(*SE*)	B(*SE*)	B(*SE*)	B(*SE*)
(Constant)	46.55(0.20)***	46.91(0.38)***	48.12(0.47)***	48.39(0.62)***
Screen time (ref:mid 50%)				
Low screen time	-0.66(0.38)	-0.74(0.37)*	-0.84(0.37)*	-0.87(0.37)*
High screen time	0.27(0.35)	0.38(0.34)	0.49(0.34)	0.48(0.34)
Health: Sometimes/always unwell		-0.40(1.29)	-0.23(1.27)	-0.49(1.27)
Chronic, physical, or mental illness		1.02(0.46)*	1.35(0.46)**	1.38(0.46)**
Obese (according to BMI)		-0.21(0.65)	0.23(0.64)	0.14(0.65)
Learning difficulty		-2.36(0.47)***	-1.99(0.47)***	**-1.99(0.47)***
Temperament (ref:mid 50%)				
Low shyness		-0.77(0.35)*	-0.89(0.35)**	-0.87(0.35)*
High shyness		0.08(0.36)	0.22(0.36)	0.18(0.36)
Low emotionality		1.51(0.33)***	1.08(0.35)**	1.07(0.35)**
High emotionality		-0.87(0.37)*	-0.42(0.37)	-0.37(0.37)
Low sociability		-0.41(0.36)	-0.22(0.36)	-0.15(0.36)
High sociability		0.67(0.37)	0.64(0.37)	0.62(0.37)
Low activity		-1.48(0.40)***	-1.38(0.40)**	-1.42(0.40)***
High activity		0.53(0.34)	0.49(0.34)	0.46(0.34)
Drumcondra test scores (ref:mid 50%)				
Low reading score		-1.57(0.39)***	-1.57(0.39)***	-1.60(0.39)***
High reading score		0.77(0.37)*	0.81(0.37)*	0.89(0.37)*
Low maths score		-1.91(0.39)***	-1.72(0.38)***	-1.71(0.39)***
High maths score		1.88(0.36)***	1.70(0.36)***	1.67(0.36)***

	M3	M4
	B(*SE*)	B(*SE*)
Structured activities (ref:1-2)		
No activity	-0.32(0.48)	-0.29(0.49)
3+ activities	0.18(0.51)	0.17(0.51)
Number of close friends (ref:2-5)		
0-1 close friends	0.06(0.55)	0.25(0.55)
6+ close friends	0.05(0.38)	0.09(0.38)
Victim of bullying	-2.25(0.35)***	**-2.08(0.35)*****
Parenting style other than authoritative	-2.05(0.34)***	**-1.99(0.34)*****
Family time (ref:mid 50%)		
Low family time	-0.36(0.33)	-0.37(0.33)
High family time	-0.41(0.36)	-0.40(0.36)
Parent-child relationship (ref:mid 50%)		
Low conflict	0.61(0.35)	0.64(0.35)
High conflict	-0.59(0.37)	-0.56(0.37)
Low closeness	-0.64(0.35)	-0.71(0.35)*
High closeness	0.68(0.37)	0.78(0.38)*
Low dependence	-0.36(0.35)	-0.39(0.35)
High dependence	-0.35(0.35)	-0.23(0.36)

	M4
	B(*SE*)
Adverse life events (ref:1-2)	
No adverse life events	0.12(0.35)
3+ adverse life events	-0.77(0.40)
PC meets depression cut-off point	-0.03(0.52)
PC level of education (ref:mid 50%)	
Low PC education	1.09(0.35)**
High PC education	0.27(0.40)
Household income (ref:2nd quintile)	
Lowest quintile	-1.50(0.47)**
3rd quintile	-0.11(0.45)
4th quintile	-0.16(0.46)
Highest quintile	-0.48(0.47)
Single-parent family	-0.57(0.45)
Siblings (ref:1-2 siblings)	
No siblings	-0.20(0.51)
3-5 siblings	0.37(0.34)
Urban area	0.08(0.29)
Neighbourhood safety (ref:mid 50%)	
Low safety	-0.16(0.36)
High safety	-0.45(0.34)

Note. Positive values indicate the variable was a positive predictor, negative values indicate a negative effect. Values in Model 4highlighted in bold reached a 0.2 effect size. C9 =children's rating at Wave 1. M =model. *SE* =standard error.
$^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

6.10 Regression – Girls' Piers-Harris 2 Ratings (C9)

The summary of the regression analysis using girls' Piers-Harris 2 scores as the outcome variable is presented in Table 6.13. As was the case in the boys' model, no block individually explained more than 10%. The person block could explain 9.8% of variance in girls' Piers-Harris 2 scores; the process block could explain 6%, and the context block 4%. Descriptive statistics for all variables included in the regression model can be found in Appendix Q.

Table 6.13

C9 Girls' Piers-Harris 2 Scores

Model	Adjusted R^2	*SE* of the estimate	Sig. *F* change	R^2 change
1	0.001	8.53	*ns*($p = .131$)	0.001
2	0.098	8.10	$p < .001$	0.097
3	0.124	7.99	$p < .001$	0.026
4	0.139	7.91	$p < .001$	0.015

Note. Model 1 relates to screen time. In Model 2, the person block was added, in Model 2, person characteristics were added, in Model 3 the process block was added, and Model 4 includes context variables. C9 = children's rating at Wave 1. NS = nonsignificant.

6.10.1 Screen time. As can be seen in Table 6.14, neither of the screen time variables were significant in the girls' Piers-Harris 2 model, and Model 1 was not associated with a significant *F* change. Therefore, we cannot reject the null hypothesis stating that screen time group affiliation cannot predict boys' overall Piers-Harris 2 scores once PPCT factors are considered.

6.10.2 Person characteristics. Learning difficulty was a negative predictor for girls' Piers-Harris 2 scores. Girls scoring in the lowest 25% percentile on sociability tended to have lower self-concept scores on average; those scoring low on emotionality and high on activity tended to have higher scores. All four Drumcondra scales were statistically significant; girls in the low reading and maths scores quartiles tended to score lower on average. Those in the highest quartile tended to score higher on the Piers-Harris 2 scale, indicating more self-confidence. The two variables that reached the effect size threshold were learning difficulty and low reading scores.

6.10.3 Process characteristics. Girls with no or just one friend, those who have been bullied, and girls in the lowest quartile of family time tended to score lower on the Piers-Harris 2. Girls in the highest family time quartile, and those in the low conflict quartile, had higher self-concept scores on average. Bullying was the only variable to reach the effect size threshold.

6.10.4 Context characteristics. As for boys, being in the lowest income quintile was a negative predictor of self-concept. Girls living in an urban area tended to score higher on the Piers-Harris 2 than those living in rural areas. The latter reached the effect size threshold.

Table 6.14

Piers-Harris 2 C9 Girls Hierarchical Regression

	M1	M2	M3	M4
	B(*SE*)	B(*SE*)	B(*SE*)	B(*SE*)
(Constant)	46.40(0.20)***	46.83(0.36)***	47.47(0.46)***	47.19(0.62)***
Screen time (ref:mid 50%)				
Low screen time	-0.40(0.34)	-0.32(0.33)	-0.40(0.33)	-0.17(0.33)
High screen time	-0.78(0.41)	-0.45(0.39)	-0.25(0.39)	-0.18(0.39)
Health: Sometimes/always unwell		1.78(1.05)	2.08(1.04)*	2.01(1.04)
Chronic, physical, or mental illness		0.23(0.49)	0.48(0.49)	0.51(0.49)
Obese (according to BMI)		-0.45(0.54)	-0.14(0.53)	0.00(0.53)
Learning difficulty		-2.41(0.55)***	-2.13(0.55)***	**-2.11(0.54)***
Temperament (ref:mid 50%)				
Low shyness		-0.23(0.37)	-0.14(0.36)	-0.18(0.36)
High shyness		0.14(0.34)	0.16(0.34)	0.20(0.34)
Low emotionality		1.81(0.35)***	1.31(0.35)***	1.26(0.35)***
High emotionality		-1.11(0.35)**	-0.47(0.36)	-0.41(0.36)
Low sociability		-1.11(0.36)**	-1.04(0.35)**	-1.06(0.35)**
High sociability		-0.11(0.35)	-0.18(0.34)	-0.16(0.34)
Low activity		-0.01(0.36)	0.26(0.35)	0.15(0.35)
High activity		1.87(0.37)***	1.69(0.37)***	1.64(0.37)***
Drumcondra test scores (ref:mid 50%)				
Low reading score		-2.08(0.40)***	-2.10(0.39)***	**-1.94(0.39)***
High reading score		0.78(0.37)*	0.82(0.37)*	0.74(0.37)*
Low maths score		-1.98(0.38)***	-1.62(0.38)***	-1.57(0.38)***
High maths score		1.16(0.38)**	1.11(0.38)**	1.00(0.38)**

	M3	M4
	B(*SE*)	B(*SE*)
Structured activities (ref:1-2)		
No activity	-0.77(0.45)	-0.74(0.46)
3+ activities	-0.12(0.40)	-0.34(0.40)
Number of close friends (ref:2-5)		
0-1 close friends	-1.69(0.50)**	-1.49(0.49)**
6+ close friends	-0.62(0.38)	-0.43(0.38)
Victim of bullying	-2.48(0.34)***	**-2.39(0.33)*****
Parenting style other than authoritative	-0.23(0.33)	-0.19(0.33)
Family time (ref:mid 50%)		
Low family time	-0.80(0.36)*	-0.71(0.35)*
High family time	0.55(0.33)	0.65(0.32)*
Parent-child relationship (ref:mid 50%)		
Low conflict	1.20(0.35)**	1.29(0.35)***
High conflict	-0.25(0.36)	-0.14(0.36)
Low closeness	-0.68(0.38)	-0.72(0.38)
High closeness	-0.18(0.32)	-0.27(0.32)
Low dependence	0.05(0.39)	0.19(0.39)
High dependence	0.12(0.32)	0.12(0.32)

	M4
	B(*SE*)
Adverse life events (ref:1-2)	
No adverse life events	0.50(0.36)
3+ adverse life events	-0.03(0.38)
PC meets depression cut-off point	-0.76(0.48)
PC level of education (ref:mid 50%)	
Low PC education	0.09(0.33)
High PC education	0.22(0.41)
Household income (ref:2nd quintile)	
Lowest quintile	-1.53(0.44)***
3rd quintile	0.17(0.44)
4th quintile	0.02(0.45)
Highest quintile	-0.70(0.48)
Single-parent family	-0.37(0.41)
Siblings (ref:1-2 siblings)	
No siblings	0.08(0.47)
3-5 siblings	-0.13(0.34)
Urban area	**1.78(0.29)*****
Neighbourhood safety (ref:mid 50%)	
Low safety	-0.49(0.34)
High safety	-0.64(0.34)

Note. Positive values indicate the variable was a positive predictor, negative values indicate a negative effect. Values in Model 4 highlighted in bold reached a 0.2 effect size. C9 = children's rating at Wave 1. M = model. *SE* = standard error.
$^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

6.11 Summary and Initial Discussion

This section serves mainly as a summary that in turn addresses the key findings of the bivariate analyses of screen time and socio-emotional outcomes, screen time and PPCT characteristics, and finally the regression analyses. A more substantial discussion of all three GUI studies will follow Study III (subsection 7.8), Chapter 9 provides a general discussion of the project.

In the current sample, TV/DVD/video was the most popular screen time, and children spent the least amount of time using the computer. Boys spent more time playing computer games and there were more boys than girls in the high screen time group. Children who owned more devices tended to have higher levels of screen time as well.

For the parents' rating of boys' SDQ scores, the main difference was seen for the high screen time group, boys in that group tended to score higher on the scales feeding into the overall behavioural difficulties score. The effect sizes reached or approached the 0.2 threshold, which is considered a small effect according to Cohen (1988). However, others have stressed that what might be considered a small effect should be seen as an average effect in educational or behavioural research (e.g., Cooper, 2008; Durlak, 2009). Therefore, it can be said that there was a clear tendency for the high screen time group to be rated as more difficult, with no real differences between the low and the mid screen time groups.

The difference in association between parents' and teachers' ratings warrants a closer look at the subscales, which are included in appendices I and J. Parents' ratings shows higher scores for boys in the high screen time group on the subscales feeding into the overall SDQ scores, the biggest difference was seen on the subscales for Emotional Symptoms and Peer Relationship Problems. However, the ratings from teachers did not follow the same uniform pattern. Here, the high screen time group only had the highest score on the Emotional Symptoms subscale. On the Conduct Problems and

Hyperactivity/Inattention subscales, it was the low screen time group that scored highest, indicating more difficulties. The same pattern emerged from the two significant Piers-Harris 2 subscales. From the boys' own perspective, high screen time was associated with more favourable self-evaluation of Physical Appearance and Attributes, and boys in the low screen time group had higher anxiety scores.

The pattern for girls was uniform across both the parental and the teachers' SDQ ratings, including all subscales, and the one significant Piers-Harris 2 subscale. The high screen time group tended to be rated as displaying more behavioural difficulties; the low screen time group tended to be rated as having the least difficulties. Girls in the low screen time group exhibited more prosocial behaviour on average and those in the high screen time group scored lowest. There was one exception; the mid screen time group had the most favourable result on the teacher's prosocial subscale rating. Overall, effect sizes were substantially bigger than those in the boys' analysis.

Thus while the girls' results were similar across parents', teachers', and children's own perspectives, the picture for boys was a little more complicated. While the ratings of the primary caregiver show a similar trend to that among girls, the teachers' perspective and the children's ratings tell a different story. Here, boys in the high screen time group tended to have better outcomes than their counterparts in the low screen time group. This highlights the importance of conducting analyses for boys and girls separately.Overall, children in the three screen time groups differed on all but one of the characteristics (number of close friends) that were examined. They differed as follows: Children in the low screen time group tend to be healthier, more physically active, and less likely to be overweight. Temperamentally, they tend to be less shy, less emotional, and more active. Conversely, children in the high screen time group tend to be less sociable, were enrolled in fewer structured activities, and spent less time with family.

The parent-child relationship of children with high levels of screen time was characterised by more conflict and more dependence. More children in the low screen time groups had authoritative parents, and a higher number of parents with children in the high screen time group were classed as following a permissive or neglectful parenting style. Parents of low screen time group children were more likely to have a higher level of education; the lowest proportion of families in the highest income quintile was among the high screen time groups. High screen time is also associated with a higher likelihood of living in a single-parent household, having fewer siblings, living in an urban area, and in neighbourhoods perceived as less safe.

Not all differences applied to both boys and girls. Some aspects were only significant for girls: those in the high screen time group had the lowest levels of closeness on the Pianta scale, and had experienced more adverse life events on average. There were higher rates of depressive symptoms among the primary caregivers of boys in the high screen time group. However, most of these associations only had very small effect sizes. There were only a range of small effect sizes: boys in the high screen time group tended to be enrolled in fewer structured activities, spent less time with family, and were perceived as more dependent than boys in the low screen time group. Girls in the high screen time group also had higher level of dependence, lower levels of closeness, and spent less time with family than girls in the low screen time group.

For some variables, the association with screen time followed a different pattern. For example, both for chronic illnesses and experience of bullying, the boys' mid screen time group had the lowest levels. Learning difficulties were associated with less screen time, the highest percentage was among boys in the low screen time group. There was no significant difference between screen times regarding the number of close friends they had.

There are two important things to note. The examination of bivariate relationships can be helpful, but it does not provide any insight into the interconnectedness between different characteristics. In addition, it ignores the cumulative effect that person characteristics, proximal processes and contextual factors may have when considered as one dynamic network. Thus, to fully understand how these variables are interrelated, they need to be considered all at once and not separately. Additionally, comparing screen time groups on different characteristics does not give any information about how these might relate to outcomes. Many of the variables examined here are also relevant to wellbeing (see Nixon, 2012). The regression analysis provided a more complex analysis of the relationship between screen time groups and outcomes, while also taking into account relevant person, process, and context characteristics.

Overall, screen time had a statistically significant, but small association with SDQ and Piers-Harris 2 scores. In the regression analyses, when person, process, and context variables were factored in, being in the high screen time group was a predictor for boys' being rated as more difficult by their primary caregiver at age nine. Being in the low screen time group was a predictor for girls to have fewer behavioural difficulties. But while low screen time was a positive predictor in the parent's SDQ model for girls, falling into the low screen time group was a negative predictor for boys' Piers-Harris 2 scores at age nine. From the parents' perspective, there was a tendency for a relationship between behavioural difficulties and screen time, and more screen time was indicative of more difficulties. But from the perspective of nine-year-old boys, little screen time was associated with lower self-concept.

The person block proved a very influential block across the models. There are two areas that came out strong: temperament, and variables relating to academic skills, scholastic ability and having a learning difficulty. While Drumcondra scores were significant throughout most of the models, reading was a more prominent factor in influencing girls' SDQ and Piers-Harris 2 scores; maths scores are more relevant in the models of nine-year-old boys. Learning difficulty was one of two variables significant across all models, and met the 0.2 effect size threshold. The other variable was whether the child has been bullied. As a process variable, this highlights the importance of positive proximal processes. The other variables that stood out in the process block were related to the parent-child relationship. High emotionality and high parent-child conflict were related to more behavioural difficulties; scoring low was indicative of fewer difficulties. The two are potentially related, and illuminate an important proximal process – the relationship between the primary caregiver and the child, which will be discussed in subsection 7.8.

Due to the inherent interconnectedness of variables in the models, results need to be interpreted with caution. As already discussed in subsection 4.4.5.3.1, relationships among predictor variables can skew results. However, no correlation between the predictor variables reached the .5 mark, and most were below .1. Variance inflation factors were generally low and tolerance high. Nevertheless, considering the effect sizes of associations provides a more conservative estimate of the true relationship among variables.

In summary, the bivariate analyses showed the intricate relationship between different person, process, and context variables and screen time. There is a tendency for children in the low screen time group to fare slightly better on measurements of variables relevant to children's wellbeing (Nixon, 2012). The hierarchical regressions showed the relative strong influence of person and process characteristics in predicting outcome scores. And, while there is some association between screen time and outcomes, other factors are more influential. The analysis is limited by its cross-sectional nature; relationships are merely correlations, associations between different variables. As such, they do not allow us to make causal inferences. In order to explore how factors bear on outcomes over time, the next chapter explores the association between screen time at age nine and outcomes at age 13.

7 Study III: Screen Time at Age Nine, Outcomes at Age 13, and PPCT

Chapter 6 showed a statistically significant association between screen time and SDQ scores. For boys, high screen time was a predictor for more behavioural difficulties, but interestingly, high screen time was also associated with a higher self-concept. For girls, low screen time was a predictor for fewer difficulties. While these findings are revealing, it is important to consider if, and to what extent, they persist over time. This is particularly interesting in light of the positive association between screen time and boys' Piers-Harris 2 ratings at age nine. There is a possibility that boys' benefit from access to a variety of screen time in the short-term, but it could be that these benefits are short lived and do not translate into a more positive outlook later in life.

This study is based on data from Waves 1 and 2 of the GUI data, methods are outlined in subsections 4.4.6 to 4.4.6.2. The aim of this study was to explore associations between screen time at age nine and socio-emotional outcomes at age 13, while also considering a range of mediating factors. All analyses were split for gender.

Research questions:

- What is the relationship between screen time at age nine and screen time at age 13?
- Can screen time at age nine predict socio-emotional outcomes at age 13?
- To what extent do person, process, context, and time variables mediate that relationship?

Based on the literature, we expect to find an association between screen time and socio-emotional outcomes, therefore the analyses test the following general hypotheses:

$\mathbf{H}^{\mathbf{13Bivariate}}{}_{\mathbf{A}}$: There is an association between screen time groups at age nine and socio-emotional outcomes at age 13.

$\mathbf{H}^{\mathbf{13Regression}}{}_{\mathbf{A}}$: Screen time group affiliation at age nine can predict socio-emotional outcomes at age 13 once PPCT factors are considered.

Since there are two outcome measures included (SDQ and Piers-Harris 2), and analyses are split for gender, each general hypothesis relates to four specific alternative hypothesis, which are listed in Appendix R with their respective null hypotheses.

7.1 Results: Screen Time at Age Nine and Outcomes at Age 13

The 13-year-olds were asked about the amount of time they spent watching television, or other film formats, how much time they spent using the computer, playing games with a console, and how much time they spent reading for pleasure. The wording was similar to the question about screen time addressed to parents at the Wave 1 stage. At the Wave 2 stage, the young people where asked to indicate how much time (in hours and minutes) they spent with either medium, including before and after school. Figure 7.1 outlines the average time spent with the aforementioned activities; zero means they spent no time at all with this activity, 1 means 1-30 minutes, 2 is 31-60 minutes and so on. As was the case at age nine, the most popular activity was watching television.

Boys spent more time watching television with $t(7{,}128) = 3.03$, $p = .002$, $d = 0.07$, very small effect size, and more time with game consoles with $t(5{,}498) = 36.61$, $p < .001$, $d = 0.78$, large effect size. Girls spent more time using the computer with $t(7{,}040) = -7.53$, $p < .001$, $d = -0.18$, very small effect size, and reading for pleasure with $t(6{,}926) = -8.86$, $p < .001$, $d = -0.21$, small effect size.

Figure 7.1 Screen Time at Age 13

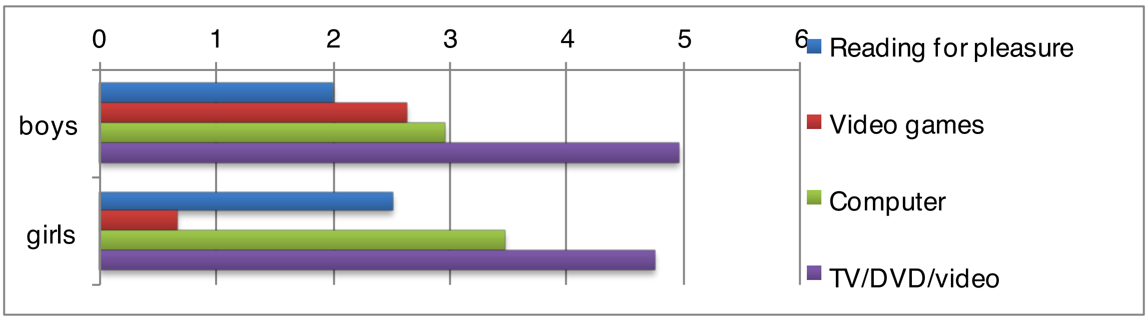

Figure 7.1. Frequency distribution of screen time activities as well as reading for pleasure. *N*(boys reading) = 3,612; *N*(boys video games) = 3,623; *N*(boys computer) = 3,622; *N*(boys TV) = 3,616; *N*(girls reading) = 3,525; *N*(girls video games) = 3,520; *N*(girls computer) = 3,522; *N*(girls TV) = 3,514.

The young people were also asked if they have access to the internet, but not how much time they spent online. The majority of young people had access to the internet, 94.9% have access at home (*n* = 7,138; boys: 97.2%, *n* = 3589; girls: 96.6%, *n* = 3,453). This access was relatively free. Less than half of the parents said they have an internet filter system which controls access to the internet, 42.1% of boys' parents (*n* = 1,466) had such a system and 41.9% of girls' parents (*n* = 1,415). The 13-year-olds were also asked if they are allowed to be online without an adult checking what they were doing. Just over half of boys (51.8%) said that they were always allowed to do so, and 46.7% of girls. Another 39.4% of boys said they were sometimes allowed online without adult supervision, 46.7% of girls. Many had access to the internet from a PC or laptop in their bedroom, 34.9% of boys (*n* = 1,286), and 43.6% (*n* = 1,559) of girls. Also, most young people (97.4%, *n* = 7,215) had a mobile phone at age 13. This was slightly higher for girls (99%, *n* = 3494) than boys (95.7%, *n* = 3,472). Mobile phones were also a popular source of internet access with 56.2% of boys saying that they use a mobile phone or tablet to access the internet (*n* = 2,072) and 59.8% of girls (*n* = 2,139).

Figure 7.2 outlines the activities young people do online. The most popular was social media or messaging, followed by surfing for a school project. Overall, 94.4% of boys and 95.6% of girls used internet for leisure activities (first four categories), while 73.7% of boys and 83.8% of girls used the internet for school related activities.

Figure 7.2 Internet Use Among 13-Year-Olds

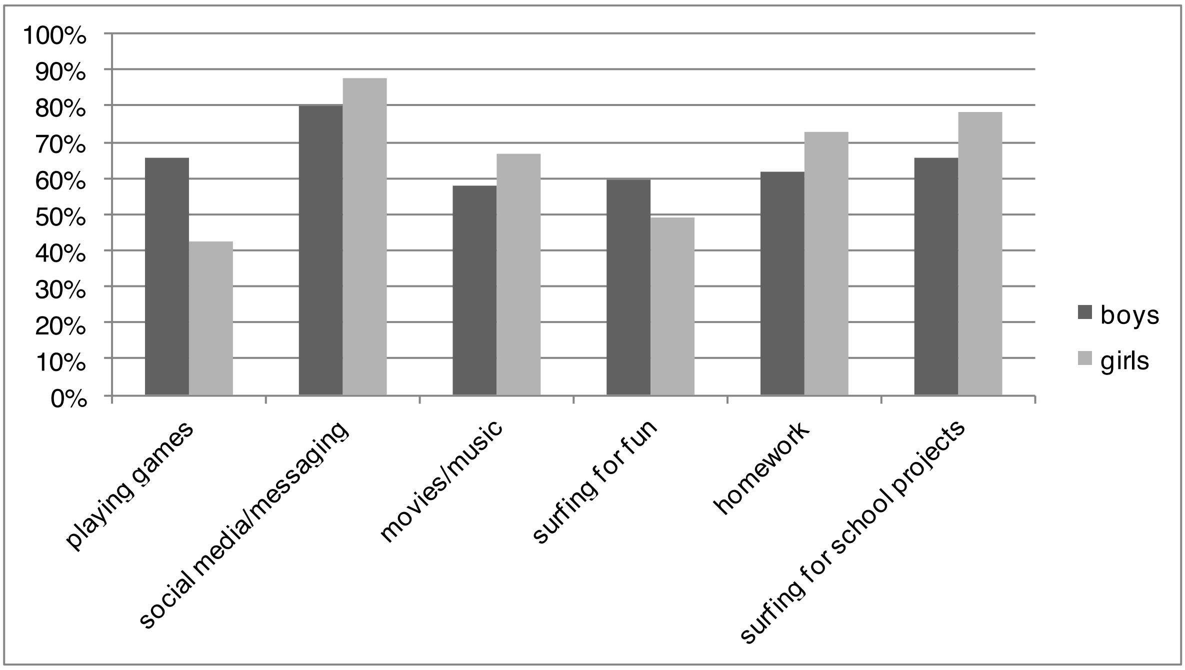

Figure 7.2. Percentage of 13-year-olds that engage in the respective activities.

The total amount of time spent watching TV/DVD/video, computer use and game console play was added to create a screen time scale ranging from 0 to 39; the higher the score, the more the young person spent with screen time. There was no information regarding time spent online on devices other than the computer. The average on this screen time scale was 9.80 (SD = 6.11), which would be anything between 4 hours 24 minutes and 4 hours 54 minutes. Boys reported higher levels of screen time at age 13 with a mean of 10.56 (SD = 6.57; between 4 hours 47 minute and 5 hours and 17 minutes). Girls scored an average of 8.90 (SD = 5.37; between 3 hours 57 minutes and 4 hours 27 minutes). The difference was significant with $t(6{,}921) = 11.73$, $p < .001$, $d = 0.27$, small effect size.

There was a significant interaction between screen time group at age nine and screen time at age 13 for boys and girls. Those in the low screen time group at age nine tended to spend less time on average with screens at age 13; those in the high screen time group at age nine tended to spend more time with screens. This difference was significant for boys with Welch's $F(2, 1{,}735) = 83.59$, $p < .001$. As can be seen in Figure 7.3, all three groups were significantly different from each other with the age nine low screen time group engaging least with screen time (*M* = 8.48, *SD* = 6.17), the mid group was in the middle (*M* = 10.39, *SD* = 6.40, *d*(low-mid) = -0.29, small effect size; *d*(mid-high) = -0.32, small effect size), and the high screen time group engages most with screen time (*M* = 12.52, *SD* = 6.68, *d*(low-high) = -0.62, medium effect size).

There was also a significant difference for girls with Welch's $F(2, 1{,}392) = 42.73$, $p < .001$. As can be seen in Figure 7.3, all three groups were significantly different from each other with the age nine low screen time group spending the least amount of time with screens ate age 13 (*M* = 7.77, *SD* = 5.10), the mid group was in the middle (*M* = 9.02, *SD* = 5.22, *d*(low-mid) = -0.23, small effect size; *d*(mid-high) = -0.26, small effect size), and the high screen time group spent the most amount of time with screens (*M* = 10.40, *SD* = 5.89, *d*(low-high) = -0.49, small effect size).

Figure 7.3 Screen Time at Nine and at 13 Years of Age

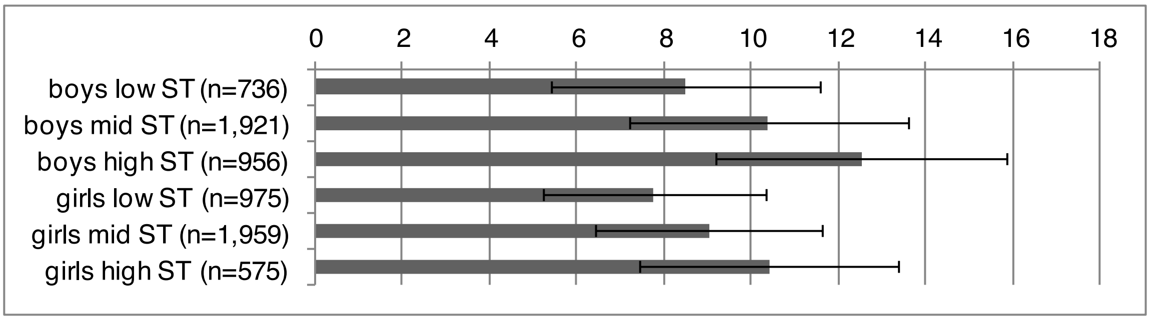

Figure 7.3. Screen time at age 13 broken down by gender and screen time groups at age nine. Error bars represent ± 1 *SD*.

Figure 7.4 visualises the changes in screen time from age nine to age 13. The *change* bar shows the composition of each screen time group at age 13; in red are young people who were in the low screen time group at age nine, those who were in the mid screen time group are coloured in blue, and the high screen time group at age nine are in grey. The associated shifts are outlined below (e.g., L to L is the percentage of people who were in the low screen time at Wave 1 and were also in the low screen time group at Wave 2).

Figure 7.4 Screen Time Change from Age Nine to 13

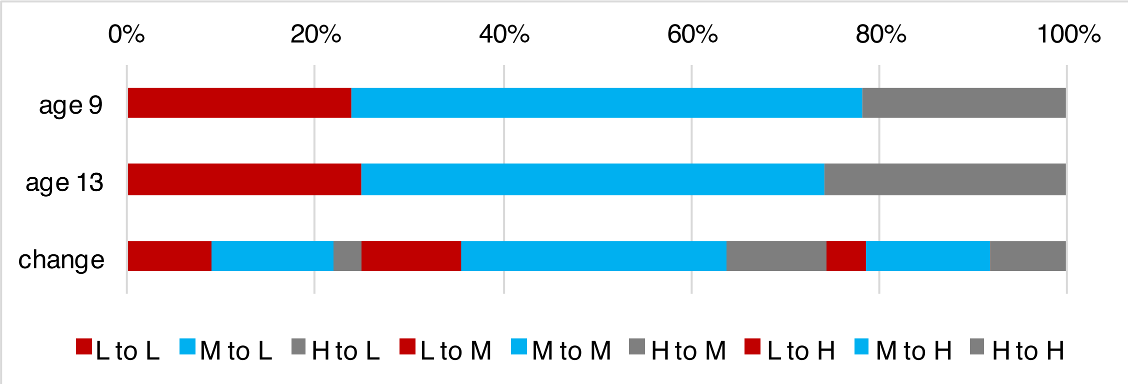

Figure 7.4. Screen time groups broken down from origin. L = low ST group; M = mid ST group; H = high ST group.

7.1.1 Strengths and Difficulties Questionnaire (P13). There were significant differences between the groups, therefore we can reject the null hypothesis stating that there are no associations between screen time at age nine and overall SDQ scores at age 13. There was a significant difference on overall SDQ scores for boys with $F(2, 3{,}685) = 5.20$, $p = .006$. Post tests showed that the mid group scored significantly lower ($M = 7.05$, $SD = 5.31$), than the mid screen time group ($M = 7.72$, $SD = 5.45$, d(mid-high) = -0.13, very small effect size).

There was also a significant difference for girls with Welch's $F(2, 1{,}428) = 9.95$, $p < .001$. As can be seen in Figure 7.5, the high age nine screen time group scored significantly higher on the SDQ overall ($M = 7.79$, $SD = 5.72$), than both the mid ($M = 6.74$, $SD = 5.17$, d(mid-high) = -0.20, small effect size) and the low screen time group ($M = 6.55$, $SD = 5.43$, d(low-high) = -0.23, small effect size).

Figure 7.5 P13 Mean SDQ Scores and Screen Time Groups

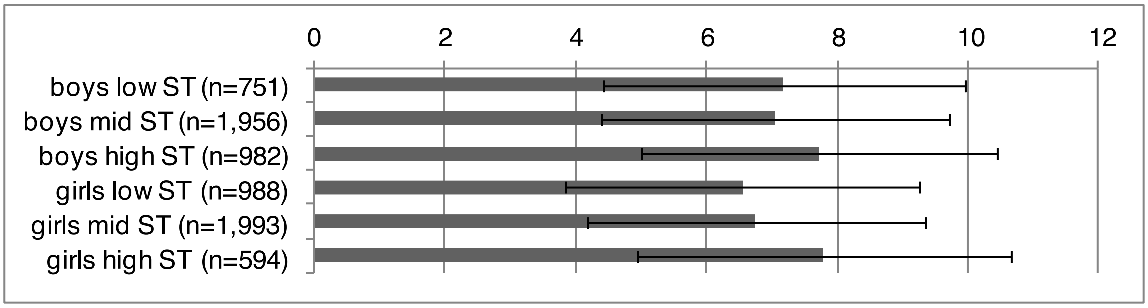

Figure 7.5. Average SDQ scores (parental rating) broken down by screen time group and gender. Higher scores indicate more difficulties. P13 = primary caregiver's rating at Wave 2. Error bars represent ± 1 *SD*.

Among boys, age nine screen time groups differed on two subscales. On the Emotional Symptoms subscale, the high screen time group scored highest, and was significantly different from the low, and the mid screen time group. On the Peer Relationship Problems subscale, the high screen time group again scored highest, and was significantly different from the low and the mid screen time groups. The mid group had the lowest score on average.

For girls, age nine screen time groups differed on four subscales. On the Emotional Symptoms and the Hyperactivity/Inattention subscales, the high screen time group scored highest and was significantly different from the low and the mid screen time groups. On the conduct subscale, there was a significant difference between the mid and the high screen time groups; the high screen time group scored highest. On the prosocial subscale, the low screen time group scored highest and was significantly different from the high screen time group. Figures and associated statistics of the SDQ subscales can be found in Appendix S.

7.1.2 Piers-Harris Self-Concept Scale (C13). There was a slight difference in Piers-Harris 2 mean scores between the age nine screen time groups among boys, but the differences were not significant in the post test. Therefore, we cannot reject the null hypothesis stating that there is no association between boys' screen time groups at age nine and overall Piers-Harris 2 scores at age 13 based on parents' ratings.

The difference between age nine screen time groups was significant among girls with $F(2, 3{,}494) = 6.99$, $p < .001$, so we can reject the null hypothesis stating that there is no association between girls' screen time groups at age nine and overall Piers-Harris 2 scores at age 13 based on parents' ratings. As can be seen in Figure 7.6, the low screen time group scored highest on average ($M = 47.37$, SD = 8.41) and the score was significantly different from the mid ($M = 46.17$, $SD = 8.94$, d(low-mid = 0.14, very small effect size) and the high screen time group ($M = 46.07$, $SD = 8.50$, d(low-mid = 0.15, very small effect size).

Figure 7.6 C13 Mean Piers-Harris 2 Scores and Screen Time Groups

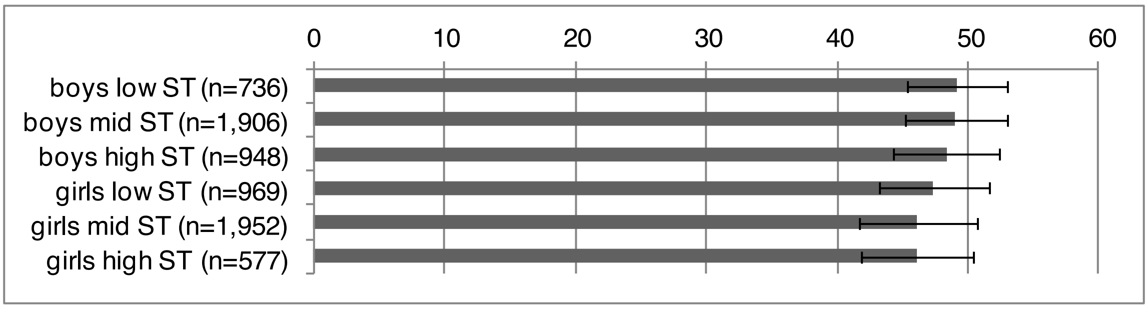

Figure 7.6. Average Piers-Harris 2 scores broken down by screen time group and gender. Higher score indicate more self-confidence. C13 = children's rating at Wave 2. Error bars represent ± 1 *SD*.

Among boys, age nine screen time groups differed on three subscales. There was a significant difference between screen time groups on the Behavioural Adjustment subscale; the low screen time group scored highest, and the score was significantly different from the mid and the high screen time group. There was a significant difference between screen time groups on the Physical Appearance and Attributes, and the Popularity subscales for boys, the high screen time group scored lowest and was significantly different to the mid screen time group.

Among girls, age nine screen time groups differed on four subscales. There were significant differences in the Intellectual and School Status, the Physical Appearance and Attributes, and the Freedom of Anxiety subscales for girls. The low screen time group scored highest and was significantly different to the mid and the high screen time group.

Screen time groups also differed on the Happiness and Satisfaction subscale. The low screen time scores highest and was significantly different to the mid screen time group, which scored lowest on average. Figures and associated statistics of the Piers-Harris 2 subscales can be found in Appendix T.

7.2 Regression – Parents' SDQ Ratings for Boys (P13)

The regression models using the primary caregiver's SDQ scores at age 13 of boys as an outcome is presented in Table 7.1. As outlines in subsection 4.4.6.2, all other variables, including screen time groups, were the same as in Chapter 6.Each model was statistically significant and each block made a significant contribution when added. When blocks were considered individually, the strongest block of predictors was the process block, which accounted for 24.6% of variance in boys' SDQ scores, followed by the person block (23.3%). The context block had a smaller impact and could explain 11% of variance individually. Crucially, this highlights the amount of overlap between the person and process blocks which is not evident when only the hierarchical modelling in Table 7.1 is considered. Descriptive statistics for all variables included in the regression model can be found in Appendix U.

Table 7.1

P13 Boys' SDQ Scores

Model	Adjusted R^2	*SE* of the estimate	Sig. *F* change	R^2 change
1	0.002	5.40	$p = .012$	0.002
2	0.234	4.73	$p < .001$	0.232
3	0.333	4.42	$p < .001$	0.099
4	0.363	4.31	$p < .001$	0.030

Note. Model 1 relates to screen time. In Model 2, the person block was added, in Model 2, person characteristics were added, in Model 3 the process block was added, and Model 4 includes context variables. P13 = primary caregiver's rating at Wave 2.

7.2.1 Screen time. The low screen time variable was not significant. High screen time was significant in the first two models (Table 7.2). In Model 1, being in the high screen time group predicted a 0.68 points higher score on the SDQ ($p < .01$) compared to the reference (middle) group, in Model 2 this dropped to $B = 0.44$ ($p < .05$). This was a very small effect and was no longer significant in models 3 and 4, when process and context characteristics were added. Therefore we cannot reject the null hypothesis stating that screen time group at age nine cannot predict overall SDQ scores at age 13 once PPCT factors are considered.

7.2.2 Person characteristics. Having a learning difficulty or a chronic, physical, or mental illness at age nine was a predictor for higher SDQ scores at age 13. This effect was a little stronger than it was in the age nine model. From the EAS scale, high emotionality, low sociability, and high activity at age nine were statistically significant predictors of higher SDQ scores at age 13. This indicates that boys scoring within these quartiles tended to have more difficulties. Low emotionality was a significant positive predictor; boys within the bottom 25% of the emotionality subscale had lower SDQ scores, indicating fewer difficulties. Boys in the highest quartile of maths test scores tended to have lower SDQ scores. The three variables with an effect size of 0.2 or higher, highlighted in bold in Table 7.2, were learning difficulty, chronic illness, and high emotionality.

7.2.3 Process characteristics. Boys with few (0-1) close friends and those whose parents reported that they have been a victim of bullying, tended to have higher SDQ scores. Those who spent a lot of time with their family at age nine have slightly lower SDQ scores at age 13. For the Pianta subscales, high conflict and low closeness at age nine were indicators of higher SDQ scores at age 13; low conflict and low dependence are indicators of fewer difficulties at age 13. As was the case in the age nine model, four variables reached the 0.2 effect size threshold. Highlighted in bold in Table 7.2, these were high conflict, having 0-1 close friends, being bullied, and low conflict.

7.2.4 Context characteristics. Having experienced three or more adverse life events by age nine, and having a primary caregiver who met the cut-off point for depressive symptoms, were indicators for more behavioural difficulties at age 13. As was the case in the age nine model, both low and high parental education were statistically significant; low education was associated with more behavioural difficulties, high parental education was associated with fewer difficulties. Being in the 3rd income quintile at age nine, living in a single-parent family household, having no siblings or having 3-5 siblings were predictors for higher SDQ scores at age 13, as well as living in a perceived unsafe neighbourhood. The only variable reaching the 0.2 effect size threshold was low neighbourhood safety.

Table 7.2

SDQ P13 Boys Hierarchical Regression

	M1	M2	M3	M4
	B(*SE*)	B(*SE*)	B(*SE*)	B(*SE*)
(Constant)	7.04(0.13)***	5.99(0.23)***	5.44(0.27)***	4.62(0.35)***
Screen time (ref:mid 50%)				
Low screen time	0.14(0.25)	0.03(0.22)	0.11(0.21)	0.14(0.21)
High screen time	0.68(0.23)**	0.44(0.20)*	0.36(0.19)	0.14(0.19)
Health: Sometimes/always unwell		1.14(0.83)	0.78(0.78)	0.46(0.76)
Chronic, physical, or mental illness		2.23(0.27)***	1.61(0.26)***	**1.55(0.25)*****
Obese (according to BMI)		-0.53(0.40)	-0.64(0.38)	-0.68(0.37)
Learning difficulty		3.18(0.28)***	2.62(0.27)***	**2.66(0.26)*****
Temperament (ref:mid 50%)				
Low shyness		-0.14(0.21)	-0.05(0.20)	-0.02(0.19)
High shyness		0.34(0.22)	0.13(0.20)	0.16(0.20)
Low emotionality		-1.87(0.20)***	-0.75(0.20)***	-0.61(0.20)**
High emotionality		2.34(0.22)***	1.44(0.21)***	**1.32(0.21)*****
Low sociability		0.87(0.22)***	0.55(0.20)**	0.57(0.20)**
High sociability		0.00(0.22)	0.02(0.21)	0.05(0.20)
Low activity		0.05(0.24)	-0.15(0.22)	-0.07(0.22)
High activity		0.53(0.21)**	0.56(0.19)**	0.54(0.19)**
Drumcondra test scores (ref:mid 50%)				
Low reading score		0.39(0.24)	0.32(0.22)	0.11(0.22)
High reading score		-0.15(0.22)	-0.21(0.20)	-0.04(0.20)
Low maths score		0.78(0.24)**	0.54(0.22)*	0.31(0.22)
High maths score		-0.75(0.21)***	-0.68(0.20)**	-0.58(0.20)**

	M3	M4
	B(*SE*)	B(*SE*)
Structured activities (ref:1-2)		
No activity	0.13(0.28)	-0.13(0.28)
3+ activities	-0.28(0.29)	-0.36(0.29)
Number of close friends (ref:2-5)		
0-1 close friends	2.34(0.31)***	**2.12(0.30)*****
6+ close friends	0.08(0.21)	-0.04(0.21)
Victim of bullying	1.56(0.20)***	**1.32(0.19)*****
Parenting style other than authoritative	0.28(0.19)	0.32(0.19)
Family time (ref:mid 50%)		
Low family time	0.06(0.19)	-0.03(0.19)
High family time	-0.45(0.20)*	-0.50(0.20)*
Parent-Child relationship (ref:mid 50%)		
Low conflict	-1.32(0.20)***	**-1.30(0.20)*****
High conflict	2.37(0.21)***	**2.19(0.20)*****
Low closeness	0.49(0.20)*	0.55(0.19)**
High closeness	-0.02(0.21)	-0.07(0.21)
Low dependence	-0.71(0.20)***	-0.58(0.20)**
High dependence	0.36(0.20)	0.33(0.20)

	M4
	B(*SE*)
Adverse life events (ref:1-2)	
No adverse life events	-0.38(0.20)
3+ adverse life events	0.59(0.22)**
PC meets depression cut-off point	0.68(0.29)*
PC level of education (ref:mid 50%)	
Low PC education	0.72(0.19)***
High PC education	-0.46(0.22)*
Household income (ref:2nd quintile)	
Lowest quintile	0.48(0.27)
3rd quintile	0.54(0.25)*
4th quintile	0.49(0.26)
Highest quintile	0.02(0.26)
Single-parent family	0.69(0.25)**
Siblings (ref:1-2 siblings)	
No siblings	0.68(0.28)*
3-5 siblings	0.48(0.19)*
Urban area	0.02(0.16)
Neighbourhood safety (ref:mid 50%)	
Low safety	**1.14(0.20)***
High safety	-0.14(0.19)

Note. Positive values indicated the variable was a negative predictor, negative values indicate a positive effect. Values in Model 4 highlighted in bold reached a 0.2 effect size. M = model. *SE* = standard error. P13 = primary caregiver's rating at Wave 2.
**p* < .05, ***p* < .01, ****p* < .001.

7.3 Regression – Parents' SDQ Ratings for Girls (P13)

The regression model summary for parental ratings of girls' SDQ scores at age 13 is presented in Table 7.3. When blocks were considered individually, the strongest block was the person block, explaining 25.2% of variance, followed by the process block with 23.3%. The context block had a smaller impact (11.3%). Descriptive statistics for all variables included in the regression model can be found in Appendix V.

Table 7.3

P13 Girls' SDQ Scores

Model	Adjusted R^2	*SE* of the estimate	Sig. *F* change	R^2 change
1	0.006	5.34	$p < .001$	0.006
2	0.254	4.62	$p < .001$	0.248
3	0.338	4.35	$p < .001$	0.084
4	0.357	4.29	$p < .001$	0.019

Note. Model 1 relates to screen time. In Model 2, the person block was added, in Model 2, person characteristics were added, in Model 3 the process block was added, and Model 4 includes context variables. P13 = primary caregiver's rating at Wave 2.

7.3.1 Screen time. The low screen time variable was not significant in any of the models. High screen time was only significant in the first two models. In Model 1, high screen time at age nine was a predictor for a 1.05 points higher SDQ score at age 13 ($p < .001$). This falls to 0.69 in Model 2 ($p < .01$). Therefore, we cannot reject the null hypothesis stating that screen time group at age nine cannot predict overall SDQ scores at age 13 once PPCT factors are considered.

7.3.2 Person characteristics. Chronic illness and learning difficulty at age nine were predictors of higher SDQ scores at age 13. Low emotionality was a predictor for lower SDQ scores, high emotionality and low sociability were predictors for more difficulties at age 13. Being in the lowest quartile for reading and maths scores at age nine were indicators for higher SDQ scores at age 13. Being in the highest quartile for reading scores predicted a lower SDQ score at age 13. The strongest predictors in the model, reaching a small effect size, were learning difficulty, high emotionality, and low maths scores, which are highlighted in bold in Table 7.4.

7.3.3 Process characteristics. Both structured activities variables were statistically significant and were both indicators for higher SDQ scores at age 13. Having 0-1 close friends, having been bullied and spending little time with family at age nine were also predictors for more behavioural difficulties at age 13. Low closeness and high conflict at age nine were significant predictors for more difficulties at age 13; low conflict was a significant predictor of fewer difficulties. Contributors reaching the threshold of at least a 0.2 effect size were high conflict, being bullied, no activity, low conflict, and 0-1 close friends.

7.3.4 Context characteristics. Girls who had experienced three or more adverse life events, whose primary caregiver met the cut-off point for depressive symptoms, and had a low education level at age nine, scored higher on the SDQ on average at age 13. Being in the 3rd, 4th, or highest income quintile at age nine, and living in a single-parent family household, were predictors for fewer difficulties at age 13. Having no siblings at age nine was a predictor for higher SDQ scores at age 13, having three or more siblings was a predictor for lower SDQ scores. As was the case in the age nine model, the only variable that reached the effect size threshold was the no siblings variable.

Table 7.4

SDQ P13 Girls' Hierarchical Regression

	M1	M2	M3	M4
	B(*SE*)	B(*SE*)	B(*SE*)	B(*SE*)
(Constant)	6.75(0.13)***	5.16(0.22)***	4.23(0.27)***	4.56(0.36)***
Screen time (ref:mid 50%)				
Low screen time	-0.19(0.23)	-0.20(0.20)	-0.10(0.19)	-0.04(0.19)
High screen time	1.05(0.27)***	0.69(0.24)**	0.33(0.23)	0.23(0.22)
Health: Sometimes/always unwell		1.24(0.63)*	0.81(0.60)	0.51(0.59)
Chronic, physical, or mental illness		1.24(0.31)***	1.17(0.29)***	0.88(0.29)**
Obese (according to BMI)		0.38(0.33)	0.39(0.32)	0.34(0.31)
Learning difficulty		3.11(0.33)***	2.44(0.31)***	**2.23(0.31)*****
Temperament (ref:mid 50%)				
Low shyness		0.19(0.22)	0.17(0.21)	0.17(0.21)
High shyness		0.37(0.21)	0.32(0.20)	0.26(0.20)
Low emotionality		-1.42(0.21)***	-0.68(0.20)**	-0.66(0.20)**
High emotionality		3.02(0.21)***	1.84(0.21)***	**1.67(0.21)*****
Low sociability		0.58(0.22)**	0.47(0.21)*	0.45(0.20)*
High sociability		0.11(0.21)	0.14(0.20)	0.13(0.20)
Low activity		0.22(0.22)	-0.04(0.21)	0.04(0.20)
High activity		0.19(0.23)	0.38(0.21)	0.38(0.21)
Drumcondra test scores (ref:mid 50%)				
Low reading score		0.83(0.24)**	0.79(0.23)**	0.69(0.23)**
High reading score		-0.58(0.22)**	-0.58(0.21)**	-0.49(0.21)*
Low maths score		1.66(0.23)***	1.36(0.22)***	**1.18(0.22)*****
High maths score		-0.55(0.23)*	-0.41(0.22)	-0.30(0.22)

	M3	M4
	B(*SE*)	B(*SE*)
Structured activities (ref:1-2)		
No activity	1.41(0.27)***	**1.20(0.27)*****
3+ activities	0.45(0.23)	0.59(0.23)**
Number of close friends (ref:2-5)		
0-1 close friends	1.23(0.29)***	**1.09(0.29)*****
6+ close friends	0.09(0.22)	0.02(0.22)
Victim of bullying	1.41(0.19)***	**1.29(0.19)*****
Parenting style other than authoritative	-0.41(0.19)*	-0.37(0.19)
Family time (ref:mid 50%)		
Low family time	0.76(0.21)***	0.74(0.21)***
High family time	0.11(0.19)	0.01(0.19)
Parent-Child relationship (ref:mid 50%)		
Low conflict	-1.08(0.20)***	**-1.14(0.20)*****
High conflict	2.35(0.21)***	**2.23(0.21)*****
Low closeness	0.51(0.22)*	0.47(0.22)*
High closeness	0.03(0.19)	0.03(0.19)
Low dependence	-0.47(0.22)*	-0.41(0.22)
High dependence	0.37(0.19)	0.30(0.19)

	M4
	B(*SE*)
Adverse life events (ref:1-2)	
No adverse life events	-0.10(0.21)
3+ adverse life events	0.72(0.22)**
PC meets depression cut-off point	1.03(0.28)***
PC level of education (ref:mid 50%)	
Low PC education	0.44(0.19)*
High PC education	-0.14(0.24)
Household income (ref:2nd quintile)	
Lowest quintile	0.25(0.25)
3rd quintile	-0.53(0.26)*
4th quintile	-0.60(0.26)*
Highest quintile	-0.81(0.28)**
Single-parent family	-0.55(0.24)*
Siblings (ref:1-2 siblings)	
No siblings	**1.21(0.27)*****
3-5 siblings	-0.49(0.20)*
Urban area	-0.04(0.17)
Neighbourhood safety (ref:mid 50%)	
Low safety	0.25(0.19)
High safety	-0.23(0.20)

Note. Positive values indicate the variable was a negative predictor, negative values indicate a positive effect. Values in Model 4 highlighted in bold reached a 0.2 effect size. P13 = primary caregiver's rating at Wave 2. M = model. *SE* = standard error.
$^*p < .05$, $^{**}p < .01$, $^{***}p < .001$.

7.4 Regression – Boys' Piers-Harris 2 Ratings (C13)

Table 7.5 gives the model summary of the regression analysis with boys' Piers-Harris 2 scores as the outcome variable. Very little variance in Piers-Harris 2 scores was explained by the blocks individually. The main contributor was the person model with 4.9%, followed by the process model (3.7%). The context block variables could only explain 1.2% of variance. Descriptive statistics for all variables included in the regression model can be found in Appendix W.

Table 7.5

C13 Boys' Piers-Harris 2 Scores

Model	Adjusted R^2	*SE* of the estimate	Sig. *F* change	R^2 change
1	0.001	7.83	*ns*(p = .072)	0.001
2	0.048	7.64	$p < .001$	0.047
3	0.06	7.59	$p < .001$	0.012
4	0.064	7.58	$p = .021$	0.004

Note. Model 1 relates to screen time. In Model 2, the person block was added, in Model 2, person characteristics were added, in Model 3 the process block was added, and Model 4 includes context variables. C13 = children's rating at Wave 2.

7.4.1 Screen time. Low screen time at age nine was not significant across any of the four models. High screen time was significant in the first model only. Boys who were in the high screen time group at age nine score 0.68 points higher on average on the Piers-Harris at age 13 ($p < .05$). However, this was not significant when person, process, and context variables were considered. We cannot reject the null hypothesis that screen time at age nine cannot predict overall Piers-Harris 2 scores at age 13 once PPCT factors are considered.

7.4.2 Person characteristics. As was the case in the age nine model, boys with learning difficulties tended to score lower on the self-concept scale. High emotionality and low sociability at age nine were predictors for lower Piers-Harris 2 scores at age 13; boys scoring low on emotionality at age nine had higher Piers-Harris 2 scores at age 13 on average. The only variable that reached the effect size threshold was learning difficulty, highlighted in bold in Table 7.6.

7.4.3 Process characteristics. Not being enrolled in any structured activities at age nine, having experienced bullying, and a primary caregiver with a non-authoritative parenting style, were predictors for lower self-concept scores at age 13. Boys scoring low on the Pianta conflict scale at age nine tended to have higher Piers-Harris 2 scores at age 13. None of the variables reached the 0.2 threshold.

7.4.4 Context characteristics. Low parental education at age nine was a positive predictor for Piers-Harris 2 scores at age 13, living in a single-parent family household and living in an urban area were negative predictors for Piers-Harris 2 scores at age 13. No variable reached the effect size threshold.

Table 7.6

Piers-Harris C13 Boys Hierarchical Regression

	M1	M2	M3	M4
	B(*SE*)	B(*SE*)	B(*SE*)	B(*SE*)
(Constant)	49.02(0.19)***	49.84(0.37)***	49.93	50.63(0.61)***
Screen time (ref:mid 50%)				
Low screen time	0.13(0.37)	0.20(0.36)	0.12(0.36)	0.02(0.36)
High screen time	-0.68(0.33)*	-0.39(0.33)	-0.30(0.33)	-0.24(0.33)
Health: Sometimes/always unwell		-1.67(1.34)	-1.40(1.34)	-1.35(1.34)
Chronic, physical, or mental illness		0.02(0.44)	0.34(0.44)	0.40(0.44)
Obese (according to BMI)		0.01(0.65)	0.13(0.65)	0.07(0.66)
Learning difficulty		-2.63(0.46)***	-2.38(0.46)***	**-2.30(0.46)*****
Temperament (ref:mid 50%)				
Low shyness		0.06(0.34)	-0.03(0.34)	0.03(0.34)
High shyness		-0.10(0.35)	0.00(0.35)	-0.08(0.35)
Low emotionality		1.19(0.32)***	0.80(0.34)*	0.75(0.34)*
High emotionality		-1.19(0.35)**	-0.95(0.36)**	-0.90(0.36)*
Low sociability		-1.29(0.35)***	-1.18(0.35)**	-1.10(0.35)**
High sociability		0.16(0.36)	0.11(0.36)	0.10(0.36)
Low activity		-0.69(0.39)	-0.59(0.38)	-0.60(0.39)
High activity		0.73(0.33)*	0.60(0.33)	0.61(0.33)
Drumcondra test scores (ref:mid 50%)				
Low reading score		-0.16(0.39)	-0.18(0.39)	-0.26(0.39)
High reading score		-0.67(0.35)	-0.59(0.35)	-0.56(0.36)
Low maths score		-0.73(0.38)	-0.51(0.38)	-0.52(0.38)
High maths score		0.04(0.35)	-0.06(0.34)	0.00(0.35)

	M3	M4
	B(*SE*)	B(*SE*)
Structured activities (ref:1-2)		
No activity	-1.00(0.48)*	-1.11(0.48)*
3+ activities	0.55(0.50)	0.59(0.50)
Number of close friends (ref:2-5)		
0-1 close friends	-0.57(0.53)	-0.47(0.53)
6+ close friends	0.26(0.37)	0.35(0.37)
Victim of bullying	-1.40(0.34)***	-1.30(0.34)***
Parenting style other than authoritative	-0.90(0.33)**	-1.01(0.33)**
Family time (ref:mid 50%)		
Low family time	0.08(0.32)	0.13(0.33)
High family time	0.67(0.35)	0.66(0.35)
Parent-Child relationship (ref:mid 50%)		
Low conflict	0.80(0.34)*	0.76(0.34)*
High conflict	0.15(0.36)	0.24(0.36)
Low closeness	-0.30(0.34)	-0.35(0.34)
High closeness	0.07(0.36)	0.16(0.37)
Low dependence	0.28(0.34)	0.12(0.35)
High dependence	-0.13(0.34)	0.01(0.35)

	M4
	B(*SE*)
Adverse life events (ref:1-2)	
No adverse life events	-0.06(0.34)
3+ adverse life events	-0.15(0.39)
PC meets depression cut-off point	-0.96(0.52)
PC level of education (ref:mid 50%)	
Low PC education	0.78(0.34)*
High PC education	0.71(0.38)
Household income (ref:2nd quintile)	
Lowest quintile	-0.21(0.47)
3rd quintile	-0.58(0.44)
4th quintile	-0.57(0.45)
Highest quintile	-0.65(0.46)
Single-parent family	-0.81(0.44)
Siblings (ref:1-2 siblings)	
No siblings	-0.26(0.50)
3-5 siblings	0.09(0.33)
Urban area	-0.51(0.29)
Neighbourhood safety (ref:mid 50%)	
Low safety	-0.65(0.35)
High safety	-0.23(0.33)

Note. Positive values indicate the variable was a positive predictor, negative values indicate a negative effect. Values in Model 4 highlighted in bold reached a 0.2 effect size. C13 = children's rating at Wave 2. M = model. *SE* = standard error.
$^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

7.5 Regression – Girls Piers-Harris 2 Rating (C13)

The summary of the regression analysis using girls' Piers-Harris 2 scores as the outcome variable is presented in Table 7.7. Individually, the process block could explain 6.4% of variance, the person block 5.5%, and the context block explained 4.2% of variance in girls' Piers-Harris 2 scores at age 13. Descriptive statistics for all variables included in the regression model can be found in Appendix X.

Table 7.7

C13 Girls' Piers-Harris 2 Scores

Model	Adjusted R^2	*SE* of the estimate	Sig. *F* change	R^2 change
1	0.003	8.73	$p = .003$	0.003
2	0.057	8.49	$p < .001$	0.054
3	0.088	8.34	$p < .001$	0.031
4	0.107	8.26	$p < .001$	0.019

Note. Model 1 relates to screen time. In Model 2, the person block was added, in Model 2, person characteristics were added, in Model 3 the process block was added, and Model 4 includes context variables. C13 = children's rating at Wave 2.

7.5.1 Screen time. Low screen time at age nine was a predictor of higher Piers-Harris 2 scores at age 13 for girls. Therefore we cannot reject the null hypothesis stating that screen time group affiliation at age nine cannot predict girls' overall Piers-Harris 2 scores at age 13 once PPCT factors are considered. In the first model, those in the lowest screen time group score 1.21 points higher on average ($p < .01$) than those in the mid group, reducing to 0.92 ($p < .05$) in the final model, when person, process, and context characteristics were considered (see Table 7.8). High screen time was not significant.

7.5.2 Person characteristics. Poor health and having a learning difficulty at age nine were a predictor for lower Piers-Harris 2 scores at age 13. High emotionality, low sociability, and low activity were also significant predictors for lower Piers-Harris 2 scores at age 13. The only variable that reached the effect size threshold was poor health, highlighted in bold in Table 7.8.

7.5.3 Process characteristics. Girls with 0-1 friends, 6+friends, and those who had been bullied at age nine tended to score lower on the Piers-Harris 2 at age 13. Scoring high on conflict at age nine was also a predictor for lower scores. Having 0-1 friends and high parent-child conflict reached the 0.2 effect size threshold.

7.5.4 Context characteristics. Being in the 3rd income quintile at age nine was a predictor for higher Piers-Harris 2 scores at age 13. Living in a single-parent household, having three or more siblings, living in an urban area, and living in a perceived unsafe neighbourhood at age nine were predictors for lower Piers-Harris 2 scores at age 13. The only variable that reached the 0.2 effect size threshold was single-parent family.

Table 7.8

Piers-Harris 2 C13 Girls Hierarchical Regression

	M1	M2	M3	M4
	B(*SE*)	B(*SE*)	B(*SE*)	B(*SE*)
(Constant)	46.17(0.21)***	47.66(0.41)***	48.90(0.52)***	50.19(0.69)***
Screen time (ref:mid 50%)				
Low screen time	1.21(0.37)**	1.12(0.36)**	1.02(0.36)**	0.92(0.36)*
High screen time	-0.10(0.45)	0.31(0.44)	0.57(0.43)	0.58(0.43)
Health: Sometimes/always unwell		-3.83(1.16)**	-3.27(1.15)**	**-3.04(1.14)****
Chronic, physical, or mental illness		0.26(0.56)	0.39(0.55)	0.46(0.56)
Obese (according to BMI)		-0.97(0.61)	-0.70(0.61)	-0.56(0.61)
Learning difficulty		-1.88(0.60)**	-1.40(0.59)*	-1.23(0.59)*
Temperament (ref:mid 50%)				
Low shyness		-0.40(0.41)	-0.30(0.40)	-0.22(0.40)
High shyness		-0.69(0.39)	-0.75(0.38)	-0.65(0.38)
Low emotionality		1.14(0.38)**	0.70(0.39)	0.63(0.39)
High emotionality		-1.86(0.39)***	-0.96(0.40)*	-0.79(0.40)*
Low sociability		-1.75(0.40)***	-1.66(0.40)***	-1.64(0.39)***
High sociability		-0.26(0.39)	-0.43(0.38)	-0.29(0.38)
Low activity		-1.21(0.40)**	-0.89(0.39)*	-1.00(0.39)*
High activity		0.44(0.41)	0.33(0.41)	0.18(0.41)
Drumcondra test scores (ref:mid 50%)				
Low reading score		-0.03(0.45)	-0.10(0.44)	0.06(0.44)
High reading score		0.22(0.40)	0.15(0.40)	0.11(0.40)
Low maths score		-0.96(0.43)*	-0.52(0.43)	-0.31(0.43)
High maths score		0.71(0.43)	0.74(0.42)	0.72(0.42)

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	M3	M4
	B(*SE*)	B(*SE*)
Structured activities (ref:1-2)		
No activity	-1.14(0.52)*	-0.84(0.53)
3+ activities	-0.42(0.44)	-0.44(0.44)
Number of close friends (ref:2-5)		
0-1 close friends	-2.90(0.56)***	**-2.58(0.56)*****
6+ close friends	-1.08(0.43)*	-0.92(0.43)*
Victim of bullying	-1.80(0.37)***	-1.60(0.37)***
Parenting style other than authoritative	-0.46(0.37)	-0.56(0.37)
Family time (ref:mid 50%)		
Low family time	-0.65(0.40)	-0.62(0.40)
High family time	0.59(0.36)	0.65(0.36)
Parent-child relationship (ref:mid 50%)		
Low conflict	0.33(0.39)	0.26(0.39)
High conflict	-1.90(0.40)***	**-1.88(0.40)*****
Low closeness	-0.48(0.43)	-0.45(0.42)
High closeness	0.13(0.36)	0.11(0.36)
Low dependence	-0.61(0.43)	-0.54(0.43)
High dependence	0.37(0.36)	0.43(0.36)

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	M4
	B(*SE*)
Adverse life events (ref:1-2)	
No adverse life events	0.01(0.40)
3+ adverse life events	-0.59(0.42)
PC meets depression cut-off point	-0.35(0.53)
PC level of education (ref:mid 50%)	
Low PC education	-0.02(0.37)
High PC education	0.01(0.46)
Household income (ref:2nd quintile)	
Lowest quintile	-0.29(0.49)
3rd quintile	1.17(0.49)*
4th quintile	-0.42(0.50)
Highest quintile	0.18(0.54)
Single-parent family	**-1.71(0.46)*****
Siblings (ref:1-2 siblings)	
No siblings	-0.53(0.52)
3-5 siblings	-1.04(0.38)**
Urban area	-0.93(0.32)**
Neighbourhood safety (ref:mid 50%)	
Low safety	-0.95(0.37)*
High safety	-0.67(0.38)

Note. Positive values indicate the variable was a positive predictor, negative values indicate a negative effect. Values in Model 4 highlighted in bold reached a 0.2 effect size. C13 = children's rating at Wave 2. M = model. *SE* = standard error.
**p* < .05, ***p* < .01, ****p* < .001.

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7.6 Cumulative Risk Score

The regression models offer a perspective about the potential influence various variables may have on individuals. They provide a number of risk and protective factors, characteristics that were related to children's socio-emotional outcomes. In the models, these variables were considered as individual actors. However, variables are not mutually exclusive. Many variables were covariates of each other, and when children fall into multiple categories of factors that were significantly related to the outcome, their impact was summated. To provide a picture of this summated impact, a cumulative risk score (CRS) was calculated. Taking the Wave 1 parents' SDQ scores as a reference, variables with a negative association were given a +1 score, variables with a positive association were given a -1 score. Then, all scores were added, which created a scale of cumulative risks. The average CRS score was 2.87 (*SD* = 3.81; *n* = 7,969), with scores ranging from -9 to 16. The distribution is shown below in Figure 7.7.

Figure 7.7 Distribution of the Cumulative Risk Score Scale

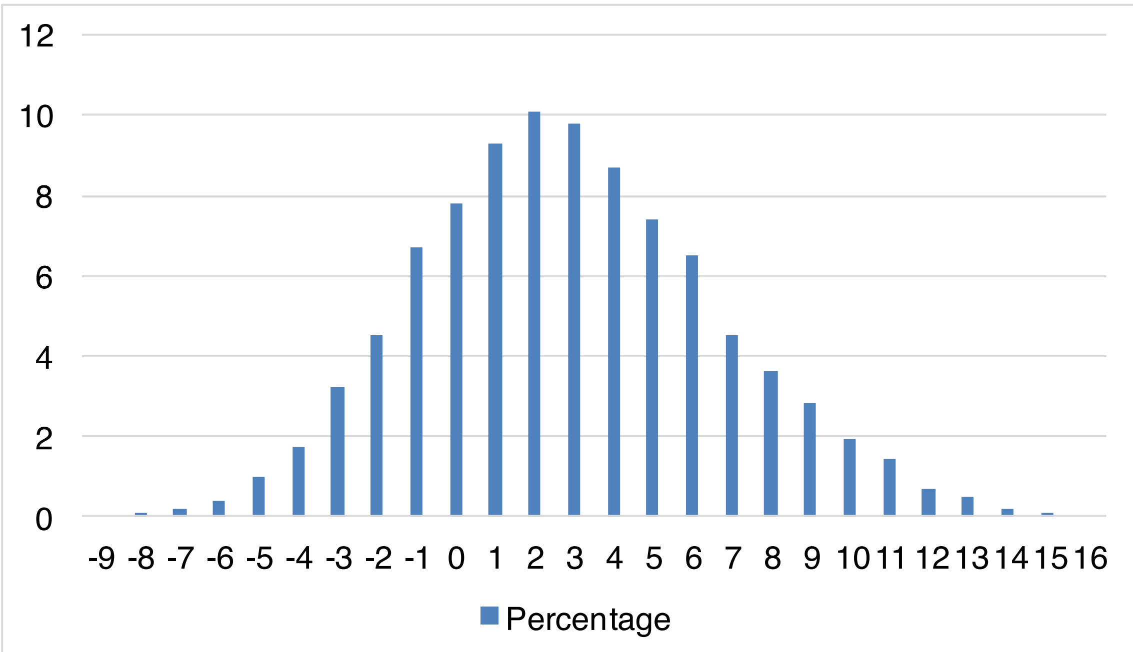

Figure 7.7. Distribution of cumulative risk scores.

Girls score higher on average (*M* = 3.14; *SD* = 3.74) than boys (*M* = 2.63; *SD* = 3.86). Both the boys' and the girls' high screen time group score above that average with

3.25 (*SD* = 3.81; *n* = 1,035) for boys and 4.08 (*SD* = 3.63; *n* = 639) for girls. Interestingly, while overall both low screen time groups scored the lowest on the CRS, the standard deviation among those groups were the highest. This indicates that among the low screen time groups, there was the most variation in risk; some scored very low, others scored very high.

There was a relationship between children's CRS and outcomes. There was a positive correlation between the CRS and SDQ scores, indicating that children with higher risk score tended to also have more behavioural difficulties. There was a negative correlation between the risk score and Piers-Harris 2 scores, the more risk factors children were exposed to, the lower their score on the self-concept measure. There was a strong correlation between the CRS and the parent's SDQ rating at age nine, a medium strong correlation between the CRS and parental SDQ rating at age 13 as well as teacher's rating at age nine. The relationship between the CRS and Piers-Harris 2 scores was small. Table 7.6 shows the correlations.

Table 7.6

Correlations between Cumulative Risk Score and Outcomes

	P9 SDQ Score	T9 SDQ Score	C9 Piers-Harris 2 Score	P13 SDQ Score	C13 Piers-Harris 2 Score
CRS (overall)	.610**	.368**	-.282**	.479**	-.221**
N	7,967	7,703	7,425	6,902	6,748
CRS (boys)	.619**	.384**	-.266**	.475**	-.180**
N	3,977	3,972	3,703	3,458	3,373
CRS (girls)	.615**	.382**	-.292**	.495**	-.242**
N	3,719	3,719	3,485	3,212	3,149

Note. Correlation coefficients are spearman's rho and significant at ***p* < 0.01 level.

7.7 Summary and Initial Discussion

Four years after Wave 1, the amount of screen time young people engaged with had increased. Young people tended to spend about one to five hours daily with screen time, and since time spent using the internet on devices other than the computer was not captured, this is likely to be more. Boys tended to spend more time with game consoles, while girls spent more time using the computer. They seem to have relatively unrestricted access to the internet and a range of devices where they can access the internet, often unsupervised. Comparing screen time at age nine and now at age 13, there was a relationship between the amount of screen time, those who spent more time with screens at age nine were also more likely to spend more time with screens at age 13.

Overall, there were some differences between the screen time groups, suggesting that screen time might have an influence on outcomes at age 13. However, the effect sizes were very small, thus the association between screen time and socio-emotional outcomes was rather small in this analysis. On the Emotional Symptoms subscale, there was a small effect and the effect of screen time on overall SDQ scores also reached the 0.2 effect size threshold for girls. The questions feeding into this subscale ask about nervous behaviour, worries, fears, and associated behaviour. Thus, this is in line with the variables that featured in the regression analysis, especially emotionality. However, as was the case with the age nine analysis, the bivariate analysis of screen time and outcomes neglects the rich context and other characteristics that may mediate a relationship.

In the regression analyses, screen time was only a significant predictor in one model. Girls who were in the low screen time group at age nine tended to score higher on the self-concept measure at age 13. However, the effect was very small. Some effects were stronger in the regressions with age 13 outcomes than they were in the regressions with age nine outcomes, most notably learning difficulty. This was the strongest predictor in all models, except for girls' Piers-Harris 2 scores at age 13. Chronic illness at age nine was a stronger predictor in the model with age 13 outcomes than it was in the age nine regression for boys' SDQ scores; poor health was the strongest predictor of girls' SDQ scores. This suggests that these person characteristics were influential factors in determining outcomes later on. Some variables were significant in the age 13 analysis, but were not significant in the age nine analysis. For example high emotionality and low sociability were significant across all four age 13 models.

Attributing effects to earlier events can be difficult, since it is possible that certain characteristics remain stable across time. This might not always be the case though. For example about half of the children with a chronic illness at age nine no longer had a chronic illness at age 13, although the number of children overall with chronic illness remains at a similar level. Thus, even though the characteristic had changed, the variable remained significant. This suggests that, even though some children were no longer diagnosed with such a difficulty at age 13, the impact of the earlier diagnosis lasted longer than the diagnosis itself. Another example is friends. Having 0-1 friends at age nine was a stronger predictor of difficulties at age 13 than it was at age nine, even though the number of children with few close friends had reduced and only a very few children who had no close friends at age nine still had no close friends at age 13. Thus, the argument could be made that some effects were not due to a persistence of a certain characteristic or situation, but rather the result of the earlier situation.

7.8 Overall GUI Discussion

While each model can be looked at and discussed separately, each one only relates to one perspective (parent, child or teacher) and to one time point. A comparison and discussion of all models offers the opportunity to consider those factors that weigh strongly across them. Some variables have stronger associations than others. Furthermore, a comparison of all models offers a perspective on differences over time. Some variables were significant in the age nine models, but not significant in the models with age 13 outcomes. There are also differences across perspectives, for instance high activity was a negative predictor in some of the SDQ models, but a positive predictor in some of the Piers-Harris 2 models. Some variables were only significant for boys and not for girls, or vice versa. It is important to keep in mind that the outcome measures were not the same across all models, and that comparing the SDQ with the Piers-Harris 2 warrants caution; however, both measures tap into children's socio-emotional outcomes. Since the aim of this study was to explore the relationship between screen time and socio-emotional outcomes, a full discussion of all significant variables is beyond the scope of this project. Nevertheless, some key patterns regarding person and process contributors are highlighted and explored.

7.8.1 Screen time. For girls, low screen time at age nine predicted fewer behavioural difficulties from the parent's perspective at age nine, and a more positive self-concept for girls at age 13. High screen time at age nine predicted more behavioural difficulties from the teacher's perspective at age nine, and from the parent's perspective at age 13. when other factors were considered, however, this effect was eliminated. For boys, the association was less homogeneous. The only negative association with screen time was for behavioural difficulties at age nine from the parent's perspective. High screen time also has a negative association with parental ratings at age 13, and boys' self-concept at age 13, but this effect was eliminated when other factors were considered. In contrast, low screen time had a negative association with boys' self-concept at age nine, and tended to predict behavioural difficulties from the teacher's perspective at age nine. It is important to note though that the association between screen time and behavioural difficulties and self-concept was very small; person and process characteristics tended to have a more significant association with outcomes for children, both at ages nine and 13.

At first glance, the gender difference in the association with self-concept seems at odds with the literature, since screen time is typically associated with lower self-esteem (e.g., Hofferth & Curtis, 2003). However, many of the earlier studies did not factor gender into their analysis. There are more recent examples of studies which have taken gender into account, and these do show differential effects for boys and girls. For example, Suchert and colleagues (Suchert, Hanewinkel, Isensee, & läuft Study Group, 2015) found that high screen time predicted lower scores on measures of self-esteem, physical attractiveness, and general self-efficacy among girls, but was a significant positive predictor for self-esteem among boys. In their sample of eight- to 13-year-olds ($N = 396$), Martins and Harrison (2012) found that television viewing was negatively related to girls' self-esteem, but there was no such relationship found for boys. Splitting the sample further for race, they found that television viewing was associated with a more positive evaluation of self-esteem for white boys only.

The authors offer some potential explanations for this effect. They discuss television content and highlight the different roles male and females play and how these might be reinforcing both gender and race stereotypes. White males typically portray strong and powerful characters, female characters tended to be portrayed as sensitive and emotional. Black males tended to be portrayed as unruly or jester-type individuals, black females are often portrayed as sexually available and exotic characters. This might explain why white boys may get a different message from television viewing than other groups. The particular data file of GUI data used in this analysis does not contain any information about ethnicity; therefore a comparison of differential effects for children from different ethnic background cannot be made. However, the gender issue may be a relevant factor in explaining the findings of this analysis.

Furthermore, Martins and Harrison (2012) offer another explanation which offers some insight into the positive association with low screen time among girls in the GUI study. Rather than just looking at the content of television and time spend with screens, it is possible that the effect was due to the displacement of other activities by screen time.

This suggestion is building on Harrison (2006), who found that children who watch less than 20 hours of television per week have more unique descriptors for themselves than those who watch more than 20 hours. If children and young people are missing out on other (non-screen) opportunities to define themselves, and explore their strengths and weaknesses, they might be overly reliant on television content for self-evaluation and comparison. There is some evidence for the displacement theory (Anderson et al., 2001; Neuman, 1995); for example, Hofferth (2010) found that children who spend more time with screens tended to engage with fewer non-screen time activities and sleep less. Thus, less screen time might be strengthening self-concept by allowing children to build their sense of identity and self-worth through other pathways that might offer better support. Combining these two possible explanations could explain the differential effects for boys and girls regarding screen time and self-concept. Exposure to affirming role models for boys might contribute to their self-development and identity building in a more positive way than for girls, thus girls might be more affected by the displacing of other activities by screen time.

In the questions relating to screen time, parents are asked about “a normal weekday during term time” (ESRI, 2010, p. 20). Therefore, it is assumed that the information captures a typical, everyday practices and proximal process. However, the data gave very little information about contextual factors, such as what types of programmes children watch, what kind of video games they play, the level of access to devices, and whether they tended to watch and play things by themselves or together with family or friends. These contextual factors are important to gauge the impact of screen time on children’s socio-emotional outcomes. In this analysis, all screen time is treated as the same, but given the opportunities as well as barriers and adverse effects discussed in the literature, more information is needed to refine the analysis and to draw conclusions.

7.8.2 Significant person contributors. Across most models, the person and process block had the largest influence on outcomes. Considering their importance in the PPCT model, this is not surprising. Person characteristics are resources, traits, and behaviours that influence and steer the interactions individuals have with their environment (Bronfenbrenner & Morris, 2006). They help initiate, establish and maintain proximal processes, but may also interfere with, hinder, or disrupt processes. Not all person variables were significant, but there are a few that stand out that warrant further discussion. One of the two variables that were significant across all models was the variable that relates to the question of whether or not the study child had a learning difficulty, a communication or co-ordination disorder. Along with bullying, this variable has the highest B value in the majority of models, indicating that falling into this category is associated with less favourable scores on the respective outcome measure. There is evidence in the literature supporting the relationship between learning difficulties with socio-emotional outcomes (Moll, Göbel, Gooch, Landerl, & Snowling, 2016; Nelson & Harwood, 2011; Wilson, Deri Armstrong, Furrie, & Walcot, 2009).

Among the learning difficulties reported by parents, the most frequent are dyslexia, slow progress or speech and language difficulties. This is consistent with the literature documenting an increased likelihood for individuals with dyslexia to exhibit emotional and behavioural difficulties (Maughan & Carroll, 2006), and low self-esteem (Alexander-Passe, 2006; Carroll & Iles, 2006; Edwards, 1994). It has been suggested that children underachieving in the academic realm due to their dyslexia may become more anxious, withdrawn, and depressed (Willcutt & Pennington, 2000). So these results are very much in line with previous findings. Having a learning difficulty might impact on the child's ability and the resources available to them to partake in school the same as their peers. In addition to a difficulty with resource characteristics, an anxious, withdrawn, and depressed demeanour would also influence the kind of reaction they will receive from their social surroundings, especially in novel contexts.

Children with a learning difficulty had a significantly higher score on the CRS on average, so they have a greater likelihood of also falling into other risk factor categories compared to children without a learning difficulty. When compared with all other variables included in the model, both boys and girls with a learning difficulties had the highest CRS with an average of 6.27 (*SD* = 3.87) for boys and 7.03 (*SD* = 3.74) for girls. This suggests that children with a learning difficulty have a very high risk of disadvantage in other domains as well.

The relationship between learning difficulties and screen time among boys is not straight forward. Proportionally, there are more boys in the low screen time group with a learning difficulty, and the high screen time group has the lowest percentage. The high screen time group scored significantly higher on the SDQ compared to the low and mid group, and a higher percentage of children reached the threshold for borderline or abnormal scores. While these figures might seem at odds with each other, they could also suggest that among boys, the relationship with learning difficulties is different depending on screen time group. Indeed, when only boys with learning difficulties are considered, a comparison of the three screen time groups shows that the high screen time group scored highest on the SDQ, followed by the low screen time group, and then the mid group. Thus, the relationship between learning difficulties and outcomes might be mediated by screen time. As has been discussed above, the relationship with self-concept followed a different pattern among boys. Regardless of learning difficulty, boys in the low screen time group scored lower on self-concept, but there was no significant difference among groups at age 13.

Learning difficulties are linked to scholastic ability. Academic performance was a significant predictor in many of the models at age nine. Being in the top quartile on either reading or mathematics was a significant positive predictor; being in the bottom 25% percentile group was a significant negative contributor. Mastery and competence are important factors in motivation and relate to wellbeing (Deci & Ryan, 2002; Legault, 2017), which may explain that performing above average in school was a beneficial factor for children, scoring low had the opposite effect. These effects lost their significance over time; at age 13, academic performance at age nine was largely insignificant, except for the parents' SDQ rating, where being in the top quartile in reading was associated with fewer difficulties for girls, and being in the top quartile for mathematics was associated with fewer difficulties among boys. There are three things to note: first, the (stereotypical) gender distribution of reading being more associated with girls and mathematics more with boys; secondly, children with scores in the lowest reading and maths quartile also scored high on the CRS on average; and thirdly, that a poor academic performance at age nine no longer carries weight regarding children's difficulties and self-concept four years on.

In the literature, the relationship between academic achievement and screen time is generally negative (Kavanagh et al., 2015; Zimmerman & Christakis, 2005). However, the focus is increasingly shifting towards other factors; for example whether children watch television by themselves or whether the family tends to watch programmes together. Generally, recommendations point towards limiting screen time and stress the importance of parental education on media literacy, and a more involved engagement where parents monitor, discuss and thus mediate media content (American College of Pediatricians, 2016; Bittman et al., 2011). Within the GUI data, there is only a limited amount of this kind of contextual information available. Children's screen time, and in particular the most popular activity of television watching, is only captured as the amount of time spent. To gain a better picture of habits and the culture around screen time, the contextual factors mentioned above need further exploration.

On-going chronic, physical or mental health problem, illness or disability was significant across all SDQ models. These results are consistent with other studies reporting that children with chronic illness are more likely to have an increased risk of emotional and behavioural problems (Hysing et al., 2007; Lavigne & Faier-Routman 1992; Pinquart & Shen, 2011; Witt et al., 2003). These results have also been observed in a study using GUI data (Reulbach, O'Dowd, McCrory, & Layte, 2010). Interestingly, chronic illness was not featured in the Piers-Harris 2 models, except for the boys' model at age nine, where it was actually a positive predictor for self-concept. The relationship between self-concept and chronic illnesses is not as clear as the relationship with chronic illnesses and behavioural problems (Pinquart, 2012). This could explain the difference in importance of this variable across the two outcome measures. Some reviews have found no effect for self-concept, while others have found effects but with smaller effect sizes than for analyses looking at behavioural problems or social and academic functioning (Pinquart, 2012).

The findings from Pinquart's (2012) meta-analysis also suggests that gender and age play a role, as well as the type of chronic illness experienced. There is a tendency for physically visible difficulties to have more of an impact than others. In the current data set, even though the association was positive, boys whose parents report that they have a chronic or on-going illness do in fact, score lower on the Piers-Harris 2 than peers who had no difficulty. Among those whose parents reported a chronic illness, the majority (46%) were suffering with a respiratory problem, followed by mental and behavioural (19%) problems (Williams et al., 2009). It is possible that the positive association was sparked by a third variable that was not included in the model and that may mediate the effect an illness might have on a child. A study from Turkey showed that there are differences in children with chronic illnesses regarding their self-esteem (Gültekin & Baran, 2007). They found that while longer stints of hospitalisation can be harmful to children's self-concept, children who knew a lot about their illnesses tended to have a higher self-concept than those who did not. It is possible that having a better understanding and some involvement in decision-making processes gives children a certain level of autonomy, which may be responsible for the boost in self-esteem.

Regarding the association with SDQ scores, a chronic illness can impact on resource and force characteristics and prevent the child in engaging in activities as their peers do (Bronfenbrenner & Morris, 2006). Depending on the level of restrictions the child faces, this can also impact on their level of autonomy. They may not be allowed to engage in certain activities because of their condition. Children with a chronic illness score high on the CRS, their average was in the top 25% quartile.

Some elements of temperament were significant predictors across most models, in particular emotionality and sociability. Low sociability and high emotionality predict more difficulties, low emotionality was associated with fewer difficulties. Temperament is a pivotal element in force and demand characteristics. High levels of emotionality, which relates to irritability and anger, and low sociability, which relates to low levels of surgency/extraversion, can interfere with the establishment and maintenance of good relationships with parents, teachers, and peers. There is some evidence for a link between temperament and behavioural difficulties, caregivers or teachers perceive children with difficult temperaments as more challenging (Bates, 1989; Chess & Thomas, 1989; Thomas, 1984). A difficult temperament is a combination of tendencies of negative emotionality, social withdrawal, non-adaptability, and high intensity. They can be a risk factor for psychosocial development; for example, by interfering with the establishment of a secure attachment, a good parent-child relationship, and friendships. A recent study found that infants with emotional temperaments are more likely to exhibit higher levels of behavioural difficulties at age five and a half (Abulizi, Pryor, Michel, Melchior, & van der Waerden, 2017).

Although a lot of research focuses on the problematic aspects of temperament and behaviour, there are studies that examined the other end of the spectrum. For instance one study found that children scoring high on sociability and activity, but low on shyness, tended to rate themselves as happier (Holder, Coleman, & Singh, 2012). In the current analyses there is a similar pattern; children in the high screen time group tended to score higher on shyness and emotionality, and lower on sociability and activity. Emotionality seems to be particularly influential; the average CRS score of children with high levels of emotionality was in the top 25% quartile, suggesting that emotionality could be contributing to difficulties in other domains. As a force characteristic, high emotionality may mediate the quality of children's engagements. Although no causal inference can be made, with the relatively strong association between high emotionality and CRS score, emotionality can serve as an indicator for a risk profile of behavioural difficulties.

The relationship between screen time, temperament and children's socio-emotional outcomes is not fully understood. There are studies which suggest; for example, that television viewing can be problematic and might be linked to hyperactivity and aggression (Christakis & Zimmerman, 2007; Manganello & Taylor, 2009; Mistry et al., 2007). The directionality, however, is less clear (Ansari & Crosnoe, 2016). On the one hand, it is plausible that children with difficult temperaments find it difficult to engage in certain activities and spend time in front of the screen. On the other hand, excessive screen time, a lack of interactions with peers, and missed opportunities to engage in other, more nourishing activities might be factors that shape temperament and emotion regulation strategies in the early years.

7.8.3 Significant process contributors. Proximal processes are at the heart of Bronfenbrenner's bioecological model and are the most important element in the model (Bronfenbrenner & Morris, 2006). Their pivotal position is supported by the findings of the GUI studies. They are the mechanisms that drive development. It is the interactions between the individual and their environment that are most influential on shaping the development of the individual. The characteristics, content, strength, and nature of these interactions supply the variation that is seen across different individuals.

For this analysis, proximal processes were mainly captured as interactions with family and peers. These bear a significant influence on the children's self-concept and behavioural difficulties, specifically variables relating to the quality of relationships with family and peers. Having fewer than two close friends was a negative predictor for behavioural difficulties for both boys and girls, and a negative predictor for girls' self-concept. This association was stronger in the models with age 13 outcomes, and more significant for girls. Bullying was one of the strongest predictors and significant across all models. Falling into the group with zero or no close friends, or having experienced bullying, was associated with a higher score on the cumulative risk factor. Friendships become increasingly more important during middle childhood and, since a lot of time is spent in schools, interactions and relationships with peers are an influential proximal process. Furthermore, friendships can be a major source of a feeling of relatedness and belonging.

The need to belong is considered an innate psychological need (Baumeister & Leary, 1995). A series of cross-sectional and experimental studies with undergraduate students showed that a strong sense of belonging predicted perceived meaningfulness of life (Lambert et al., 2013). As friendships and peer relations change in middle childhood, children tend to spend a considerable amount of their energy into the formation and maintenance of friendships. During this time, the concern for social acceptance and working on maintaining or increasing their social standing can develop into a heightened sensitivity to rejection in certain individuals (Parker, Rubin, Erath, Wojslawowicz, & Buskirk, 2006). On the one hand, this may lead to interpersonal difficulties and thus may be a pathway to more problem behaviours in some vulnerable children. On the other hand, children displaying high levels of aggressive behaviour can be more vulnerable to peer difficulties and rejection (Bierman, 2004 in Parker et al., 2006). No definite conclusions can be drawn about any potential mechanism in the relationship. It is possible that some children have a heightened fear of rejection and may act in irrational ways, which makes them even more susceptible to peer rejection. But it might also be the case that peer rejection causes some children to display more behavioural difficulties. It is also important to note that it is the parent's report about their child's friendships, and not the child's own report.

Interestingly, friendships were only a significant contributor in girls' Piers-Harris 2 models and not boys' models. Some authors suggest that girls' friendships are closer and more intimate during middle childhood when compared to boys (e.g., Rose & Rudolph, 2006). That might offer an explanation as to why friendships were featured in the girls' Piers-Harris 2 models, but not the boys' models.

Bullying has been established as a risk factor in psychological health and wellbeing and as a predictor for anxiety, insecurity, low self-esteem and self-confidence, and hypersensitivity among other indicators (Duncan, 1999; Hawker & Boulton, 2000; O'Moore, 2010). Moreover, the experience of bullying can have a long-term impact and increases the risk for mental health difficulties and psychiatric diagnosis later in life (Cowie; 2013; Kumpulainen & Räsänen, 2000; Reijntjes et al., 2011; Reijntjes, Kamphuis, Prinzie, & Telch, 2010; Sourander et al., 2016; Wolke & Lereya, 2015).

In the current analyses, bullying is a binary variable and does not give information about the amount of times the child has been bullied. It is important to remember that it is the parent reporting about whether the child has been bullied. The parental perspective might be different and they may have interpreted a story their child has told them as bullying. It is also possible, however, that they may not know about difficulties their child experiences in school if the child chooses not to disclose the information to their caregivers or teachers. The children were asked if they had been picked on; this was further qualified by a question on whether or not they were upset by it. The majority of the parent and child reports matched up. About two-thirds of children whose parents say they were bullied reported getting picked on and out of those, 53% said they were very upset by it. But 32% of children whose parents did not report bullying said they got picked on, and out of those, 33.7% said they were very much upset by it. So there is still a considerable number of children who reported having been very upset by getting picked on and their parents seemed unaware of that.

It needs to be noted that bullying features strongly in the analyses, despite the gap in matching reports of parents and children. This would also suggest that the real impact of bullying might be even higher. Assuming the child has experienced bullying in school, this could be an indicator that the network of people whom they spend a lot of time with might be problematic. It has been recognised that bullying is not just a simple dyadic interaction between the bully and the victim, but is a group phenomenon (Olweus, 2001). Thus, bullying might not be an isolated incident, but could be an indicator for an environment of competition and social comparison.

Some of the parent-child relationship variables come out strongly throughout the model. The most influential variable was conflict, with low conflict being associated with better outcomes across eight of the ten models. High conflict featured strongly in the parent's model at both time points, with high dependence and low closeness being negative predictors. Children scoring high on the Pianta conflict scale also tended to have a high CRS. The parent-child relationship gives some insight into the quality of proximal processes taking place in a daily basis within the home. Although children start moving towards peers for companionship during middle childhood, parents still represent a source of safety (Kerns, Schlegelmilch, Morgan, & Abraham, 2004).

Social relationships have been found to be important for wellbeing. A UK based study with over 6,500 10- to 15-year-olds found that the quality of children's social interactions is a major contributing factor to children's subjective wellbeing (Goswami, 2012). They considered family relationships, positive and negative peer interactions, and neighbourhood adult relationships. The biggest positive effect was found for family relationships, followed by positive friendships. The biggest negative effect was found for the experience of having been bullied.

7.8.4 Effect sizes. In general, the threshold of a 0.2 effect size was used to demarcate effects that are not merely statistically significant, but also bear a social significance. This is based on Cohen's (1988) commonly followed guidelines. However, it has also been recognised that this may not be an accurate classification and it is generally accepted that depending on the research design, sample size, and research field, different standards may be applied (Cooper, 2008; Durlak, 2009; Hill, Bloom, Black, & Lipsey, 2008; Pagani, Lévesque-Seck, & Fitzpatrick, 2016; Pagani, Lévesque-Seck, Archambault, & Janosz, 2017).

Pagani et al. (2016) argue that small effects can have a substantial impact when considered over a lifespan and across the population. In their analyses of a longitudinal data, their effect sizes range from 0.06 to 0.19, but yet are considered "modest, yet non-trivial" (Pagani et al., 2017, p. 628) by the authors. This would suggest that small effect sizes should not be rejected as bearing no substantial significance. In fact, analyses of effect sizes in social psychology showed that the average effect size was 0.21 (Richard, Bond, & Stokes-Zoota, 2003). A similar analysis into effect sizes in management shows that the average effect size was .23 (Paterson, Harms, Steel, & Credé, 2016). According to their analysis, an effect size of .31 would be in the 75th percentile, and anything above .51 would be in the 95th percentile.

If there is a lack of consensus on effect sizes within sizes, it is hardly surprising that media reports report tend to inflated findings. Strong, sensationalist headlines draw in readers, and in addition to issues around effect sizes, significance is often equated with p values, which do not give any indication of the magnitude of an effect at all (Sullivan & Feinn, 2012). Furthermore, there is a certain element of subjectivity involved in statistical analyses, which means that even with the same data set and the same research questions, different approaches can yield different results (Silberzahn & Uhlmann, 2015; Silberzahn et al., 2018). Considering all these factors, it is unsurprising that research findings disseminated to the public often fail to portray the relative significance of statistical analyses.

7.8.5 Limitations. There are several limitations to the GUI studies. Some are related to the data: first, as already mentioned, the measurement of screen time at age nine is only captured as time spent with watching TV, videos, and DVDs, using the computer, and playing video and game console games. There is no additional contextual information available regarding the where, when, what, and who with of the matter. Furthermore, the offered options are rather broad, so for example if a parent responded "1 hour to less than 3 hours" on each of the three category, this may be anything from three hours up to almost nine hours of screen time, but was treated as the same in my analyses. A further issue is the age of the data. With digital technology expanding rapidly, information regarding screen time may no longer be applicable to today's nine-year-olds.

In relation to the analyses, the regression with outcomes at age 13 does not take into account screen time at age 13 and does not factor in changes in PPCT factors during the intervening period. Further analysis could explore the relationship between screen time and socio-emotional outcomes with the inclusion of age 13 variables.

7.8.6 Conclusion. The GUI analyses suggest that, while there are some associations between screen time and children's socio-emotional outcomes, these associations are small, and variations in the SDQ and Piers-Harris 2 are better explained with associations to person and process characteristics. This highlights the importance of adopting a bioecological lens when investigating processes that are integrated in a complex network. Considering the prevalence of issues regarding screen time in popular media, and the likelihood that screen time engagement among primary school children has changed since 2007/2008, screen time needs to be considered in family contexts. The following study's aim was to gain some insights into children's engagement with screen time, and how parents navigate decision-making around digital devices in their homes.

8 Study IV: Parents' Views of Screen Time

Analyses of the GUI data provided a detailed description of overarching patterns, key influences, and mediators of the relationship between screen time and children's social and emotional outcomes. They also illustrated the complexity of the dynamics between different person, process, context, and time factors. The interactions between different variables and the mechanisms of decision-making can only be understood by adopting a more holistic approach. The aim of the qualitative study was to further delve into issues relating to content and types of screen time, affordances, parental values, beliefs, concerns, and influences on decision-making processes. The analysis of these issues adds another angle to the complex issue of screen time; and to the significance it has gained as a proximal process in children's lives. Exploring the ways in which parents navigate screens and digital devices can provide a richer and more in-depth picture of the role screen time plays in modern family life.

In the GUI data, the main screen medium at age nine was television. But with the rapid expansion of digital technology (Central Statistics Office, 2016; Weckler, 2015), this might be different for nine-year-olds today. The aim of the qualitative study was to ascertain information about the type of screen time children are engaged with and the content children are accessing. As discussed in Chapter 3, many studies (including the current GUI studies) use quantity as a measurement of screen time, i.e., the amount of time spent with various screens and digital devices (e.g., Allen & Vella, 2015; Russ et al., 2009). Studies that do take into account content, or the *quality* of screen time, tend to suggest that it is important to go beyond the crude measure of screen time quantity to measure potential impacts. A number of studies with young children suggest that the content of television programmes matters, and while some television shows may have a negative effect, others can make a positive contribution (Lillard & Peterson, 2011; Lillard et al., 2015; Zimmerman & Christakis, 2007). A meta-analysis found positive effects for studies investigating the association between watching television with prosocial content and children's social interactions, altruism and levels of aggression and stereotyping (Mares & Woodard, 2005).

The GUI data contain a lot of contextual information but cannot provide an illustration of the unique dynamics of proximal processes in individual families. According to Bronfenbrenner (Bronfenbrenner & Morris, 2006), these frequent and sustained interactions are an integral part of children's lives and there are a few different issues at play that need further exploration. One of these relates to affordances. Affordances vary depending on the physical and social environment of children and their families, and pre-established structures; different individuals will have different opportunities and restrictions contingent on what *fits* best into these contexts. These structures may be the physical environment, such as the area they live in, access to playmates, or outdoor spaces. Furthermore, many activities need to be negotiated to fit into the family's overall schedule. This is likely to be dominated by parental work commitments, but will also be affected by other variables, for example siblings' activities. The nature of these contexts are complex and dynamic processes. There are certain elements that are rather fixed, for instance family's living arrangements. Others are more fluid, or variable, and connected to parental beliefs, attitudes, values, and behaviours.

As has been explored in Chapter 3, parents' guidance, control and monitoring, and incentives and modelling also impact on children's activities and screen time behaviour (Jago, Edwards, Urbanski, & Sebire, 2013; Norton et al., 2003). Collectively, these behaviours influence social affordances. Attitudes, normative perceptions, and social pressure are significant predictors of parents' intentions to restrict television viewing (Bleakley et al., 2013; Hamilton et al., 2015). These dynamics must be understoond in order to gain a more holistic picture of screen time in context. Parents are often gatekeepers to children's access to screen time, and the family environment shapes affordances. If parents and young people are to be adequately supported as they negotiate childhood in the digital era, the views, concerns, and strategies of parents need to be explored.

As already mentioned in Chapter 1, the public discourse around screen time does not simplify the issue. On the one hand, technology is being portrayed as the catalyst for a modern society (DCCAE, 2018a). Technology, particularly in the form of tablets, is part of everyday lessons in many school; indeed, initiatives like encouraging primary school children to learn how to write code certainly convey a message that the ability to manipulate and interact with digital technology is not just desired but essential (DES, 2017, 2018b). On the other hand, there are media reports making exaggerated claims about detrimental effects of excessive screen time (e.g., Gibson, 2016; Kardaras, 2016; Pells, 2017). Thus, parents are likely to have competing views around digital technology or may be unsure due to juxtaposed messages.

The qualitative study's aim was to explore affordances; one objective was to get some insight into family structures and the type of fit that has been created by family dynamics, as well as opportunities afforded by the environment. In addition to the physical aspect of affordances, a pivotal interest was also to explore parental beliefs and attitudes towards their children's activities and screen time in particular. This includes parental values, priorities, thoughts, preferences, and concerns. Concerns are pertinent in light of one of the issues raised in the literature review: the way childhood has changed regarding access to space and activities (Clemens, 2004; Elkind, 2008; Veitch et al., 2006). Parental concerns about safety, a decline in adequate play spaces and competing activities have been discussed as a potential vehicle of these changes. These variables tie into the affordances components discussed. Parental concerns are impacting on the decision-making processes and familial proximal processes. Therefore, the aim of the quantitative study was to explore parents' concerns for their children, and concerns parents have around their children's screen time engagements.

Furthermore, the objective was to explore some of main influences on parental decision-making. No decisions are made in a vacuum and therefore the study sought to uncover what sources influence parents' views and behaviours. This may pertain to advice seeking, decision-making, or external influences such as the school community, friends or family. It may also relate to influences discussed above, such as perceived social norms, and positive and negative messages about screen time. Another source of influences comes via the children. As children grow older, they are also increasingly influenced by peer norms, and there is research suggesting that sedentary peer norms are associated with increased screen time (Hoyos Cillero, Jago, & Sebire, 2011). Negotiations around access and use of digital technology is not just influenced by parents' beliefs, but also by children's own beliefs and their friendship groups are an influential factor. Parents often struggle to set screen time limits, even if they think that there is value in doing so (Jordan, Hersey, McDivitt, & Heitzler, 2006) and children's perceptions of peer norms are likely to be a barrier in these endeavours.

8.1 Steiner Education

The *Digital Strategy for Schools 2015-2020* is actively pursuing the integration of information and communications technology (ICT) in primary school classrooms "to enhance teaching, learning and assessment so that Ireland's young people become engaged thinkers, active learners, knowledge constructors and global citizens" (DES, 2015, p. 12). While the implementation brings its own challenges (see e.g., Irish National Teachers' Organisation, 2015), the general premise of ICT as an enhancement of the learning experience during the primary school years is not shared by all. One example of an educational philosophy opposed to the early use if ICT is the Steiner or Waldorf school movement. There have been a number of media accounts over the past year in relation to this topic, particularly with a focus on a Steiner school based close to Silicon Valley, California, where there is a very high concentration of ICT related companies and businesses. Many parents working in the information technology industry in this area choose to send their children to the ICT-free Steiner school, deliberately opting for a system that excludes digital devices in the classroom in the early years (Hoyle, 2018; Jenkins, 2015; Richtel, 2011).

Considering these opposing approaches then makes for an interesting comparison between parents of children attending public schools, and parents of children attending Steiner schools. Steiner or Waldorf schools are based on the philosophy of Rudolf Steiner (anthroposophy), who started a school for the children of a cigarette factory in Stuttgart, Germany, in 1919 (Kiersch, 2015). Three principles are considered key in the development of children: thinking (intellectual and cognitive), feeling (artistic and creative), and willing (manual and practical). Therefore, a typical Steiner curriculum is filled with a lot of exploratory and hands-on experience. Children do not use textbooks; they create their own books and learn many practical skills and crafts; for example, gardening, woodwork, metalwork, and needlework. A thorough account of Rudolf Steiner is beyond the scope of this project, but can be found elsewhere (e.g., Angus, 2011; Childs, 1991; McDermott, 1984; Steiner, 1894/2000; Trostli, 1998).

The main reason for choosing Steiner schools was the exclusion of ICT in the primary school curriculum. Steiner pupils only start with ICT when teenagers (Kullack-Ublick, Hübner, Schönstedt, Glaw, 2015; Straube, 2000). The Steiner philosophy takes a holistic view of education and, in preparation for media competency, “[t]he aim is to enable children to practice and train their ability to do things physically and experience things emotionally, and thus their will, in many different ways“ (Kullack-Ublick et al., 2015, p. 11). The argument is, that children and young people first need to acquire a certain skill set that helps them navigate the world before ICT is introduced. It is the media abstinence of earlier years that aids children in developing media competency later on. It is likely that parents of children attending Steiner schools have a similar personal philosophy. More importantly, through the school community, parents have a different kind of context and might have different normative perceptions, based on this very conscious choice of alternative schooling for their child. The methods of this study are described in subsection 4.5.

Research questions:

- How do parents navigate the digital lives of their school-aged children?
- How do parents make decisions around screen time use? What kind of limits, rules, and restrictions are imposed and how?
- How do the affordances created by children's physical and social environments impact on children's pastimes?
- What are the key influences on parental views and behaviours?

8.2 Findings

The 12 parents interviewed constituted a fairly homogeneous group in terms of their education, age, and general family composition. All lived together with their respective (other sex) partners. Nine were Irish born, three were born in another European country, but have been living in Ireland many years and their children had been born in Ireland. There was some variation with regard to neighbourhood, about a third lived in a town, another third in rural areas, and the final third lived in small towns or villages. Only one parent lived in a suburban setting. Table 8.1 gives a grid of parents' characteristics.

Table 8.1

Grid of Parental Characteristics

Name	**Sex**	**Children**	**Area**	**School**	**Age**	**Highest Level of Education**
Paul	M	F21, F17, F15, **F9**	small town	Public	50-60	Masters
Kathryn	F	M13, **F11, M10,** F5	town	Public	40-50	Degree
Jordan	M	M13, **M10**	rural	Public	40-50	Masters
Marie	F	**M11, M8**, F5	town	Public	40-50	Degree
Adele	F	**F10, M8**	town	Public	30-40	Masters
Anna	F	**M10, F7**	rural	Public	40-50	PhD
Laura	F	**F9**, F4	suburban	Public	30-40	Apprenticeship
Maggie	F	F13, **M11**	rural	Steiner	40-50	Degree
Sharon	F	**M12**	small village	Steiner	40-50	Community College
Joelle	F	**M11, M9**	rural	Steiner	40-50	Degree
Cora	F	**M11, M8**	town	Steiner	40-50	Masters
Martha	F	**M10, M6,** F2	small town	Steiner	40-50	Masters

Note. Pseudonyms and descriptions of participants.

Combined, the 12 parents had 29 children ranging from two to 21 years of age. Of those children between seven and 12 years of age, five were girls, 13 were boys. While parents have been given pseudonyms, their children are described by age and gender only. In some instances, name and gender of a child are indicated by an abbreviation; for example M8 is an eight-year-old boy, F10 is a 10-year-old girl.

8.2.1 Neighbourhood. Parents were asked about their neighbourhood, whether it is safe to play outside and whether there are other children around to play with. All parents said that there were opportunities to play outside. They either lived in the countryside, have a big garden, access to a green area in an estate, a playground, or a football pitch. Most parents also said their children can play independently outside; only two parents said that they would watch them when they are playing outside or check continuously. One issue that arose were playmates, only four parents said that there were children of a similar age in the neighbourhood to play with. A few parents also mentioned that while there is the opportunity to play outside, their children tended to find it somewhat boring to do so, unless they had friends over.

8.2.2 Types of screen time. The types of screen time accessed reflects the change described in the literature toward a more diverse landscape of digital device usage. Television was the main type of screen time accessed by nine-year-olds in the GUI data, while in the qualitative data, screen time was divided between television, tablets, and game consoles. At a first glance, access to these three types of screen time was the same for the majority of children in this sample.

All children watched television, although most parents (nine out of 12) said they do not have a regular TV, so children either watched DVDs or selected shows and movies from a movie box or a subscription service. The majority (nine out of 12) also had a game console. Most children also owned, or had access to, a tablet (10 out of 12). Only a minority of children had mobile phones, and the phones' functionality was restricted. One child (M11) had no SIM card in his phone, three children had a phone with a SIM card, but no access to the internet (M11, F10, M8). Some of the children may have had access to their parents' or siblings' phone at times.

8.2.3 Content. Broadly speaking, there were four different types of engagement with screen time overall: *watching*, *playing games*, *interacting*, and *finding information*. Aside from classic content, such as movies, DVDs, cartoons, and family shows, many children watched YouTube content. Unlike television content, these typically follow a different format and are specifically made to be uploaded on the platform. Popular YouTube content are videos about gaming, where the video creators either discuss games or record their own playing (called "Let's Play" videos). The other type of content that was frequently mentioned were pranks, or jokes, and videos about animals, or sport. Games were either played with a game console or a small digital device such as a tablet or a mobile phone.

Minecraft was the most frequently mentioned game (or similar games like Roblox), but other games were mentioned too; for example virtual football, racing, or farming. Some parents also mentioned little app games (e.g., Talking Tom). Typically, interacting involved an engagement with messaging apps –these are apps which allow users send pictures to each other, or apps where other content is uploaded, such as dances. Children also used the internet to find information, often together with a parent. This typically related to school work, toys, public figures, sports, and so on.

8.2.4 Level of access. The major difference among the sample was the level of access to screen time and digital devices. In general, there were three different family profiles in the sample: families with little restrictions around screen time, families with a medium level of screen time restrictions, and families with significant restrictions. Within these profiles, there was variability, and a certain level of fluidity and mutability; exceptions were made, and rules could be changed. However, considering the level of access through these three different profiles provides a structure to discuss the descriptions of family rules around screen time.

In families with little screen time restrictions, there were no fixed rules around the amount of time children were allowed to spend with screen time. However, parents might ask children to stop if they felt they have been on a device for too long. Kathryn commented:

> I don't have a time or anything on it, I have [the PlayStation] literally in the playroom just off the kitchen, so I can kind of more monitor it I guess, to a certain extent, and if there is a gang of them in there […] I am like, 'Right, out you go'.

Children were given access to the internet, albeit not always unrestricted, but parents tended to be lenient. One frequent topic mentioned by these parents was trust, which will be discussed in more detail further below.

Many parents have set a fixed amount of time that their children can spend with screen time each day, thus applying a medium level of restrictions. This was typically one or two hours. These time regulations typically applied to screen time in general, children were allowed to pick whether they would like to spend the time watching television, playing with their game console, or access games and videos on a tablet. There were restrictions around content, children were only allowed to access content suitable for their age; they could not access the internet independently, or bring devices to their bedrooms. In some instances, screen time was described as a kind of currency; for example, Laura and Marie used screen time as a reward or a punishment for behaviour. Laura said that when her nine-year-old daughter "is really bold […] that's how we punish her, she can't have the iPad for a week. If she has done something really bad, like really hitting her [little] sister, she won't have it for a month".

In some families, there was a significant level of restriction. Television was restricted to the weekends, and children either did not access the internet at all, or only together with their parents. Some were allowed to play for an hour with their game console during the week. Parents tended to be very conscious about content and strict about disallowing access to content that is not age appropriate. This also meant that siblings of different ages were afforded different levels of access to movies and games. For example, Cora's eight-year-old son was not allowed to play certain games on the game console that her 11-year-old was allowed to play; Joelle's nine-year-old was not allowed to play on the game console at all, but his 11-year-old brother was allowed.

There is variation and fluidity across the three profiles. For example, Jordan was working on a major project at the time the interview took place, and explained that while he used to time his sons' screen time, he now lets them have more so he can complete his work. He added that "[the situation] should come back around in another few months when things are more normal". Marie acknowledged that they started out with different rules but have since adjusted them:

> We have a strict policy in our house that tablets have to be seen, so there's no hiding in the bedrooms. They did [take them to the bedroom] at first, but we've pulled all that. They have to be seen. So they're downstairs and they can put earphones on, but they need to be able to be seen.

Parents spoke about learning from experience and parents adjusted rules as they see fit. This change could be an increase in access, or disallowing certain activities and restricting access or tightening rules, if the previous arrangement did not work out for them.

Adele and Laura disallowed their children to play a certain game, or use an app, after they had learned something they were unhappy about. Adele described this fluidity and evolution by saying that "being a parent is a process, and it's actually an educational process, because you are learning *from* children, but you are also learning *with* children, and you are learning *for* children. So there's […] these three dimensions, you know".

8.2.5 Navigating screen time. There were a lot of commonalities between the parents interviewed. Not surprisingly, parents wanted their children to be well physically, emotionally, and socially; they put effort into caring for them, into protecting them, and encouraging them to do activities that they feel are beneficial for their children's wellbeing and development. As briefly discussed in Chapter 3, the aim is to equip children with the skills and knowledge to navigate adulthood successfully, but also to enjoy being in the here and now. There were subtle differences between parents, reflecting the multitude of definitions of what exactly success entails. Parents' specific attitudes were typically congruent with their own lifestyle or philosophy. For example, Kathryn described that "on a Sunday afternoon, I would be one of those to go out all the time and do something". Throughout the interview, she also mentioned multiple times that she likes her children to be involved in sports and in the community, which reflected her own preference for an active engagement in different things.

Jordan expressed a preference for a less materialistic way of being, explaining that: "We're not bothered with having bigger TVs and loads more stuff [...]. When we can keep the place warm and everybody fed, we're happy enough, you know". In relation to his two sons' (13 and 10) after school activities, he explained that "there's plenty more, there could be plenty more for them to do but they weren't too pushed, so we just let it go because you could spend your whole life bringing them here and there [...]". Jordan's sons were involved in a few structured activities, and he said while organised extracurricular activities have their benefits, he likes seeing his 13-year-old son cycling with his friends; to have "this little bit of freedom [...], and let them work things out for themselves [...]. I think that's good for them, that's better than organised stuff, that they just find their own way".

Many parents actually voiced that they do not want to overschedule their children, Marie said that she "[prefers] them to go off and play and have their down time". The majority of parents shared the view that children benefit from some unstructured and child-led play. A number of parents also mentioned that their children enjoyed joining activities that they engage in, such as working in the garden or cooking.

In relation to screen time, three themes were identified and are discussed below: Concerns around screen time, strategies to manage concerns, and influences on both parents and children. Figure 8.1 shows the themes identified.

Figure 8.1 Identified Themes

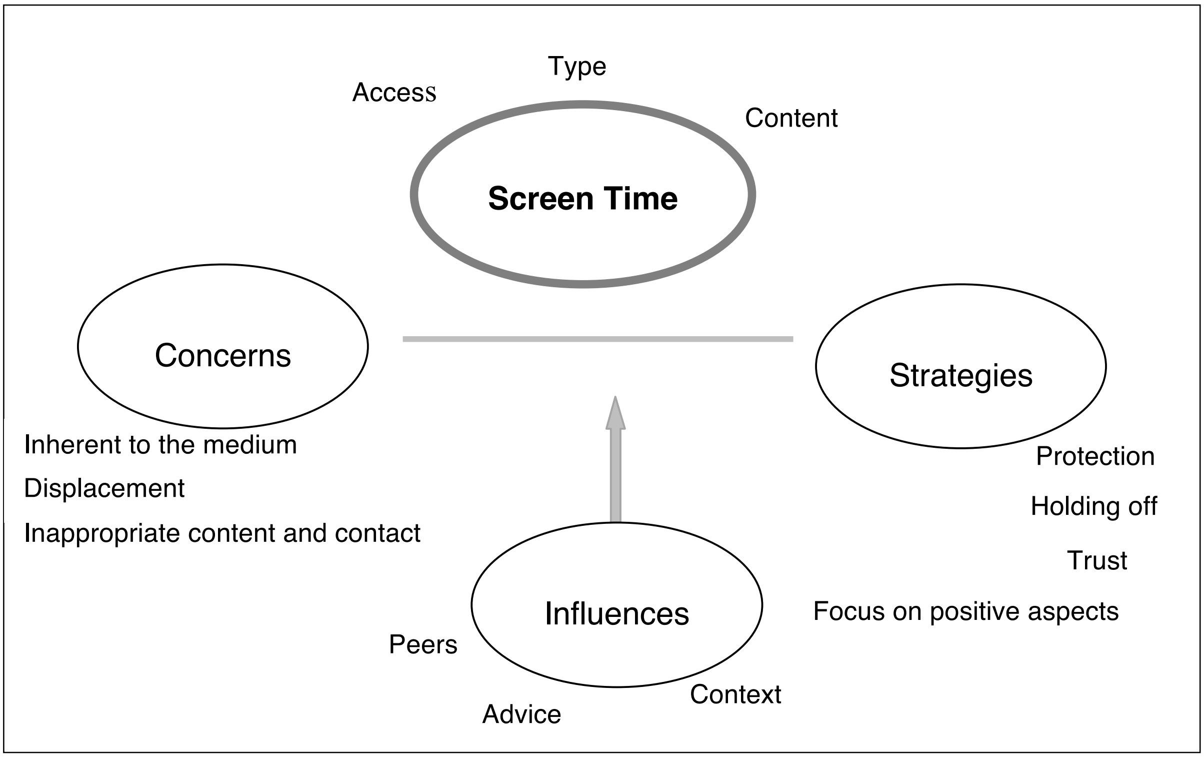

Figure 8.1. Themes identified in the thematic analysis.

As illustrated in the right-hand section of Figure 8.1, concerns about screen time included concerns about aspects inherent to the medium, displacement of other activities, and inappropriate content and contact. In an effort to navigate screen time rules and manage the concerns and challenges, parents used a range of strategies which will be discussed under four headings: protection, holding off, trust, and focus on positive aspects of screen time. This process was influenced by a number of factors (shown in the mid section of Figure 8.1), namely peer pressure experienced by the children, and input from different sources of advice. The context and the community that parents are part of were also influential factors, and the Steiner school parents have chosen a particular context. By consciously selecting their school community, they circumvent some pressure points other parents experience, since the level of access to screen time seems more restricted among Steiner school children in this sample.

8.2.6 Concerns around screen time. All parents interviewed acknowledged in one way or another that they believe that too much screen time would have, or did have, a negative impact on their children. Many expressed this with a generalised statement about how they did not want their children to be "glued to" a screen for too much time. Negative aspects about screen time ranged from concrete situations parents had experienced to concerns about what may come or what may happen in the future. Some parents suggested that screen time is addictive and seductive, and voiced concerns that both the mode of delivery and the content draws children in. They feared that this could have negative consequences. These concerns then served as a rationale to limit the amount of time children spent with different digital devices or provided the justification not to allow access to certain types of screen time, especially activities that have an online component to them.

8.2.6.1 Aspects inherent to the medium. Parents expressed concerns about the medium of screen time. Adele described having difficulties getting her son (8) to stop playing his computer game when she asks him to, and how upset he gets when he needs to stop playing. A caveat in her opinion is that, if friends call around to invite him to play, he stops immediately. Explaining why she does not want her son (11) to have a phone, Joelle responded that she "can see how addictive it is; I'm on my stupid thing all the time". Jordan reflected on why television has such a draw, especially for children:

> [W]e're programmed to pay attention to movement and colour […], if something moves you catch that out of the corner of your eye, straight away you're programmed to pay attention to it and I think that's kind of what they're getting out of this and there's all the light […] and the movement and it's kind of seductive but there's no substance to it so they want to keep doing it but they're not having great fun […]. When you kick them out in the garden, then you hear the laughing and, you know, I think the same thing happens with TV, it's while you sit in front of the TV, when it's absolute rubbish, you just sit there watching it like, because it clicks into that part of your brain and you're getting the constant sensations and stuff, but

> there's no substance behind it, there's no *story*, you know, it's just flashing lights, and I think that has a big effect on kids more so than adults. We're easier able to put them down and go and do something else but it's not as easy for them.

Unlike Joelle, Jordan believed that adults are better able to withstand the seduction of screens. He also questioned the level of satisfaction children get on balance from playing computer games. He explained:

> [A]t the end of hours of [playing], they're not content with [it]. 'Ah that was great I played that game for a few hours and I did really well'. That doesn't come into it. It's like you're stuck, it's like taking a drug off them. 'No I want that, I want that' 'Well you can't have it' and then they're grumpy for a while, and they get over it, but […] it's not like finishing a game of football and chatting about it afterwards how great the game was. It doesn't matter that you've played for four hours, it's just the fact that you're taking it off me now, 'I want to keep doing this' and the thing you keep hearing […] is 'There's nothing to do, there's nothing else to do', and I think that's because this is so exciting in a very superficial way; it's so exciting that everything else around it seems dull, you know, that when you turn off these flashing lights then it's just back to the plain old world that isn't flashing, you know, and […] I can see it in the future, you know, in 20 years' time, a whole list of new psychological ailments coming to the fore from kids who grew up with their faces stuck in screens, you know.

Much like Jordan's evaluation on the mood succeeding screen time, Laura said that when she observes children playing with an iPad "they never share and are always in a horrible mood after, always". Jordan also felt that his sons get cranky after a couple of hours of playing with their game console, that it affected their mood, and that they were grumpy when told to stop.

Paul, Joelle, Martha, and Cora mentioned the risk of radiation from mobile phones; Paul said that while the effects are unproven, because the devices have not been used long enough, he thinks “it fries your brain”. Martha was of the opinion that screens are not good for brain development, and explains that screens are interfering with the ability to concentrate.

> [I]t’s the screen who tells your mind all the time ‘look here, look there, go down, go up’, it’s not the mind [that is] in control, it’s the screen who is in control of your mind, you know. So kids who are hours and hours and hours of playing, then when they stop that and they close their eyes they are just not able to concentrate, you know. The theory is that […] you can get [Attention Deficit Disorder] […] from that. […] your mind is just not trained to […] focus on something, your mind has been trained to be like a monkey mind directed by a screen, you know, ‘look here, look there.’

Cora and Sharon mentioned that the mode of screen time intake is passive; Sharon explained that she prefers to see her son using his own creativity and skills, rather than watching somebody else be creative.

8.2.6.2 Displacement. Many parents mentioned that their children spent too much time with screens, or that they would spend all day in front of a screen if allowed. Some alluded to the concept of displacement, expressing that they felt that their children were losing out on other experiences that would be more beneficial for children than spending it with screen time. Paul felt that spending too much time in virtual environments may impact on social skills and the “ability to deal with problems and situations, because it’s a false… it’s not a life, it’s not real, you know? You’re looking at a screen, it’s not real”. Marie and Adele said that they felt that their children were influenced by some of the content, and they did not like it. Adele described a type of reality show her children watched that is about an American family living an opulent lifestyle and observed her children imitating the show's characters, including the accent.

Paul said that children should have a variety of things and that "there's loads of other things that [F9] could be doing instead of just looking at the screen"; for example, homework, reading, playing outside, mixing with friends, or baking a cake together. Jordan also described computer games as having "no value" and that the time spent playing the game could have been used to read or learn something, or being outside to get some fresh air and a bit of exercise. The argument of screen time as a sedentary activity was mentioned by two more parents. For example, Martha said that children need to move and play, and that the computer makes them sit still.

8.2.6.3 Inappropriate content and contact. All but one parent mentioned inappropriate content as one of their concerns about their children's level of access to screen time, and within that, the internet was featured particularly frequently. Specific references were made to four areas: violence, advertisement, negative body image, and pornography. Laura and Adele mentioned violence. Laura tried to control the range of programmes her daughter (9) watched to avoid exposure to violence. Adele mentioned that her husband sometimes played a shooting game on the game console with the children and she did not approve of this.

Clicking on advertisements brings the user to a different page, one that may not be appropriate. Concerns about advertisements were usually linked to their content, specifically explicit images, or messages, that parents wanted to avoid. Joelle said that advertisement typically "very much focuses them on how they're looking and how other people are looking, and how many followers you have, and this false sense of 'oh, they're more popular' ". Sharon described images she saw on a movie streaming website as "derogatory to women" and felt that these images gave her son (12) wrong ideas. Laura's nine-year-old daughter had been using snapchat on her father's phone, but Laura discovered that there are advertisements on it with taglines such as “Ten Ways to Make you Bikini Ready” or “Ten Positions for Sex”. She explained to her daughter that anything relating to sex that is online is not going to be appropriate for her age and that she was therefore not allowed to continue using the app.

Laura also worried about her daughter watching videos that advertise fitness routines, showing *before* and *after* pictures of women who have engaged in the programme advertised. These videos conveyed the message that women look superior after having completed the programme. She said that she was very conscious about the negative impact that this might have on her daughter, because this is in addition to exposure to other messages of a similar kind by other children, or women, criticising their own bodies or somebody else’s body. Laura made sure to tell her daughter that “this is bad”, but she was not sure whether her daughter understood it. Laura remembered watching “blue movies” when she was younger, and said that the thing that stayed with her the most was a perception of a desirable body, “how a woman had to look”. She said she would rather shield her daughter from messages around supposedly ideal appearances. Like Laura, Maggie pointed out that girls are exposed to these images offline as well.

Another major concern around appropriate content mentioned by parents was in relation to pornography. There has been a big change in this regard, and especially in Ireland, access to pornographic material was very limited some years ago, when the parents interviewed were children themselves. However, the internet has opened up access, not just to pornographic images but to movies, including material depicting “hard core” sex, and practices to suit a wide range of preferences and fantasies. While some parents mentioned the possibility of their children being shocked, confused, or disturbed by pornographic videos, the main concern seemed to be that their child might get a false sense of reality, “a whole twisted idea of relationships and sex”, as Jordan explained.

Half of the parents mentioned a potential danger from strangers online. Many computer or console games offer the opportunity to play with others via the internet. Some parents talked about social media; parents of children with access to interactive apps, such as Snapchat, tended to make sure that their children are only connected to people they know. Two parents mentioned cyberbullying, and Paul said that his daughter's school sent out a letter cautioning parents about an app which allowed students to post anonymously, and which had been used by students to post unpleasant things about others. Adele said that her children used to play a game online, but then there was a report about a father playing the game under his child's avatar and encountering an unsavoury situation. His game character was invited into a virtual room by one of the players, who proceeded to take off their clothes and "there was some kind of sexual activity supposedly", so Adele stopped her children from playing the game after learning about this.

In total, four parents described a concrete situation in which something had happened that had caused upset or stress to their children. Paul's daughter's (9) online game account got hacked and her virtual possessions were stolen. Sharon revealed that when watching a movie from an online site with her son, a whole page of pornography suddenly popped up. Maggie's 13-year-old daughter stumbled upon a video online of a child getting knocked over repeatedly on a busy road without anybody attempting to intervene and said it distressed her greatly. Adele recounted an incident where one of her son's (8) friends accepted a stranger into an online game which was played among friends. Adele also found her daughter (10) watching a video about a game in which a girl killed a number of other children over a love drama, and in which the figurine creator explained that he designed the girl figurine in a way that she would be more memorable after taking her own life.

There were some gender differences regarding the perceived risks online. While boys' interactions with others mainly arose in gaming situations, one parent described phones as “maybe more of a girls’ thing”. Some differences were not strictly based on children’s gender, but a difference in character. Parents commented on their children’s activity levels and general disposition. In families with multiple children, some parents described their children’s temperament as being linked to the activities that interests them, for example reading or sports. In the context of screen time, this also suggests that parents’ concerns are linked to children to the individuality of each specific child. Speaking about risks online, Maggie commented: “I’d say [F13] would be much more in danger than [M9] because she is much more prone to group pressure and she is a good person whereas [he] is a lone wolf in comparison”.

8.2.7 Strategies. Parents portrayed screen time predominantly in a negative light. However, they described a range of strategies they used to avoid their children being exposed to certain risks and potentially negative impacts. These strategies exist on different levels, and often varied from family to family, depending on the level of screen time access afforded to children. In a sense, a dilemma was created by the presence of a generally negative attitude towards screen time in conjunction with letting children access digital devices despite these concerns. This tension could be explained by considering this state as a cognitive dissonance, and by seeing the strategies discussed as a measure to reduce this incongruent cognitive state. This will be discussed in detail further on. First, an account is given of different strategies parents used in an effort to reduce any negative effects that their children might experience.

8.2.7.1 Protection. Aware of the inappropriate content available online and potentially adverse experiences children might encounter, parents talked to their children and explained that there are certain things that they should not look at online and that they needed to be wary of strangers approaching them online. Some parents shared the approaches they take. For example, Anna explained:

> Well, we just say to them, ‘You know you could click on a flower and next thing you know it could bring you onto something, it could be about flowers or it could be something and that then could link [to something else]. Next thing, you’re seeing these horrible images that you can hardly get away from your head and really you’re better off not seeing, that it can be very traumatic and can disturb you’ and those sort of things.

Anna used a very innocent analogy to explain to her children that there is content on the internet that might disturb them, describing the way in which they might experience inappropriate content rather than formulating it as a rule. Finding the right language and choosing the right amount of information to pass on was discussed by Adele, who indicated that, while she knows more, she would not pass certain information to her children.

> [S]o we would say ‘There […] are some bad people, […] they might use […] information about you, there are people who can steal children and […] you might not, ….’ We wouldn’t explain what can happen, ‘but you might not see your parents again.’ […] So I would know lots of stories but I cannot tell them that, [but I would say that] there were children stolen in Ireland or there’s someone wanting to steal a child in Ireland. ‘Just be mindful, never stay on your own on the street [and when you are online and] if someone talks to you in the game, […], if they are asking questions about […] where do you live or things like that, you cannot answer, you have to tell us […].’

Kathryn also described the difficulty of finding an approach that is “a balance […] between educating them and protecting them and then frightening them, you know what I mean, too young for all that. So, you’re trying to get that balance right”. Parents’ approaches were somewhat aligned with the level of access their children have: Adele’s account of what she shared with her children spoke particularly to strangers online; Anna was more concerned about inappropriate content.

Strategies aimed to protect children online varied from family to family. Marie said that her husband checks the children's devices once a week to see their search history and what they have downloaded. Three other parents mentioned that they have put parental control on their children's devices. The majority of parents had a rule whereby children are only allowed to use their devices in the vicinity of the parents, and cannot take them to a different room. By actively monitoring their children's screen time content, parents felt they would be in a position to intervene if necessary. As was the case with the explanations provided to children, strategies were aligned with the level of access children have, especially to the internet.

8.2.7.2 Holding off. Especially for parents whose children had the least access to screens and digital devices, there was a sense of *holding off* by delaying access to digital devices until children are older. Parents actively tried to limit their children's screen time. While effective as a way to avoid many negative aspects of screen time, parents' reasoning was more aligned with the avoidance of displacement. They made a concerted effort to provide the space for their children to gain experiences that will benefit them and encourage engagement with activities that parents consider superior to screen time. Marie explained that she is reluctant to start incorporating the internet into their daily lives with the children, as there is always something to look up, and the fast and instant access to a world of information might mean that once they start, there will be no stopping. Cora acknowledged that her sons will probably spend a significant proportion of their lives working with computers, so she sees no need to encourage them to do so during their childhood years. Joelle in particular felt that there are other skills that are more important, and that they are needed to provide a strong base to deal with the challenges later in life.

> [My son] has such inner strength which [is] going to stand to [him] down the line, rather than, knowing all about bloody Snapchat, and having always just followed like a sheep with everything that's going on. I think being able to stand back and question something, because he's going to now enter the world of drug taking, of alcohol, of sexuality… so to be able to stand back and question something, and his head filled with the world rather than a false world of social media for so long, I think is going to stand to him much more.

Joelle provided a strong rationale for her decision to delay her sons' use of certain apps and her reasoning for limiting screen time activities. Her explanation was in line with the Steiner philosophy, suggesting that there are certain skills that need to be developed first, and that these skills will provide the foundation for media literacy. By holding off on introducing these technologies and apps too early, children are equipped to handle the challenges better which will come later down the line.

Even though other parents allowed their children more access to digital technology, some parents felt that their children are still rather innocent, particularly in relation to inappropriate content online. Paul, speaking about his nine-year-old daughter, admitted that they "maybe kept her a little bit hidden from it". Kathryn reflected on the knowledge her 13-year-old son might have around the issue:

> And he is probably at the age now […] where we need to start having those conversations. And maybe we should have had them before, we're possibly naïve, but I know we had a conversation with him about sexual education and I could tell he actually didn't know a lot. I was surprised, it was a year or two ago, but he was more naïve than I thought he was. Yeah, I was like, 'Oh my God.'

This highlights that access to the internet does not necessarily mean that children are less innocent than children with no, or only very limited, access to the internet. Allowing children certain freedoms regarding access does not guarantee that they will also discuss in detail the potential dangers that arise from navigating that space, and that access to certain apps does not necessarily means that children do come across inappropriate content or contact.

8.2.7.3 Trust. One topic that came up frequently in relation to screen time and balancing the level of strictness of rules is trust. Many parents acknowledged that there are limits to what can be done to prevent children from accessing inappropriate content. Anna said that: "I don't know whether it's going to work, but so far it's worked, you know, we trust them". Other parents mentioned that there is no way to shield children completely from inappropriate content. Maggie explained that, even with security and parental control restrictions in place, the risk for children to stumble upon something disturbing or inappropriate is always there. Maggie commented that:

> In fairness, I don't really check on him to see what he watches but I think [the father] put in some safety things […] but I think kids will *always* outsmart us when it comes to computers and […] online stuff, so we just have to trust them and make sure that they talk to us, you know, if there are things. I think that it's futile to try […] and control them. They will *always* outwit us. If they want to. […]. Of course I don't want them to find out about sex through pornography, [but] are they going to find those sites? Yeah, no matter what I put in. Again, I suppose it's just to make sure that they know it's there, it is vile, it's horrible, a lot of things, and that's what real life is.

Four parents in particular stressed the importance of ensuring that their children know that they can come and talk to them if they encounter a situation they are uncomfortable with, or if have seen something that has upset them. Paul said that they "have a policy where it's quite ok to say if something is not ok, without being judged" and that his children are "encouraged to speak up". He provides the space to facilitate that. Kathryn emphasised the need to be available to talk and to provide a perspective on inappropriate content that children might see but not fully understand:

> [Y]ou can't control everything that is going to go in. It is more about talking to them so that they know if they find something to be able to talk to you about, it doesn't mean that they are in trouble and secondly that they understand that these things aren't the whole story.

Maggie also said that it is normal for teenagers to rebel against their parents and offered a reason why she is reluctant to put restrictions in place for her 13-year-old daughter. She said her daughter would break them, "and then she knows, oh, if she broke the restriction then she can't tell me".

8.2.7.4 Focus on positive aspects of screen time. Parents also acknowledged that screen time is not all negative. For example, the incorporation of screen time into family life alters the general character to be one of quality family time. By selecting content or activities that parents perceive as good, potentially negative aspects are reduced or avoided. Some parents recounted the creative things their children did with the aid of technology. Jordan's 10-year-old son used photo apps, and a video app that lets you film something which is later played backwards. Jordan said that his son has made some elaborate and creative videos with the aid of the app. Martha's 10-year-old son learned how to make wands with the help of YouTube videos which he later sold. Cora remembered how her two sons (eight and 11) were re-enacting the plot of a movie with figurines. Some parents acknowledged the enjoyment their children get from watching certain things, Maggie said that "actually, it is quite funny to listen to [M11] because he laughs his head off, and to just listen to [him] watching that is hilarious because he screams laughing".

Screen time was also often seen as educational. Adele explained that rather than telling her daughter (10) how to spell a word, she lets her look it up, so that she might remember the spelling in the process. She also mentioned several websites that have little games that help with logical thinking and calculations. Adele's eight-year-old son has an interest in science, and Adele used the resources available online to learn things about science and the universe:

> We would look at videos on YouTube about the universe and how stars are created and things like that. So we would discuss a lot of these things. When I have […] time we make crystals out of sugar, you know, and […] he has like a science set and we would make stuff like that.

Jordan acknowledged that much of what his 10-year-old son looks up is "cool stuff", and Laura said she does not mind her nine-year-old daughter playing educational games on the tablet. Paul's nine-year-old daughter used the computer to write a story, which is helping her with her writing skills. One parent also watched movies with her children in her mother tongue as a way of staying in touch with their heritage.

Many parents said that they watch movies or TV shows together as a family. Paul described this as a ritual, saying:

> We do watch TV […] together […], each evening we sit down for an hour. And then on a Saturday evening, we actually have a thing where we'd […] make like a curry or an Indian (or have a take-away and) then we watch a movie all together. And even the bigger ones, you might have a glass of wine, the kids would have a treat, a coke or something, so that would be a Saturday evening.

Joelle also mentioned that she likes to make movie night a special treat for the whole family:

> I try and be with them, because then… they really have this feeling of the family movie, if they, on a Sunday get to watch a movie, it's not the same for them unless we're there. And again, that changes the TV experience and it's not just a flickering banal thing, it's a… they get to have their chocolate or something.

These family movie nights clearly constitute some quality family time that is not just about watching a movie, but also about being together. Paul summed this up by saying “I know, yeah, it’s silly, but it’s like an hour of the day when we all just sit around and chat and mess.”

Parents also said that their children use apps to stay in touch with friends or family. This was mentioned more by parents who have a child already in secondary school. Maggie explained:

> And we started with [F13] and the phone and snapchat because we live in the countryside, […] you know –*we* chose to live that far away, *we* chose to bring her to this school with a very small pool of kids. And she was always the outsider when it came to family gatherings. All her cousins, all the girls, they get on very well when they meet […], and she always felt excluded. They meet up a lot and then there are also always in contact via Snapchat. And I felt that it was just unfair that she was left out.

Maggie let her daughter use the app so she would be able to stay in touch with her cousins. While these interactions are positive, they also tap into another topic that was discussed by parents: the influence of external pressures. The factors that came out most strongly were the influences that other peers have on their children, mainly because they have a certain device or because they have access to a certain app or game. This then becomes a discussion point within the family, and parents spoke about the challenges between creating and sticking to their own rules. This requires the weighing up of positive and negative aspects about rules, and balancing of concerns about too much screen time with the potential that their children might feel excluded from their peer group due to a lack of access to certain programmes or games.

8.2.8 Influences. Regarding decision-making processes and screen time management in general, parents especially mentioned their children’s peers as influential factors.

Parents tended to listen to the advice of others, but ultimately followed their own instinct. School choice also relates to influences; the Steiner school community provided an environment of shared values based on the Steiner school philosophy.

8.2.8.1 Peer pressure. The topic of exclusion, which was discussed above, was mentioned by parents regarding access to devices or content. Martha explained that, although she did not want to get a game console for her son, she decided to do it in the end. She describes her reasoning, saying:

> [All my son's friends] started with the Xbox, tablets and all that. And even though I wanted to wait a bit longer, it was causing him more emotional *whatever you call it*, because all his friends were playing and he was not allowed. So I said, well okay, we'll start playing, so he started to play […].

Even though she did not want her son (10) to have a game console, Martha decided that the reasons for not wanting him to play were outweighed by the distress her son experienced by not having what his friends had. She added:

> But then you also realise that being too rigid is not good either for the relationship so you kind of have to weigh things up and then you don't, I don't want him either, you know, it's like we're in a community so you kind of go along with people are doing".

Furthermore, Martha had to adjust the rules from only playing over the weekend to half an hour every day for the same reasons.

Cora faced a similar dilemma with movies that she felt were not age appropriate for her eight-year-old. She described this conflict by saying:

> I contradict myself, but it's almost like, you know, it's that balance between, … Because his friends in his class will have seen the seven or eight Harry Potter movies. It's that balance between, there's a word for it, you know, between what is

> okay in my consideration and what I would like them exposed to and not exposed to, and then deprivation, that's the word, you know that feeling, 'I'm the only child in the class that's still watching Paddington and everyone else has seen Star Wars […]', you know what I mean?

Other parents recounted similar situations, how they navigate these, and how they explain to their children that they cannot have a certain thing, even though others have it. Paul elaborated on the arguments he has with his nine-year-old daughter whose cousins have a lot more devices and access than she has. Speaking about uploading videos, he commented:

> But a lot of her friends are doing this, and actually a lot of her cousins, there's a lot of peer pressure from her cousins, because they're allowed a lot more freedom. […] [Her cousin has] an iPhone 8, so she's miles ahead of them, she's miles ahead of the rest of them because, you know, she has her own laptop now, she has her own iPad, […] like, what do you get her next, an Apple watch? Where the next thing for [my daughter] is a mobile, but it's not going to happen today or tomorrow. But that cousin I think has been spoiled a little bit and has got everything. And now nothing is enough, so there's never any satisfaction, always looking for the next thing. […] And then the argument always is, well why can't I have a phone because such and such […] has one. And I always say, well unfortunately I'm not their father so I can't determine what they do or don't do. And unfortunately, whatever their father's name is, is not your father. And you're not getting one […].

Paul's solution was a compromise, so his daughter has an iPod which, as per Paul's description, is like an iPhone, except you cannot make phone calls. It allows her to take videos and go online.

Other parents also explained how they stand their ground and do not give in to outside influences by peer pressure. Joelle said:

> I would notice the main difference when we go camping during the summer, we go camping […]. And all his peers down there, he feels like an alien. […] because they're talking with Snapchat and… and he's just not. So that's a bit awkward, but… a part of me feels it is tough love, and to feel that awkwardness is normal as well. And just to get a phone to fit in with a few kids over the summer, I'm not willing to do that.

Marie voiced that it is difficult to have these kinds of discussions with her 11-year-old son. She said:

> It's hard […] to be honest, because there are kids in [his] class […], they're allowed to do anything they want, 'cause the parents don't really care. They're just 'Ah, whatever, sure what harm are they going to do? They're in the village'.

Many parents commented on how some of their children's peers have devices and access that they do not want for their own children. Laura explained that some of her nine-year-old's friends have phones and social media accounts, and Marie said that children had begun to buy iPhones with their communion money, adding "that's not gonna be happening with us. I said I just can't have it". Anna, Martha, Laura, Kathryn, and Jordan said that, when in primary school, children do not need a phone, because they never go anywhere without their parents. In general, parents agreed that when children start secondary school, or take a bus to school, it is justified that they would have a phone. Cora said that she would like to wait longer than that, but admitted "that could be very challenging and you don't want your child to be an absolute weirdo, you know what I mean, so I could see that could be challenging".

8.2.8.2 Advice. From the parents' description, peer pressure seemed to be a very instrumental force and a major struggle at times. In some instances, parents eventually gave in, as they felt their child was disadvantaged, or felt left out among their peers. In other instances, parents resisted, and felt that the benefits gained from not having a device outweighed all other arguments. Parents' decision-making seemed to involve a delicate balancing act of their own preferences and the potential distress their child experiences from being denied what they would like to have. When asked what they base their decisions on, most parents said that ultimately, they trust their "gut feeling" or "instinct". Joelle commented that: "There are certain things I feel very deeply within my stomach, that I know to be correct, and that's deep intuition". This is not to say that they did not seek advice. Parents quoted a variety of sources they turn to for advice. The two sources most frequently mentioned are friends and family, and the internet. Other sources mentioned are the school or a teacher, parenting books, or talks.

Parents identified situations in which they felt it was good to reach out. They typically asked others how they are handling a certain aspect, and then weighed that up with their own instinct. Marie explained:

> I would just Google and get a few different forums and see what different things have been done, and sort of say 'Right, no, I don't agree with that' or 'Yeah, that sounds okay, I could do that' or 'No, that's a bit too much' and I'd just try [to find] a happy medium. [I would also talk to my] girlfriends to find out where they are at with their children, and not necessarily follow any of them, but take a pinch of salt from what they're doing, and just sort of say 'Right, well d'you know, I'm doing the right thing here'.

A few parents also said that they get conflicting advice, where one source told them to do one thing, and another source adamantly insisted the opposite. Jordan reflected on the issue saying:

> [S]ome people are saying 'Oh you always have to do this' and someone else is telling you 'Never do that' and so you have to figure it out for yourself and you do

> kind of muddle through. It's what the whole world's doing I realised. For a while you think all the other parents know what's going on and I'm just the one that's kind of a bit confused but they're all the same. They're all just going 'Jesus I hope I've made the right decision there,' you know.

Many parents described this process of listening to others, considering the presented perspective, and comparing it to their own. In the end, they based their decision on what *they* felt was right. However, many parents admitted that they do not know if they are doing "the right thing". Many said that they frequently reflect on their decision-making, and whether they made the right choice. A few parents drew attention to the difficulty in dealing with their own emotion in this process, the difficulty of removing oneself from a certain situation and reflecting on whether their decisions are always in the best interest of the child.

8.2.8.3 Choosing a context. Aside from the peer pressure entering the equation via the children, there was very little talk about external pressures in relation to screen time. Excluding family, adults typically have more scope to choose their context. Regarding advice, the parents interviewed were selective about which topic they would like to discuss with whom. The five parents who decided to send their children to the Steiner school provided the most prominent example of context selection. Interestingly, none of the parents mentioned the absence of ICT as a reason for their decision. The emphasis was very much on the alternative way of learning in the school, lots of outdoor activities and play, and the holistic approach taken by the school. Cora explained:

> I would say that as opposed to mainly focussing on educating the intellect or the head, that there is such a kind of hands on way of learning things and there is such a recognition and an acknowledgment and a development also of the emotional side, so it's like the head, the hands and the heart, you know the thinking, the doing and the connecting. Yes, so for me that's what it is, you know.

Maggie also explained that there is a lot of diversity and acceptance of diversity, and a few parents mentioned that they have like-minded people within the Steiner community. Even though none of the parents explicitly listed the absence of ICT as an important factor for choosing the school, it is reasonable to assume that they are happy about the lack of ICT in the Steiner school. This can be seen in their praise of the amount of contact their children have with nature, the way they get to learn in a very practical and hands-on approach. In addition, four out of the five Steiner parents interviewed matched the family profile of significant screen time restrictions.

8.3 Discussion

The interviews provided a contextualised view of parents' concerns and attitudes, strategies applied to manage children's screen time and influencing factors. Synthesising the findings, this section discusses affordances and moderation. Moreover, cognitive dissonance is presented as a possible mechanism under which to consider parents' strategies. The importance of content is discussed with the example of YouTube, and questions are raised regarding the appropriateness of content and critical media literacy.

8.3.1 Affordances. In terms of physical affordances, most parents described their neighbourhood as a safe place with ample opportunities for children to play outside. There was a generally positive attitude to outdoor play; some parents mentioned that they would actively encourage their children to play outside. One factor that seemed to mediate the attractiveness of outdoor play for children was the presence or absence of playmates. Rather than adequate amenities, the decisive element was company. This speaks to the variability of affordances (Gibson, 1979). Affordances are not merely seen within an object or an environment, but depend on the observer. The outdoors seems to afford playing more when there is someone to play with.

There are other aspects to affordance. Family life creates a certain dynamic in which some activities are more accessible or likely to be actualised than others. As described earlier, some parents positioned their attitude to their children's activities within their own lifestyle. Thus it is likely that the children of parents who like to be busy tend to also be involved in many activities. In the domain of screen time then, parental behaviours are likely to influence children's own engagement with screen time. While there was some reflection on own screen time behaviours, this was more likely to be mentioned with regard to the behaviour of interviewees' partners. Although not discussed in the analysis, some parents mentioned excessive phone use, or phone use at the dinner table; for example, and playing video games with the children that did not seem age appropriate.

Parents' own screen time engagement sets a certain amount of precedence. Indeed, there is research that suggests that parental screen time is a significant indicator of how much time children spent with screens (e.g., Jago et al., 2010, 2012). Of course, a lack of access also makes screen time less of an affordance. The access is contingent on the availability of devices, which pertains to the existence and use of digital devices in the family home in general, but can also be influenced by a broader context. Seeing extended family or friends engaging with screens can create a situation whereby screen time, and specifically a desire to increase access certain devices or extend the period allowed with certain devices, can become a preoccupation for children. This is perhaps one of the major influences that school type had on this sample. Steiner children were a lot less likely to be exposed to environments where high levels of screen time access were the norm.

Rules can mitigate affordances. Even if devices are available in the household, they may not be accessible. This can be the entry point of a parent-child conflict. Some parents described that their children are able to stop using devices once they have been asked to. Other parents mentioned the discussions they have with their children around stopping screen time activities, time restrictions, and level of access. It might be the case that imposed rules are perceived differently by individuals, or that the perceived solidity varies. Gibson (1979) regarded affordances as both objective and subjective. Objects do not change their material form, but the perceived affordance is influenced by the cognitions of the beholder. So for some children, rules may have a greater influence on their perception of affordance of screen time, for other children, affordances remain salient, which may lead to conflict.

8.3.2 Moderation. The complex process of navigating the digital lives of their children, balancing concerns, values, family rules, and influences on the decision-making process, is one of moderation. Screen time seems to be incredibly enticing and popular, evoking the analogy of sugar. In its simplest form, the general premise is that sugar is bad. Sugar consumption is too high, especially among children, which results in an increased risk for several health issues (Azaïs-Braesco, Sluik, Maillot, Kok, & Moreno, 2017). Most children like sugar, and tend to want to consume more than they are allowed. Habits vary across families; in some families, giving young children foods and drinks with added sugars is delayed, and even when introduced, the intake is highly regulated. In other families, sugar is introduced early and children have relatively easy access to sugary foods and drinks.

Similarly, each parent interviewed had different rules around screen time, albeit that there were similarities across families. We tend to compare ourselves to others, and since moderation is subjective, it is contingent upon perceived norms. In this sample, Steiner school children were most likely to have the least access to screens and digital devices. This would suggest that the Steiner community offers a particularly homogeneous environment in which screen time is limited and regulated to a greater extent compared to a public school context, where there seems to be more variability.

Regardless of the level of access, a back and forth of balancing takes place in an effort to moderate time spent with screens. There were a multitude of factors that came into play; most parents were happy to let their children use digital devices for certain activities, but not for others. There was a pronounced awareness of potential negative effects, and a certain level of acknowledgement that aside from the impacts felt immediately, like a bad mood, there may be delayed effects, such as poor social skills and unrealistic views and attitudes towards relationships.

8.3.3 Cognitive dissonance. Although not expected or anticipated prior to synthesising the findings from the study, the processes of balancing concerns is captured well by considering the concept of cognitive dissonance (Festinger, 1957). As a concept, it has been discussed and developed into different directions (e.g., Aronson, 1968; Cooper & Fazio, 1984; Steele & Liu, 1983; Stone & Cooper, 2001), but the concept will be considered in its original form here and with the belief that cognitive dissonance encompasses a broad range of situations, which has been argued elsewhere (e.g., Gawronski, 2012; Greenwald & Ronis, 1978).

Cognitive dissonance operates under the assumption that opinions and attitudes tend to be consistent (Festinger, 1957). It describes a state whereby there is incongruence between two cognitions. Festinger describes a cognition as "what a person knows about themselves, their behaviour and surroundings" (p. 9). A disequilibrium between two cognitions creates a discomfort and hence a motivation to resolve the dissonance. Resolution can be reached through different strategies. First of all, we can change our actions so that they are congruent with our attitudes. Secondly, we can change our attitude so that it matches our behaviour. Thirdly, balance can be restored by "adding new cognitive elements" (Festinger, 1957, p. 21), which entails finding reasons to justify why we have behaved, or are behaving, in a certain way, despite the mismatch with our attitudes.

The dissonance here is that although screen time was predominantly described as having a negative impact, all parents allowed their children a certain level of access to screen time. According to the strategies described above, the dissonance was resolved by disallowing children access to screen time, by changing attitudes about screen time, or by introducing other factors in an effort to rationalise the apparent mismatched choices. Of course, screen time is only one of many areas in which parents are faced with challenges and it is a complex issue. In order to experience the discomfort of the dissonance, engagement with the topic is required. With the discovery of new information, cognitions are likely to evolve over time.

A change in attitude may be abrupt or gradual. Cora explained that she used to love watching television, but then when her son (11) was small, she went to an event where others were saying that watching television is not good for young children, so habits in her house changed as a result of that. This is an example of an abrupt change in cognition. Cora may have not given much thought to any potential impact television might have on her son, so the dissonance was created suddenly when she received some new information. The description of her acts suggest that she acted immediately to resolve the dissonance, by changing her behaviour.

In other situations, new information may not have such a significant and immediate impact. Much like the process of considering advice from other people, new information is not always absorbed or adopted. Since advice and messages about screen time are proliferate and sometimes conflicting, it is likely that some attitudes and concerns emerge over time rather than suddenly appear. Furthermore, there are limits regarding the number of cognitions we can consider jointly at any one time, which may impact on the perceived level of dissonance and therefore the desire to resolve the conflict (Gawronski, 2012). In general, not all perceived incongruity evoke the same drive to act to change the discomfort, the importance of the elements decides the magnitude of the dissonance (Festinger, 1957). Within the sample of parents, some felt very strongly about screen time, and tended to avoid it as much as possible. Others were a lot less concerned, and tended to only intervene to avoid their children having contact with inappropriate content or spending excessive amounts of time with devices. Thus the level of negative valence associated with screen time varied. In addition to that, many parents admitted that there are many things that they do not fully understand, or that they do not know a lot about.

Many strategies discussed are efforts to reduce the perceived negative impact; for example, by installing parental control on devices, or by not allowing children to access the internet when not in the vicinity of parents. The conflict gets somewhat reduced by ensuring that children are protected against what parents perceive to be the most negative aspect of screen time, in this case inappropriate content and contact. Families with significant levels of screen time restrictions were likely to feel rather strongly about potentially negative impacts of screen time. By limiting the level of access, and the type of content their children are engaging with, parents circumvented many of the potential negative impacts. Moderation offers a source of resolving the conflict as well.

Comparing their own approach to screen time management to that of other families, parents more often spoke about other children having more screen time, or more devices, but there was little to no mention about children who had less access or fewer devices. First of all, with the backdrop of limiting screen time being perceived as more desirable, this can be regarded as another strategy to alleviate dissonance. When considered in comparative rather than absolute terms, there is a sentiment that, at least compared to other children, one's own child is more supervised or more restricted than other children. Even though there was a substantial gradient in access to devices across families, parental attitudes were more alike than they were different.

Concerns about potential impacts did not vary hugely, the main differences were seen for strategies used and restrictions imposed. Admittedly, the sample is not representative of parents in general, but from the data at hand, it seems that there is almost a mythical "other" created, a child with unlimited access to devices and no restrictions at all. This idea is perpetuated by parents' tendency to seek advice from sources that are likely to be in agreement with them on many issues. In addition, children's reports of their peers' screen time engagement might be skewed as well; however, oftentimes there are other factors that play a role. As Martha discussed, her son was unhappy about not having access to a game console and she eventually gave in. Here, a third cognition entered the equation, and in that moment, the welfare of the child became more important than the preference to avoid screen time, and the emotional turmoil her son was experiencing became more of an issue than Martha's wish to delay access to game console playing.

Choosing the route of trust incorporates the realisation and acceptance that screen and digital devices are part of modern lives for both adults and children. Rather than resisting, some parents chose to invest effort in supporting their children on the journey of discovery and to navigate the challenges they encounter; emphasising the positive aspects of screen time reduces the importance of the experienced dissonance. It also relativises the original position. In fact, many parents said they do not mind when their children use digital devices to do something which parents perceive as educational. The general negative attitude towards screen time becomes more refined then; not all screen time is negative, but certain content is, including movies that are not age appropriate, or violent video games, online interactions with strangers, and excess use in general.

The whole process is embedded in a complex and dynamic system. Parents face many decisions and, as Jordan highlighted, there is no rule book, or a manual; hence, parents are relying on themselves, their experience, and the advice from others. The experience of a dissonance between two cognitions is an important vehicle for change and progress, as it allows us to develop and learn; it enables a change in behaviour and attitudes. As such, the conflict experience is not a bad thing, but rather a system carried within that allows for change.

8.3.4 Content matters. From the interviews, it became clear that engagement with screen time, and especially the interactions with digital devices, is constantly evolving. Consumer patterns have changed significantly. For example, television programmes used to run at a certain time and, if you were not home then, you could not watch the show. Now there are many alternative options: programmes can be recorded, or can be accessed online at any time. The market is lot more user-oriented, and programmes are available on demand. Many parents said that their children do not watch *regular* television at all, but instead access content through different services. This finding dovetails with recent research; for instance, figures from the UK show a 40% decline in television viewing between 2010 and 2017 for children aged four to nine, and a 47% decline for children aged 10 to 15 (Ofcom, 2018).

A recent report which included a sample of over 26,000 Irish primary school children found that tablets were the most popular devices used to go online, followed by smartphones, the computer, and game consoles (Everri & Park, 2018). But it is not just access behaviours that have changed, there is also a tendency towards a change in content. Alternative content is growing in popularity, specifically user generated content available on YouTube. The platform was mentioned frequently during the interviews. This trend is consistent with UK figures, according to which 71% of five- to seven-year-olds now use YouTube, and 90% of children aged between 12 and 15. Irish figures show that 36% of primary school children list YouTube as their favourite app (Everri & Park, 2018). Two *YouTubers* mentioned during interviews were Jacksepticeye and DanTDM. Both men, Daniel Middleton (DanTDM) and Seán McLoughlin (Jacksepticeye), are in their late 20s. One type of content posted are “Let’s Play” videos, where they play video games, and in addition to seeing what is happening in the game, the viewer also sees and hears the players as they narrate their actions and comment on their play.

Both McLoughlin and Middleton have a substantial following on YouTube, with around 20 million subscribers. They upload at least one video a day, and have become millionaires doing that. The most prominent figure in this genre is Felix Kjellberg, a Swede posting under the name PewDiePie, whose YouTube channel is the channel with the most subscribers on the platform with over 60 million subscribers. Content of Kjellberg's YouTube channel has been included in research; for example examining contemporary masculine identities (Maloney, Roberts, & Caruso, 2018) and swearing (Beers Fägersten, 2017). In 2017, Kjellberg lost a contract with Disney over posting anti-Semitic jokes and Nazi imagery (Solon, 2017). This raises the questions of whether this YouTube content is age appropriate for young children.

Neither Middleton's, McLoughlin's, nor Kjellberg's content is probably age appropriate. Their content is aimed at teens and tweens (Knorr, 2017). In an interview, McLoughlin said that he swears a lot in his videos, that parents have complained about the level of swearing, but adds that he has never said that his content is suitable for children (Kelleher, 2017). Of course, YouTube videos do not have an Irish Film Classification Office label, or an equivalent label to advice parents about the suitability of certain content. And according to Bridle's (2017) article about curious, weird, and disturbing YouTube videos, it is not always evident for viewers which videos are appropriate and which are not prior to clicking on them. He gives the example of altered versions of popular children's cartoons, for example a video of the popular character "Peppa Pig" eating her father. The point is that content can be rather unpredictable, and videos by high profile YouTubers can have a major influence on audiences. It is also important to acknowledge that influences are not always negative; McLoughlin (2018) uses his channel to promote what he calls a "positive mental attitude".

Income is generated by brand and product endorsements and advertisements schemes via YouTube. The promotion of certain brands and products has been discussed with YouTube channels that produce "unboxing" videos, another popular genre in which people unpack and show products, for example toys (Ramos-Serrano & Herrero-Diz, 2016). From the parents' descriptions it became evident that children can be influenced by the content they watch. Some parents described how their children re-enact scenes they have seen in a video, or might adapt certain mannerisms or accent. Again, this does not necessarily mean that all influences are negative, but it is important to recognise the draw media content might have. The understanding of what constitutes an advertisement and its intent to sell a product is something children master at an early age, but defence levels for implicit persuasion are only developed later. Resisting, by controlling the effects of implicit persuasion, can still present a challenge to adolescents (Nairn & Fine, 2008).

One of the other issues that came up in interviews with parents, and relates to the debate about children's ability to critically engage with content, is exposure to pornographic films and images. Parents voiced concerns that this kind of portrayal of intimacy might give their children inaccurate ideas about relationships and sex. Research from the UK would suggest that both the concerns about exposure to advertisements and pornographic content voiced by parents are substantiated. A 2016 survey of 11- to 16-year-olds (N = 1,001) found that 48% had seen online pornography and almost half of the young people who had seen it reported that it had "just popped up" somewhere (Martellozzo et al., 2016). The survey also found that young people are not necessarily naïve. Half of young people in the survey thought that the actions depicted in pornographic videos were unrealistic, and young people were able to reflect upon how pornography might lead others to think that the kind of behaviour viewed is "normal". However, some statements made in the focus groups would suggest that some young people have become somewhat desensitised to pornographic content and sexual practises that are unlikely to be the kind of sex education parents would like their children to have.

8.3.5 Skills to navigate content. Considering the content young people encounter online, it seems paramount to provide children with digital literacy skills, or critical digital literacy. This goes beyond the ability to understand and manipulate content, but needs to include abilities to analyse, synthesise, and reflect about purpose, agendas, and power dynamics (Hinrichsen & Coombs, 2014; Luke, 2000). Recent Irish research showed that children start accessing the internet at age six or seven (Everri & Park, 2018). This shift to early internet access is probably still in progress, the authors found that those in 6th class now report a later starting age for internet use than children just starting in primary school now.

On the one hand, the Steiner school movement's position of delaying ICT use makes sense, considering the difficulties with navigating implicit persuasion. Their rationale speaks directly to the need of developing the required skills to critically engage with material offline (which might be a more sheltered environment), but that would mean that they possess the ability to successfully navigate an online environment later on. On the other hand, considering the statistics of access to digital devices and children's engagement with screen time, and particularly activities online, the Steiner position could be regarded as naïve or archaic. In debates around screen time, one point of reference that used to be cited continuously was the American Academy of Pediatrics' guidelines, which recommended no screen time for children under the age of two, and up to two hours for older children (Council on Communications and Media, 2013). These guidelines have since been changed, to reflect the actual reality of habits and children's engagement with screen time (Council on Communications and Media, 2016). They highlight the continuing struggle that may lead to parents' confusion regarding *good* and *bad* screen time, or technology.

In public schools, technology is heralded as the path to a modern society, and the key to equip children with the skills needed to navigate this world successfully. But while there is a drive to make devices available to children, and to integrate them into the learning process, schools also struggle with the ramifications of children's use of smartphones and social media apps. One school has banned the use of smartphones and tablet outside of school hours for their older students (Lucey, 2018). In 2018, the Department of Education and Skills has issued a circular asking schools to devise a school-wide policy on the use of smartphones and digital devices in the school, together with teachers, parents, and students (DES, 2018a). This discourse of mixed messages is not useful, and applying high levels of restrictions may have unintended implications with regard to young people's autonomy and relationship building. This will be discussed further in Chapter 9.

8.3.6 Differentiation. While there are differences across families, within-family differences were also common, which speaks to the individuality of each person. Some differences were of a more practical nature, such as creating different rules for children of different ages. Other differences were gender-focused; parents' concerns tend to be a little different depending on whether they have a son or a daughter. The specificity of children's dispositions provided another source of difference, albeit a source that is linked to the above characteristics. This illustrates the dynamic between person and process variables in Bronfenbrenner & Morris' (2006) model. Parents have a sense of their children's strengths and vulnerabilities, and often consider this in their decision-making. The strong connection between person and process factors echoes the findings from the previous GUI chapters. There were reasonably strong associations between outcomes and variables pertaining to children's temperament, the quality of parent-child relationships, and other indicators of children's relationships with their surroundings.

8.3.7 Limitations. There are several limitations to the findings of this study. First of all, parents are very similar in their profile regarding their age, education, and neighbourhood. Another aspect is that there were a lot more parents with boys. The profile of popular screen time activities varies with gender; boys are more likely to spend time playing game consoles, whereas girls tend to use more social media than boys (Booker, Kelly, & Sacker, 2018; Everri & Park, 2018). This was echoed in the data, game console access was discussed a lot, but this was almost exclusively in relation to boys. Concerns arising through messages about body images were more likely to be brought up by parents of boys, and this issue could have been explored more in a more gender balanced sample. Finally, the sample might be biased due to participants' self-selection process, and they may have chosen to take part in the research due to feeling strongly about the topic of the research.

To conclude, and while acknowledging the limitation, it seems clear that there are many different forms of screen time serving different functions. Grouping them under one umbrella term may not sufficiently reflect the variety of activities children are engaging with. However, in many families, there was a certain contingent allocated to *screen time*, and children could choose which activity they would like to engage with during that time. In the decade that has passed since the GUI data were collected, the types of devices available has changed, particularly the availability and the use of tablets. One aspect that filters through is the apparent decrease in passivity during screen time engagement. The four types of screen time engagement were watching, playing, interaction and information-seeking. For the three latter categories, there is a certain level of input involved, but even watching, which is typically associated with being rather passive, is changing. YouTube seemed to be very popular among children, and this different type of content is often less like a movie but directed at the viewer, hence perhaps decreasing the passivity as well. Changes in the types of screen time children engage with predominantly prompt the need for examining and regulating online content in particular.

Generally, parents seemed to make rules that are consistent with their own values and attitudes. As attitudes varied across families, rules varied as well. The strategies discussed highlight that parents have chosen different approaches to counterbalance their concerns about screen time. There was also some fluidity around rules. Many parents gave examples of exceptions, for instance when the weather is particularly bad, or their child is sick, they may be allowed to watch a movie. Rules were also adjusted if needed; for example, when new information was acquired, or when current arrangements were not working out.

Overall, there was a sense of moderation and an effort to balance. Parents were aware that, sooner or later, technology, and the internet, will be a substantial part of their children's lives, but parents also acknowledged the challenges they are facing and could potentially face in the future. One significant challenge mentioned were the influence peers have, resulting in their own children wanting devices, access to certain content, or more time with certain devices. Parents then must weigh up between their own preferences, which typically is not to give in, with potential consequences. These include tension created by ongoing discussions with their children, or the distress children might experience by feeling excluded from their peer group due to a lack of access. While the alternative context of the Steiner school does not eliminate this peer pressure, the level of access to digital devices was lower.

9 General Discussion

The aim of the current project was to explore associations between screen time and children's socio-emotional outcomes, while considering a range of potentially mediating variables, and to explore how parents navigate their children's engagement with screen time. This chapter will discuss the key issues that have emerged across the four studies, as well as outline the limitations and recommendations of the project. Specifically, this section will discuss the importance of adopting a contextualised stand point, the appeal of screen time in relation to the concept of affordances, and the importance of differentiating between different types of screen time. The implication of negative public discourses around screen time is discussed, and issues around protection, regulations, and restrictions are highlighted.

9.1 Importance of Adopting a Contextualised Stand Point

The project's mixed method approach provides several viewpoints on screen time. Studies I, II, and III provided an overview of how screen time is related to socio-emotional outcomes and process, person, context, and time factors in a sample representative of the study population; Study IV offered insights into what the integration of screen time *looks like* in family's daily lives. Thus the four studies complement each other and account for the complexities inherent in the subject matter. Each study explores a different angle of screen time as a process embedded in a dynamic system.

Study I situates screen time in the context of children's daily lives. School-related activities take up a lot of time during a normal day, and the majority of free time is spent sedentary. The time use data suggest that screen time is an established proximal process of modern childhood.

Studies II and III highlight why it is important to adopt a contextualised view when exploring aspects of children's lives. Once PPCT factors are considered, the associations between screen time and socio-emotional outcomes are changed. This shows that these outcomes are best explained by these factors, and that screen time itself is only a correlate of other variables that have a more substantial impact on children's outcomes. High engagements with screen time may be a symptom of a certain profile that impacts negatively on wellbeing, but screen time itself is not the cause of poorer outcomes.

In Nixon's (2012) report on how family matters, which is based on Wave 1 of the GUI child cohort, she identifies several factors that emerged as pivotal factors for children's outcomes. These relate to person characteristics: health, gender, and temperament, and process characteristics, specifically the parent-child relationship. Nixon discusses the importance of temperament in relation to research showing that temperament can be influential due to its position in influencing interactions with the environment (Rothbart & Bates, 2006 in Nixon, 2012). This echoes Bronfenbrenner's (Bronfenbrenner & Morris, 2006) conceptualisation of person characteristics as assets that may aid or hinder the initiation of proximal processes, and their role in shaping these processes, as has been discussed in Chapter 2. Nixon also draws on the Goodness-of-Fit model (Thomas & Chess, 1977), which suggests that positive child outcomes are dependent on how children's temperament and individual characterises *fit* their caregivers' dispositions.

This idea of goodness of fit was highlighted in Study IV, when we saw that parents' encouragement of certain activities tended to match their own attitudes and preferences. This dynamic is likely to be supported by a good fit, and provides a rationale for the importance of the parent-child relationship for children's outcomes. In addition to considering their own personal philosophy, parents also take their children's disposition into account when they reflect on the impact of screen time. Their concerns are linked with children's characteristics. The variance across families shows that screen time, the process, is linked to both the person and the context.

Time is a constant factor in development. The analysis of outcomes at age 13 suggests that the influence of different elements changes over time. The connection between time and change is also evident in parents' accounts of rules and the ways in which these rules are adjusted as their children gradually mature. Overall, this lends support to the PPCT model and its argument that children's development needs to be considered in context. It further highlights the pivotal position of proximal processes; these are the contact points of all the other elements, which justifies their centrality.

9.2 The Appeal of Screen Time

Screen time certainly tends to have high appeal for children. Parents described it as addictive; some mentioned that their children would spend all their time with devices if they were allowed to do so, and relayed instances of arguments about access to devices and time limits. Screen time takes up a large proportion of children's free time; the majority of sedentary time was spent with screens. However, when asked about their favourite activity in the GUI questionnaire, the overwhelming majority of nine-year-olds named a type of sport or an active hobby. Chapter 5 offered some possible explanations for this apparent mismatch, but with the addition of the qualitative study's findings, this warrants further exploration. In a study by Livingstone (2000) with six- to 17-year-olds, participants indicated that screen time was something they did to fill time with when they were bored. They perceived their neighbourhoods as lacking opportunities to do something worthwhile, or were hampered by restrictions regarding the places they were allowed to go. In a selected quote from focus groups conducted, one participant also mentioned that they she would not watch television when friends were around.

This was also an issue that arose from the interviews with parents: the lack of playmates in close proximity was identified as a barrier to children's outdoor play in particular. The GUI analyses showed that children with devices in their bedrooms tended to spend more time using them than children who did not have their own devices. Of course, there still may be restrictions, but this would nonetheless suggest that these parents are more lenient about usage than parents whose children do not own their own devices.

The association between ownership and higher usage would certainly suggest that easy access to devices makes action possibility more likely to be realised.

As discussed in Chapter 2, according to Gibson (1979), the environment is perceived according to individuals' action capabilities. Although Gibson (1982b) acknowledges needs and motives as factors implicated in what affordances are perceived, some have argued that he did not sufficiently account for agency in his conceptualisation (Cutting, 1982; Reed, 1982,1993,1996; Withagen et al., 2012, Prieske, Withagen, Smith, & Zaal, 2015). Withagen et al. (2012) suggest that whether an action possibility is realised also depends on the amount of effort needed to carry out an action. Perhaps this is at the core of the appeal of screen time: a low effort to engage with it and a high return; high return in this instance is enjoyment, as many parents have pointed out. In their study of affordances in a simple playscape, Prieske et al. (2015) found that children tended to make use of affordances that were not overly challenging to them. These findings would support that individuals might be drawn to action possibilities that require less effort in some instances.

Parker Schiffer & Roberts (2018) offer an explanation as to why this might be the case. Although based on an adult sample, their study suggests that engagement with high effort activities are hampered by a lack of activation energy. They asked participants to rate a range of activities in terms of how enjoyable they find them, how much effort it takes to initiate the activities, how daunting it is to get started, and how often participants engaged with the different activities in a typical week. The list included activities that were either high or low in physical or psychic involvement. High effort activities included exercising, cooking, studying, face-to-face socialising, and helping others. These are activities that have been linked to the promotion of long-term happiness. The list also included a range of predominately passive activities, which offer more immediate returns by being enjoyable in the moment; for example listening to music, resting, surfing the internet, checking social media, and watching television. They found that although people identified high effort activities as facilitating long-term happiness, they were more likely to engage in passive activities. Participants tended to rate high effort activities as too daunting to initiate and rated low-effort activities as more enjoyable.

This would suggest that it is indeed important to consider the difference of potential and actualised affordances (e.g., Heft, 1989; Kyttä, 2002). The realisation of action possibilities is not just determined by the environment, but contingent on motivation and needs. The crucial point is that affordances go beyond the characteristics of physical spaces. It is not enough to design spaces that afford active outdoor play, as the mere fact of their existence will not guarantee that affordances are actualised.

In addition to suggesting that there is a plethora of potential interactions between individuals and environments, Davis and Chouinard (2017) consider cultural and social influences on affordances. This creates the intersection between the bioecological model and the concept of affordances. The question becomes less about *what changes* but more about *how does it change*. The interactions and interconnections between systems, and the manner in which contextual factors exert their influence in indirect ways, support both the argument of individualism and collectivism. Development simultaneously consists of sameness and difference. Although each individual experiences their own journey, societal and cultural factors shape the framework in which this development takes place. Screen time needs to be considered as part of family processes, but also as part of a broader, or systematic, change to the essence of modern childhood.

9.3 All Screen Time is Not Equal

Synthesising research becomes difficult if each study on screen time uses a different definition of screen time. In addition to varying inclusion criteria for screen time activities, many studies, including the current one, use the time spent with screen time as a measurement of screen time, which does not reflect the different ways that children engage with devices. In light of the wide range of activities children engage with, and the devices they use, the umbrella term *screen time* is probably not useful. Technology, digital devices, and screens are tools, and as such they can be used in versatile ways. This came through in interviews with parents. They were happy about their children using devices for educational purposes, in creative ways, and to wind down, and acknowledged that their children get enjoyment from watching certain things. Playing game consoles and accessing the internet were a lot more restricted in general. Screen time as a term does not distinguish between the whole family sitting down on a Sunday evening to watch a movie together and a seven-year-old child watching inappropriate content on a mobile device by themselves. There is a need to differentiate screen time activities depending on content and functionality.

Studies that examine divergent of engagements with Social Network Sites (SNSs) suggest that depending on how SNSs are used, they may have either positive or negative effects (e.g., Allen, Ryan, Gray, McInerney, & Waters, 2014; Clark, Algoe, & Green, 2018, Verduyn, Ybarra, Résibois, Jonides, & Kross, 2017). Positive effects were shown for people using SNSs actively, and to maintain existing friendships (Rae & Lonborg, 2015; Wang, 2013). Using SNSs passively and interacting with strangers was shown to have negative effects (Rae & Lonborg, 2015; Shaw, Timpano, Tran, & Joormann, 2015). There are studies that find positive relationships between the use of SNSs and young people's wellbeing, happiness, sense of belonging, self-esteem, and identity development (e.g., Davis, 2012, 2013; Ellison, Steinfield, & Lampe, 2007; Gajaria, Yeung, Goodale, & Charach, 2011; Mauri, Cipresso, Balgera, Villamira, & Riva, 2011).

While internet access was relatively restricted and regulated by parents in the qualitative study, data from Wave 2 of the GUI study showed that social media and messaging was the most popular online activity among 13-year-olds, and that they have relatively free access to the internet. The lack of friends in physical proximity means that face-to-face meetings may not always be possible, so young people use alternative ways to stay in touch. This might not be exactly a recent phenomenon, but while the last generation may have spent hours on landline phones, the current generation communicates via the internet. This way, young people make use of the opportunities afforded by the internet, SNSs, and other services that offer another means of communicating with existing friends. They can also facilitate the process of interest groups getting together, or finding each other. For instance, Garjaria et al. (2011) studied online groups for young people with Attention Deficit Hyperactivity Disorder that aim to convey positive messages. Used in such a way, the internet offers a medium to connect to support systems, and find like-minded people; those who might share an interest in whacky music, embroidery, superhero comics, or anything else that would be considered a niche area. It is now possible to find others with whom to exchange ideas in a relatively easy way.

This highlights the point that simply treating screen time as one thing, as a singular homogeneous activity, fails to account for the variety and variability of engagement with different media that may serve different purposes. Reducing varied activities such as watching television, playing computer games, whether it is with or without interactive components, and online communication to *screen time* is an overgeneralisation, one which fails to acknowledge the nuances that exist, even if the functionality of just one device is considered. Establishing distinctions between different activities may help to encourage conversations that are needed to support young people as they navigate online environments. It may also help to tease out what is appealing about screen time. Watching television might be a way to relax, or ease boredom; messaging services can enable communications with friends; the internet can be used to find out about topics of interest. By shifting the focus on content and functionality, screens can be incorporated more smoothly into daily life without causing conflicts based on the reductive common denominator of a screen. This differentiation may also help to lessen the negative connotations often associated with the term *screen time*.

9.4 Moral Panic

The results of the GUI analyses suggest that there is no overwhelming negative impact of screen time on children's socio-emotional outcomes. This is not to say that the study proves that screen time has no negative impacts, but it should serve as evidence that the current public discourse portraying screen time as the culprit for a decline in young people's wellbeing (e.g., Sigman, 2005; Twenge et al., 2010, 2018; Twenge, 2017) is not supported by decisive evidence. Cohen (2002) writes that a moral panic may have some truth to it, but the effect is highly overstated, thus deflecting from other, more pertinent problems. There are others that have cautioned that many claims about screen time are not supported by strong evidence (e.g., Galpin & Taylor, 2018; Przybylski et al., 2018). Scaremongering is deeply problematic and potentially damaging. It creates a stigma around screen time, equates high levels of screen time with supposedly bad parenting practices, prejudices young people, and may displace more constructive discussions and actions to ensure children can safely access and participate in the digital sphere, which will be discussed later on.

As discussed above, the negative portrayal of screen time ignores the diversity of engagement and functions of screen usage. Demonising screen time is also likely to create friction within families and contribute to conflicts, which will negatively impact on parent-child relationships. It might create situations where screen time reaps more than its fair share of blame, influenced by expectations based on negative attitudes towards screen time. This generally negative attitude towards screen time, which was evident in many of the interviews, may be self-perpetuating by its very existence. This could be explained with confirmation bias: the expectation is that children are in a less pleasant mood after screen time, and situations in which this was the case are remembered over situations in which this was not the case.

Another explanation would be a self-fulfilling prophecy, comparable with parents' expectations that children get hyperactive after eating a lot of sugar which persists, despite the fact that research does not find a causal link between consumption of sugar and hyperactivity (Hoover & Milich, 1994; Krummel, Seligson, Guthrie, & Gans, 1996). One of the potential explanations is that parental expectations of their children's behaviour exacerbates children's activity levels in response to their parents' behaviour towards them. Thus if parents hold the belief that their children are in a foul mood after screen time, it might be their own attitude and behaviour towards the child that brings on mood changes.

9.5 Protection, Regulations, and Restrictions

Arguably, one of the main points to take from the screen time behaviour of today's children is that the focus of regulating and restricting advertisements with products that appeal to children needs to be expanded beyond the medium of television to include digital spaces. For example, research into the advertisement of unhealthy foods to children and young people shows that advertisements are persuasive and impactful (Boyland & Tatlow-Golden, 2017; Tatlow-Golden, Hennessy, Dean, & Hollywood, 2014). These studies also underscore that efforts to reduce marketing of unhealthy food need to broaden their focus beyond television advertisement. A United Nations International Children's Emergency Fund (UNICEF, 2018) discussion paper on digital marketing calls for stricter restrictions on advertisement and marketing online, claiming that "the digital marketing ecosystem has been somewhat of a 'wild west', with fewer restrictions and standards than in the traditional broadcast space" (UNICEF, 2018, p. 5).

Advertising online is predominately programmatic, meaning that rather than being placed on specific sites, algorithms decide which places are best suited as advertisement spaces for certain products based on demographic and other available information. This is only possible in an environment where users' data are collected. Furthermore, it means that even advertisers themselves actually do not know where their advertisements are placed, which can lead to inappropriate, offensive, or unfortunate matching of online content and accompanying advertisements. The UNICEF report acknowledges that, rather than the companies themselves, it is advertisement technology companies and data brokers that have control over where exactly advertisements are placed. Indeed, they remark that these intermediaries have not shown any interest "in engaging in discussions about responsible marketing and use of personal data". (p. 22). The issue goes back to money: free online platforms and services generate revenue through advertisements; hence, the motivation to disallow certain advertisement practices or specific products is at odds with their own business model.

In 2018, the General Data Protection Regulation was introduced, which stipulates that no personal data of children under the age of 16 can be collected without parental consent. The added complications in this scenario are the policing and verification of age. Many apps, gaming, or social media platforms have a minimum age of 13, for example Snapchat (Snap Group Limited, 2018). The video social media platform Musical.ly and the messaging service WhatsApp have a minimum age of 16 in the EU (except Germany, where it is 13; TikTok, 2018; WhatsApp Inc., 2018). Some platforms, for example Roblox, offer a different mode that limits access to young people under 13, meaning they have restricted access to games, and parents retain control regarding who children connect to online. Similarly, YouTube have a YouTube Kids version, but none of the parents specifically referenced this tool; based on the content their children watched, it is unlikely that they use this more controlled YouTube environment.

Neither of these services require a proof of identity, which means that the age restrictions are easily circumvented by young users. This means that they need to provide some personal data, albeit with a fake date of birth, because the option not to share data is typically not given: the choice is between sharing your data or not participating at all. Emphasising the importance of children gaining access to the digital world, the UNICEF (2017) report on children's engagement with digital media stresses two things in their recommendations: first, to facilitate children's access to digital media, and secondly, to ensure that they are protected online.

The questions around how children can be protected and what level of protection is needed are not easy to answer. In a 2017 survey of approximately 2,000 British parents with children aged between 0-17, participants were asked at what age they think their child would be old enough to make their own decisions about the websites or apps that they use (Livingstone & Ólafsson, 2018). Parents' responses averaged on age 13; however, the most common answer was 16. Interestingly, the older the child of participants, the higher the age they named. This suggests that no matter what age the child is, parents tend to think that they are not quite ready to make their own decisions online. This is reflected in the findings of another report based on the same survey (Livingstone, Blum-Ross, & Zhang, 2018). Half of the parents with children aged between nine and 12 years of age indicated that they need to check what their children do online, and almost two-thirds of parents agree with the statement, "I have the right to see everything my child puts online if I think I need to" (Livingstone et al., 20018, p. 11).

Protection is often equated with supervision, which raises yet another question: when does monitoring become spying? Mathiesen (2013) makes a somewhat radical argument, suggesting that children have a right to privacy, and that it is "ethically inappropriate" to advise parents to monitor their children's internet use. Mathiesen posits that the paternalistic case for monitoring is not justified; she argues that online risks are overstated, and that monitoring is ineffective and may lead to harm. Monitoring may impact on children's current and future capacity for autonomy and for building trusting relationships.

Mathiesen's arguments link back to the discussion of whether screen time can be considered play or not. From the characteristics described in Chapter 3, screen time can be regarded as play, certainly in terms of children's intrinsic motivation, and that it is fun. But if screen time is subject to high levels of restrictions, children are given a relatively small space to make decisions and direct their own *screen* play, thus putting a question mark above whether screen time could be described as freely chosen, child-directed, and child-led.

This, of course, goes beyond the consideration of definitions or inclusion in terminology. Much of the literature on play highlights the benefits children gain by the process of autonomous learning and exploration. These experiences could possibly be transferred to the digital play sphere, albeit in different forms. For instance, pretend play often involves mimicking adult behaviours, though the roles taken on can be exaggerated and qualitatively different. It has been argued that this type of play is a preparation for the behaviours and strategies suitable to the environment or culture a child is growing into (Bock, 2005; Pellegrini, Dupuis, & Smith, 2007). Through this type of play, they practice the skills they need to survive and thrive in their culture (Groos, 1898, 1901; Gray, 2013). While exploring and learning to use the tools and objects that are commonly used in their communities, children look around at what people do, what successful people do, what strategies are used, and what arguments and logics are being applied (Bjorklund, 2007).

Digital technologies can certainly be considered cultural tools, and as such, children's curiosity and eagerness to explore is not surprising. Perhaps the difficulty arises through the array of opportunities that different devices offer. The rapid development of ICTs also means that functions and possibilities are constantly expanding, which introduces a certain level of uncertainty; interactions with an iPhone are different to exploring the characteristics of cultural tools that have become more familiar over time, such as an axe. Although devices may appear to be a singular tool, their functionality is varied. Shifting the focus from considering *screen time* as a reductive catch-all term to considering singular activities may provide better parameters to allow exploration in a safe environment.

This aligns with the examples of creative or educational device usage given by parents in Chapter 8. Mathiesen's arguments may not sit well with parents, especially given their concerns and indeed experiences of inappropriate content and contact online. They are, however, a reminder that digital and online fora for children need to be safe spaces where children can participate fully and explore cultural tools, rather that spaces where children's choices are limited and subject to monitoring.

9.6 Limitations

Limitations of the studies were already discussed in Chapters 7 and 8. One difficulty with studying any phenomenon that is embedded in a wider system is that variables are bound to correlate, which warrants caution at the interpretation stage. This was managed by applying more stringent criteria when evaluating the results. Rather than focusing on statistical significance, magnitudes were judged by effect sizes.

While the longitudinal analysis offers some insight into potential long-term associations of screen time on socio-emotional outcomes, variables relating to young people at age 13 were not considered. This also limits the ability to make claims regarding the potential existence of a causal relationship between predictor variables and outcomes.

It is also important to acknowledge that the findings from the qualitative study are, by default, not generalisable. The sample was rather homogenous and therefore it does not reflect the practices of families in Ireland in general. Furthermore, the focus was not on the relationship between socio-emotional outcomes and screen time. This means that the parents' verbal accounts of children's wellbeing and behaviour cannot be equated with outcomes on a standardised measure.

One limitation inherent to research on screen time is that practices are evolving rapidly, and information may already be outdated by the time data are collected, analysed, and disseminated. In this regard, a limitation to this study is the synthesis of the findings from the quantitative and qualitative studies, as the point of data collection is almost 10 years apart. Parents' attitudes, concerns, and strategies may have changed in the meantime. Nevertheless, the current studies made a significant contribution insofar as they highlighted the complexity of screen time when considered in context. The inclusion of process, person, context, and time relativises the otherwise narrow approach of a binary exploration of screen time and socio-emotional outcomes. The mixed method approach with its convergent parallel design provides different angles to the topic of screen time. This can serve as a knowledge base and a reminder that it is a combination of circumstances, contexts, and perceptions that need to be considered alongside analyses of associations between variables.

9.7 Recommendations

Based on the importance of PPCT factor, we should also aim to always consider children's activities in the dynamic context in which they are naturally embedded. This applies both to screen and active play. Children's physical activity will not increase automatically if access to screens is limited and access to active play spaces is increased. In reality, affordances are a far more complex concept. Research studies should also broaden their studies on screen time to consider the many different types and functions of individual activities.

Pivotal to a constructive discussion about children's participation in digital discourses is the halt of the moral panic created around screen time. For this to happen, it is important to strengthen the bridge between research and the public domain, so that research findings are disseminated in the public domain in a more nuanced fashion. This applies to the differentiation of screen related activities and to the relationship between these activities and children's wellbeing.

To ensure successful and safe navigation of online spaces, it is important to support children in the acquisition of critical literacy skills. Moreover, as has been suggested elsewhere (e.g., Livingstone, Blum-Ross, Pavlick, & Ólafsson, 2018), parents need to be supported so that they have the skills to guide and assist their own children. Based on parents' strategies discussed in Chapter 8, the findings of this project support Mathiesen's (2013) suggestion for social co-use of digital devices and an open dialogue between parents and children, which encourages children to share potential negative experiences they have encountered online. This can also alleviate parents' concerns about risks and potential dangers.

Finally, consumers should demand higher standards of companies who make or provide devices, apps, websites, and services used by children to ensure that children are protected from inappropriate and unwanted content and contact. This endeavour needs to be supported by policy makers, whose task it is to hold companies accountable and regulate the digital sphere. Within this discussion, we need to draw on the research available to inform the debate, and strive to find a solution that is in the best interest of children.

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Appendix A Information Sheet

Researcher:
Mira Dobutowitsch
Education Department
Maynooth University
Co. Kildare
Email: XXXXX
Phone: XXXXX

Supervisor:
Dr. Catriona O'Toole
Education Department
Maynooth University
Co. Kildare
Email: XXXXX
Phone: XXXXX

Dear Parent/Caregiver,
my name is Mira Dobutowitsch and I am inviting you to take part in a study which will form part of my doctoral research. The aim of the study is to explore children's play and pastime activities as well as parents' decision-making around children's activities (7-12 years of age). Our society has changed a great deal in recent years, and these changes impact the way children play and the kinds of activities they engage in. I want to explore your views and experiences about modern-day childhood.
The research will involve an interview (chat style) lasting no more than 60 minutes. It will take place at a location convenient to you, such as a cafe or your home. During the conversation, I will ask you some questions about your family background, how your child(ren) like to spend their time, and about your own views, concerns and preferences in relation to your children's play.
If you are uncomfortable with any question, you do not need to answer it. All information collected will be anonymised and any identifier that may compromise the anonymity of yourself, your child/children or your family will be removed, so your identity is protected.

Data analysis will involve a thematic analysis and identify themes reoccurring across all interviews. Some of your quotes may be used to exemplify a theme or to highlight a point. These quotes will be in anonymised format also. Since this is a research project, data may also be part of a publication so that our findings can be shared with other researchers and the wider community.

All data will be stored anonymised as an encrypted file and will be kept for a minimum of 10 years. It must be recognised that, in some circumstances, confidentiality of research data and records may be overridden by courts in the event of litigation or in the course of investigation by lawful authority. In such circumstances the University will take all reasonable steps within law to ensure that confidentiality is maintained to the greatest possible extent.

It is your choice to decide if you would like to participate in this study. If you decide to participate but change your mind later, you can withdraw your consent and up until the point of publication, your data will be deleted.

If you do wish to take part we would ask you sign the consent form attached (one is for you to keep).
If you have any questions, at any stage, feel free to contact me (Mira) for further information.
Should you feel like you need support or are worried about the content of what was discussed in the interview, please contact **Parentline** on **1890 927277** or on **01 8733500**.

Appendix B Consent Form

Researcher: Mira Dobutowitsch
Email: XXXXX
Phone: XXXXX
Supervisor: Dr. Catriona O'Toole
Phone: XXXXX
Email: XXXXX

Maynooth University
Department of Education
Maynooth University
Co. Kildare

I understand and consent to the following:

- I have read and understand the information sheet provided.
- I can ask any questions I may have at any time before or after the interview.
- I consent to participating in this study.
- The main aim of the project is to look at children's pastime activities within a home context and decision making around children's free time.
- The interview will be audio recorded.
- All information collected will be treated confidentially, will be stored safely and coded so my family's and my own identity will be protected.
- My data will be available to me at my own discretion.
- The data of this study will form part of Mira Dobutowitsch's doctoral thesis and the results may be included in other publications.
- The data will be retained for a minimum of ten years.
- I can withdraw my participation at any stage if I so wish, up to the time of publication.

Name of Parent/Caregiver (block capitals please): ____________________

Signature: _____________________ Date: _____________________

If you would like to receive some information about the study once all data has been analysed, please provide your email address:___________________________

If during your participation in this study you feel the information and guidelines that you were given have been neglected or disregarded in any way, or if you are unhappy about the process, please contact the Secretary of the Maynooth University Ethics Committee at research.ethics@nuim.ie or +353 (0)1 708 6019. Please be assured that your concerns will be dealt with in a sensitive manner.

Appendix C Interview Guide

Can you tell me a little bit about yourself and your family?

Prompts: age, education, employment status, income, family structure

Can you tell me a little bit about the place where you are living?

Prompts: urban/rural, neighbourhood cohesion and safety, play spaces, other children

Can you tell me a little bit about [focus child]?

Can you tell me a little bit about a typical day in your household?

In general, do you spend much time together as a family?

Can you tell me a little bit about what [focus child] does in his/her free time?

Prompt cards:

- play (pretend play, toys, lego, etc)
- outdoor play
- board games
- reading
- TV/Video/DVD
- Computer/console games
- Mobile phone
- Internet (on phone, computer, tablet)
- Hobbies

Potential follow up Questions:

- How much day they spend on [particular activity] on an average day?
- How did you pick [focus child]'s pastime activities?
- Do you need to pay for that?
- Did the cost impact on the decision to do [particular activity]?
- Do you do these things together?
- Do you encourage [focus child] to do/play certain things and not others?
- Do you talk about the content? (books, TV/media content)

Screen time:

- Who decides what [focus child] watches on TV?
- Do you ever limit [focus child]'s screen time?
- Does s/he have free access to devices?
- Does [focus child] use the internet? If so, for what?
- How do you feel about the content that they may be exposed to?
- How you comfortable with [focus child] using them?

Do you ask others for advice?

What do you base your decisions on?

Comparing your childhood to that of [focus child], would you say that [focus child] has more restrictions or more opportunities than you had?

Being a parent, what do you find the most challenging thing about making the right decision for [focus child]?

Appendix D Time Use Weekday During Term

Breakdown of Activities on an Ordinary Weekday During Term

Activity	Mean	SD	Minimum	Maximum
Sleeping	10.48	0.83	7	16.5
Resting/Relaxing	0.54	0.62	0	4.75
Personal Care	0.60	0.39	0	5.5
At School	5.76	0.85	0	10.5
Homework	0.81	0.56	0	7.75
Travelling to/from school	0.59	0.4	0	3.75
Eating/Drinking	1.05	0.50	0	4.5
Other travelling	0.25	0.51	0	7.5
Household chores	0.11	0.29	0	4.25
Visit to relatives	0.13	0.48	0	4.5
Family Outing	0.07	0.4	0	6.5
Shopping trip	0.09	0.35	0	4
Religious Activity	0.02	0.15	0	2.25
Physical play	1.06	1.03	0	7.5
Playing board games/cards	0.12	0.35	0	4.25
General play	0.5	0.75	0	6.25
Hobbies/leisure activities	0.24	0.52	0	4.25
Reading books/comics/magazines	0.33	0.46	0	6.75
Computer/internet/game console	0.31	0.51	0	3.5
Email/Bebo/texting and calling	0.06	0.30	0	6.25
Watch TV/DVD/Videos	0.99	0.83	0	5.5

Note. Total time spend with various activities on an ordinary weekday during term (n = 3,474). Time is displayed as fractions of an hour where 0.5 is 30 minutes.

Appendix E Time Use Weekday Out of Term

Breakdown of Activities on an Ordinary Weekday Out of Term

Activity	Mean	SD	Minimum	Maximum
Sleeping	11.17	1.04	7.25	13.25
Resting/Relaxing	0.82	0.75	0	3
Personal Care	0.62	0.38	0	2.25
At School	0.90	2.10	0	7
Homework	0.19	0.57	0	6.25
Travelling to/from school	0.14	0.45	0	3.75
Eating/Drinking	1.39	0.73	0	5.75
Other travelling	0.54	1.09	0	9
Household chores	0.49	0.87	0	4.75
Visit to relatives	0.58	1.29	0	5.5
Family Outing	0.34	0.93	0	6.75
Shopping trip	0.54	1.18	0	7.5
Religious Activity	0.04	0.21	0	2
Physical play	2.07	2.36	0	11
Playing board games/cards	0.17	0.56	0	6.25
General play	0.92	1.21	0	4.75
Hobbies/leisure activities	0.22	0.65	0	5
Reading books/comics/magazines	0.53	0.77	0	3.5
Computer/internet/game console	0.53	0.73	0	3.75
Email/Bebo/texting and calling	0.05	0.24	0	2.5
Watch TV/DVD/Videos	1.60	1.32	0	6.5

Note. Average time spend with various activities on an ordinary weekday out of term (n = 204). Time is displayed as fractions of an hour where 0.5 is 30 minutes.

Appendix F Time Use Weekend Day

Breakdown of Activities on an Ordinary Weekend Day

Activity	Mean	SD	Minimum	Maximum
Sleeping	11.26	1.12	7	15
Resting/Relaxing	0.80	0.87	0	5.5
Personal Care	0.72	0.48	0	3.75
At School	0.43	1.53	0	6.75
Homework	0.11	0.35	0	3.5
Travelling to/from school	0.05	0.20	0	2.25
Eating/Drinking	1.37	0.66	0	4.5
Other travelling	0.67	0.98	0	7.25
Household chores	0.25	0.49	0	7.25
Visit to relatives	0.55	1.20	0	17.25
Family Outing	0.67	1.42	0	8.75
Shopping trip	0.59	1.12	0	10.25
Religious Activity	0.28	0.52	0	3.5
Physical play	1.63	1.62	0	9.75
Playing board games/cards	0.20	0.48	0	6
General play	0.98	1.35	0	11.25
Hobbies/leisure activities	0.36	0.74	0	5.25
Reading books/comics/magazines	0.39	0.60	0	4.25
Computer/internet/game console	0.55	0.83	0	7.5
Email/Bebo/texting and calling	0.12	0.37	0	3
Watch TV/DVD/Videos	1.99	1.44	0	8

Note. Average time spend with various activities on an ordinary weekend day (n = 962). Time is displayed as fractions of an hour where 0.5 is 30 minutes.

Appendix G Time Use Gender Difference

Table t-test Gender Differences Time Use

						Boys		Girls	
weekday during term	t	df	Sig.	Mean Diff.	SE Diff.	Mean	SD	Mean	SD
Sleeping	-2.44	3224.60	.015	-0.07	0.03	10.45	0.78	10.52	0.89
Personal care	-7.45	3084.98	<.001	-0.10	0.01	0.55	0.34	0.65	0.43
Physical play	10.06	3337.93	<.001	0.35	0.03	1.22	1.08	0.87	0.94
General play	-6.29	3311.77	<.001	-0.16	0.03	0.42	0.73	0.58	0.76
Hobbies/leisure activities	-6.71	3113.93	<.001	-0.12	0.02	0.18	0.47	0.31	0.58
Computer/internet/game console	10.08	3242.35	<.001	0.17	0.02	0.39	0.56	0.22	0.43
Reading books/comics/magazines	-3.21	3242.04	.001	-0.05	0.02	0.31	0.43	0.36	0.49
Shopping trip	-4.02	2811.12	<.001	-0.05	0.01	0.07	0.28	0.12	0.42
weekday out of term	t	df	Sig.	Mean Diff.	SE Diff.	Mean	SD	Mean	SD
Sleeping	-1.99	174.53	.048	-0.31	0.15	11.04	1.03	11.34	1.05
Eating/drinking[a]	3.32	185.00	.001	0.33	0.10	1.60	0.73	1.27	0.63
Computer/internet/game console	6.28	173.63	<.001	0.56	0.09	0.76	0.76	0.20	0.46
watch TV/DVD/videos	-2.34	127.05	.021	-0.48	0.20	1.43	0.98	1.91	1.65
Visit to relatives	-2.45	133.94	.016	-0.50	0.20	0.41	1.04	0.90	1.60
weekend	t	df	Sig.	Mean Diff.	SE Diff.	Mean	SD	Mean	SD
Sleeping[a]	-2.85	936.00	.005	-0.21	0.07	11.15	1.12	11.35	1.10
Physical play[a]	4.57	936.00	<.001	0.48	0.10	1.87	1.60	1.39	1.61
General play	-4.41	929.20	<.001	-0.38	0.09	0.78	1.22	1.17	1.45
Hobbies/leisure activities	-2.47	935.68	.014	-0.12	0.05	0.28	0.70	0.40	0.76
Computer/internet/game console	7.61	777.70	<.001	0.41	0.05	0.76	0.96	0.35	0.65
Reading books/comics/magazines	-3.31	902.90	.001	-0.13	0.04	0.33	0.51	0.46	0.68

Note. [a]equal variance assumed. Weekday during term boys n = 1,734, girls n = 1,623. Weekday out of term boys n = 104, girls n = 83. Weekend boys n = 449, girls n = 489. df = degrees of freedom. Sig. = probability value. SE = standard error. SD = standard deviation.

Appendix H Hypotheses Study II

Bivariate Analyses (Age Nine)

$\mathbf{H^{9B}1_A}$: There is an association between ST groups and overall SDQ scores for boys (parent rating).

$\mathbf{H^{9B}1_0}$: There is no association between ST groups and overall SDQ scores for boys (parent rating).

$\mathbf{H^{9B}2_A}$: There is an association between ST groups and overall SDQ scores for girls (parent rating).

$\mathbf{H^{9B}2_0}$: There is no association between ST groups and overall SDQ scores for girls (parent rating).

$\mathbf{H^{9B}3_A}$: There is an association between ST groups and overall SDQ scores for boys (teacher rating).

$\mathbf{H^{9B}3_0}$: There is no association between ST groups and overall SDQ scores for boys (teacher rating).

$\mathbf{H^{9B}4_A}$: There is an association between ST groups and overall SDQ scores for girls (teacher rating).

$\mathbf{H^{9B}4_0}$: There is no association between ST groups and overall SDQ scores for girls (teacher rating).

$\mathbf{H^{9B}5_A}$: There is an association between ST groups and overall Piers-Harris 2 scores for boys (child rating).

$\mathbf{H^{9B}5_0}$: There is no association between ST groups and overall Piers-Harris 2 scores for boys (child rating).

$\mathbf{H^{9B}6_A}$: There is an association between ST groups and overall Piers-Harris 2 scores for girls (child rating).

$\mathbf{H^{9B}6_0}$: There is no association between ST groups and overall Piers-Harris 2 scores for girls (child rating).

Regression Analyses (Age Nine)

$H^{9R}1_A$: ST group affiliation at age nine can predict overall SDQ scores for boys at age nine (parent rating) once PPCT factors are considered.

$H^{9R}1_0$: ST group affiliation at age nine cannot predict overall SDQ scores for boys at age nine (parent rating) once PPCT factors are considered.

$H^{9R}2_A$: ST group affiliation at age nine can predict overall SDQ scores for girls at age nine (parent rating) once PPCT factors are considered.

$H^{9R2}{}_0$: ST group affiliation at age nine cannot predict overall SDQ scores for girls at age nine (parent rating) once PPCT factors are considered.

$H^{9R}3_A$: ST group affiliation at age nine can predict overall SDQ scores for boys at age nine (teacher rating) once PPCT factors are considered.

$H^{9R3}{}_0$: ST group affiliation at age nine cannot predict overall SDQ scores for boys at age nine (teacher rating) once PPCT factors are considered.

$H^{9R}4_A$: ST group affiliation at age nine can predict overall SDQ scores for girls at age nine (teacher rating) once PPCT factors are considered.

$H^{9R4}{}_0$: ST group affiliation at age nine cannot predict overall SDQ scores for girls at age nine (teacher rating) once PPCT factors are considered.

$H^{9R}5_A$: ST group affiliation at age nine can predict overall Piers-Harris 2 scores for boys at age nine (child rating) once PPCT factors are considered.

$H^{9R}5_0$: ST group affiliation at age nine cannot predict overall Piers-Harris 2 scores for boys at age nine (child rating) once PPCT factors are considered.

$H^{9R}6_A$: ST group affiliation at age nine can predict overall Piers-Harris 2 scores for girls at age nine (child rating) once PPCT factors are considered.

$H^{9R}6_0$: ST group affiliation at age nine cannot predict overall Piers-Harris 2 scores for girls at age nine (child rating) once PPCT factors are considered.

Appendix I SDQ Subscales P9

There were significant differences between the screen time groups and scores on the SDQ Emotional Symptoms subscale for boys with Welch's $F(2, 1{,}959) = 18.33$, $p < .001$. As can be seen in Figure I.1, the high screen time group scored significantly higher ($M = 2.34$, $SD = 2.14$) than the low ($M = 1.92$, $SD = 2.07$, d(low-high) = -0.21, small effect size) and the mid screen time group ($M = 1.89$, $SD = 1.90$, d(mid-high) = -0.22, small effect size). There was also a significant difference for girls with Welch's $F(2, 1{,}628) = 16.97$, $p < .001$. As Figure I.1 shows, all three groups were significantly different from each other with the low screen time group scoring lowest ($M = 2.04$, $SD = 2.05$), the mid group in the mid ($M = 2.29$, $SD = 2.05$, d(low-mid) = -0.12, very small effect size; d(mid-high) = -0.17, very small effect size) and the high screen time group scoring highest ($M = 2.64$, $SD = 2.19$, d(low-high) = -0.29, small effect size).

Figure I.1 P9 SDQ Emotional Symptoms Subscale and Screen Time Groups

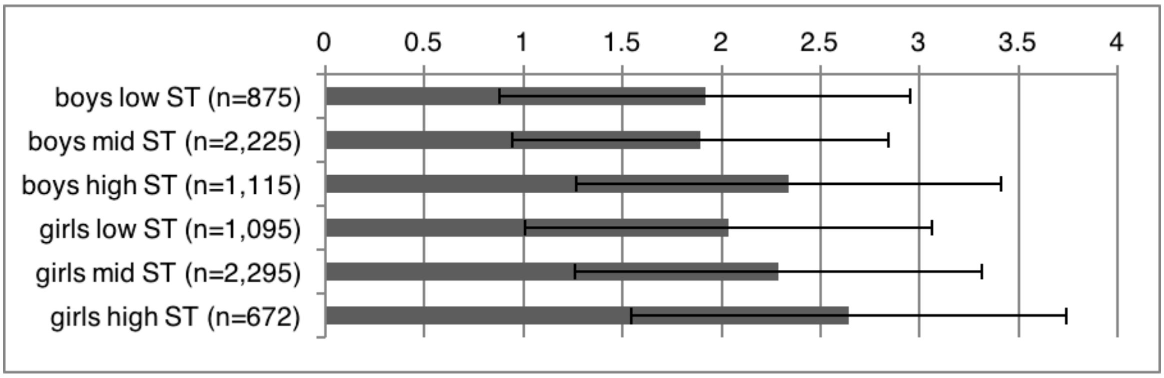

Figure I.1. Average SDQ Emotional Symptoms subscale scores (parental rating) broken down by screen time group and gender. Higher scores indicate more emotional difficulties. P9 = primary caregiver's rating at Wave 1. Error bars represent ± 1 SD.

There were significant differences between the screen time groups and scores on the SDQ Conduct Problems subscale for boys with Welch's $F(2, 1{,}944) = 6.62$, $p = .001$. As Figure I.2 shows, the high screen time group scored significantly higher ($M = 1.59$, $SD = 1.62$) than the low ($M = 1.59$, $SD = 1.62$, d(low-high) = -0.13, very small effect size) and the mid screen time group ($M = 1.59$, $SD = 1.62$, d(mid-high) = -0.13, very small effect size).

There was also a significant difference for girls with Welch's $F(2, 1641) = 18.47$, $p < .001$. As can be seen in Figure I.2, all three groups were significantly different from each other with the low screen time group scoring lowest ($M = 1.13$, $SD = 1.41$), the mid group in the middle ($M = 1.30$, $SD = 1.45$, d(low-mid) = -0.11, very small effect size; d(mid-high) = -0.19, very small effect size), and the high screen time group scoring highest ($M = 1.57$, $SD = 1.51$, d(low-high) = -0.30, small effect size).

Figure I.2 P9 SDQ Conduct Problems Subscale and Screen Time Groups

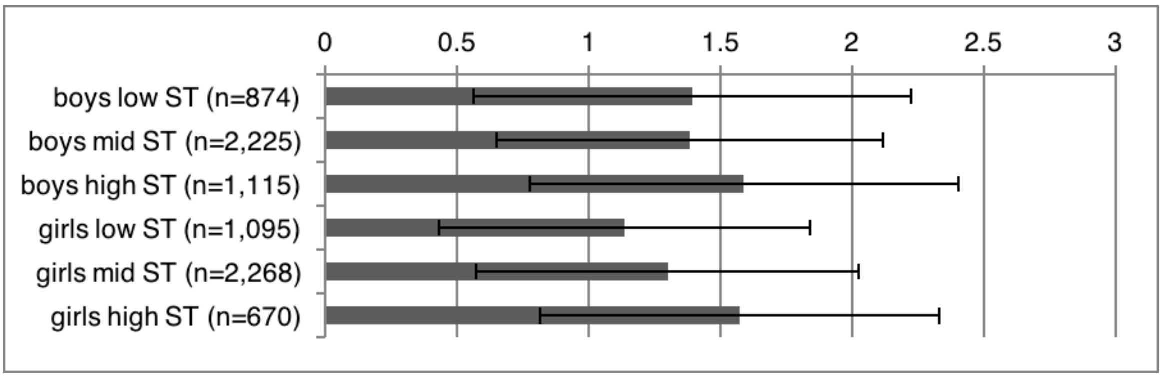

Figure I.2. Average SDQ Conduct Problems subscale scores (parental rating) broken down by screen time group and gender. Higher scores indicate more Conduct Problems. P9 = primary caregiver's rating at Wave 1. Error bars represent ± 1 SD.

There was no significant difference between the screen time groups and scores on the SDQ Hyperactivity/Inattention subscale for boys. Even though Figure I.3 shows a slightly higher score for the high screen time group, there was no statistically significant difference between either of the groups. There was a significant difference for girls with Welch's $F(2, 1{,}633) = 11.75$, $p < .001$. As can be seen in Figure I.3, the high screen time group ($M = 3.31$, $SD = 2.45$) scored significantly higher than the low ($M = 2.77$, $SD = 2.35$, d(low-high) = -0.23, small effect size) and the mid screen time group ($M = 2.85$, $SD = 2.33$, d(mid-high) = -0.20, small effect size).

Figure I.3 P9 SDQ Hyperactivity/inattention Subscale and Screen Time Groups

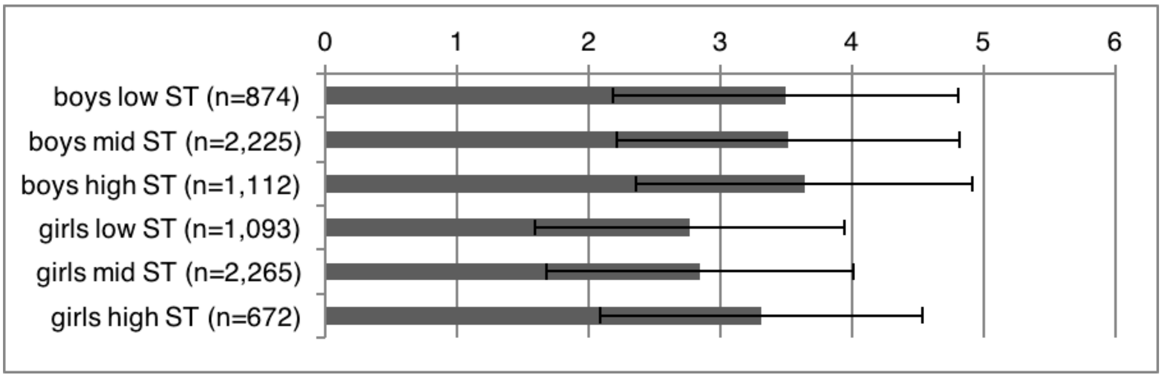

Figure I.3. Average SDQ Hyperactivity/Inattention subscale scores (parental rating) broken down by screen time group and gender. Higher scores indicate more hyperactivity. P9 = primary caregiver's rating at Wave 1. Error bars represent ± 1 SD.

There were significant differences between the screen time groups and scores on the SDQ Peer Relationship Problems subscale for boys with Welch's $F(2, 1{,}973) = 13.91$, $p < .001$. As can be seen in Figure I.4, the high screen time group scored significantly higher ($M = 1.48$, $SD = 1.70$) than the low ($M = 1.17$, $SD = 1.49$, d(low-high) = -0.20, small effect size) and the mid screen time group ($M = 1.17$, $SD = 1.45$, d(mid-high) = -0.20, small effect size). There was also a significant difference for girls with Welch's $F(2, 1{,}559) = 9.64$, $p < .001$. As Figure I.4 shows, the high screen time group ($M = 1.51$, $SD = 1.69$) scored significantly higher than the low ($M = 1.17$, $SD = 1.42$, d(low-high) = -0.23, small effect size) and the mid screen time group ($M = 1.24$, $SD = 1.38$, d(mid-high) = -0.19, very small effect size).

Figure I.4 P9 SDQ Peer Relationship Problems Subscale and Screen Time Groups

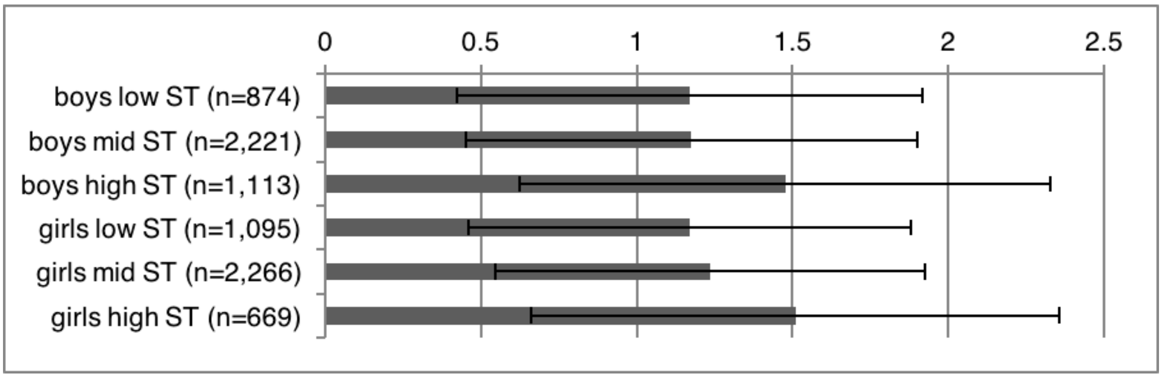

Figure I.4. Average SDQ Peer Relationship Problems subscale scores (parental rating) broken down by screen time group and gender. Higher scores indicate more Peer Relationship Problems. P9 = primary caregiver's rating at Wave 1. Error bars represent ± 1 SD.

There are no significant differences between the screen time groups and scores on the SDQ Prosocial Behaviour subscale for boys. Even though Figure I.5 shows a difference in means between groups, once the lack of homogeneity is factored in, Welch's *F* was not significant (*p* = .054). There was a significant difference for girls with Welch's *F*(2, 1,585) = 7.16, *p* = .001. As can be seen in Figure I.5, all three groups were significantly different from each other with the low screen time group scoring highest (*M* = 9.17, *SD* = 1.26), the mid group in the middle (*M* = 9.06, *SD* = 1.29, *d*(low-mid) = 0.09, very small effect size; *d*(mid-high) = 0.11, very small effect size), and the high screen time group scoring lowest (*M* = 8.92, *SD* = 1.53, *d*(low-high) = 0.19, very small effect size).

Figure I.5 P9 SDQ Prosocial Subscale and Screen Time Groups

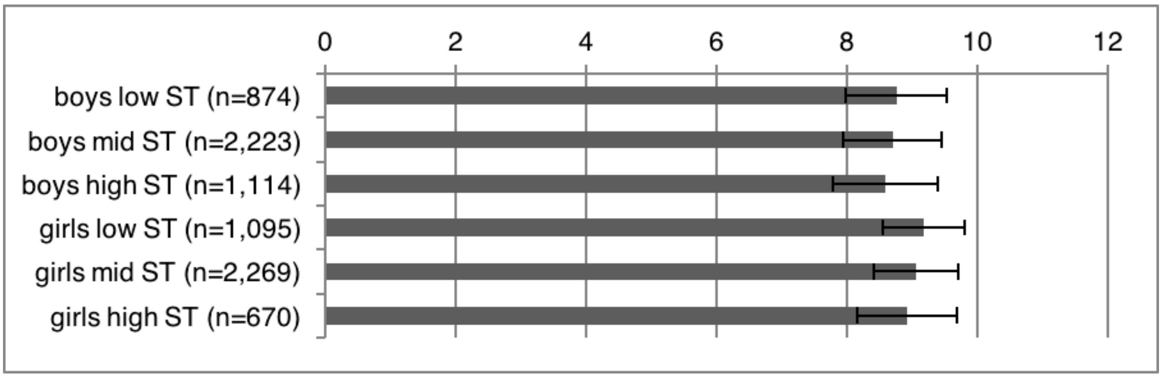

Figure I.5. Average SDQ Prosocial Behaviour subscale scores (parental rating) broken down by screen time group and gender. Higher scores indicate more Prosocial Behaviour. P9 = primary caregiver's rating at Wave 1. Error bars represent ± 1 SD.

Appendix J SDQ Subscales T9

There were significant differences between the screen time groups and scores on the SDQ Emotional Symptoms subscale for boys with Welch's $F(2, 2{,}055) = 4.21$, $p = .015$. As can be seen in Figure J.1, the high screen time scored significantly higher ($M = 1.50$, $SD = 2.06$) than the low ($M = 1.28$, $SD = 1.70$, d(low-high) = -0.12, very small effect size) and the mid screen time group ($M = 1.31$, $SD = 1.87$, d(mid-high) = -0.10, very small effect size). There was also a significant difference for girls with Welch's $F(2, 1{,}622.01) = 5.13$, $p = .006$. Although Figure J.1 shows a difference between all three groups, only the difference between the low ($M = 1.38$, $SD = 1.89$) and the high screen time group ($M = 1.70$, $SD = 2.17$, d(low-high) = -0.16, very small effect size) was statistically significant.

Figure J.1 T9 SDQ Emotional Symptoms Subscale and Screen Time Groups

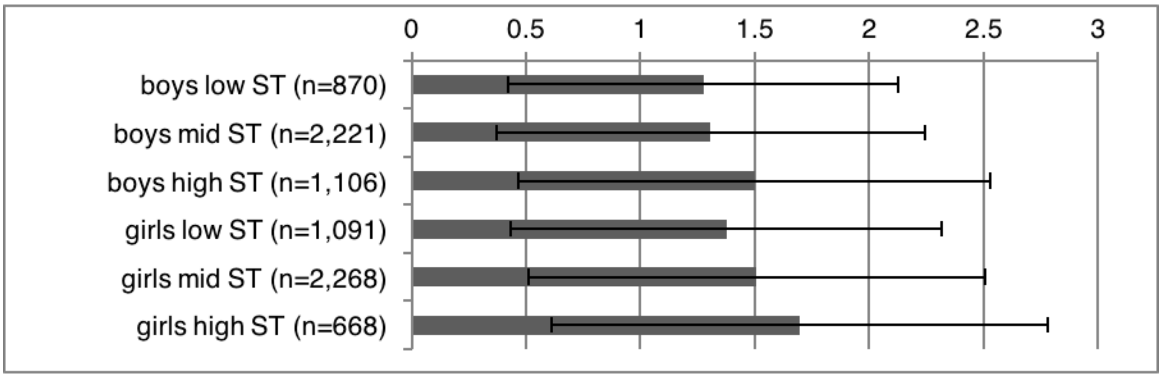

Figure J.1. Average SDQ Emotional Symptoms subscale scores (teacher's rating) broken down by screen time group and gender. Higher scores indicate more emotional difficulties. T9 = teacher's rating at Wave 1. Error bars represent ± 1 SD.

There were significant differences between the screen time groups and scores on the SDQ Conduct Problems subscale for boys with Welch's $F(2, 2{,}061) = 6.44$, $p = .002$. The only difference was between the high and the low screen time groups; the high screen time group scored significantly lower ($M = 0.91$, $SD = 1.60$) than the low screen time group ($M = 1.19$, $SD = 1.80$, d(low-high) = 0.16, very small effect size). There was no significant difference for girls. Figure J.2 shows a slight dip for the mid screen time group but the variance within the groups was rather large so the difference was not statistically significant.

Figure J.2 T9 SDQ Conduct Problems Subscale and Screen Time Groups

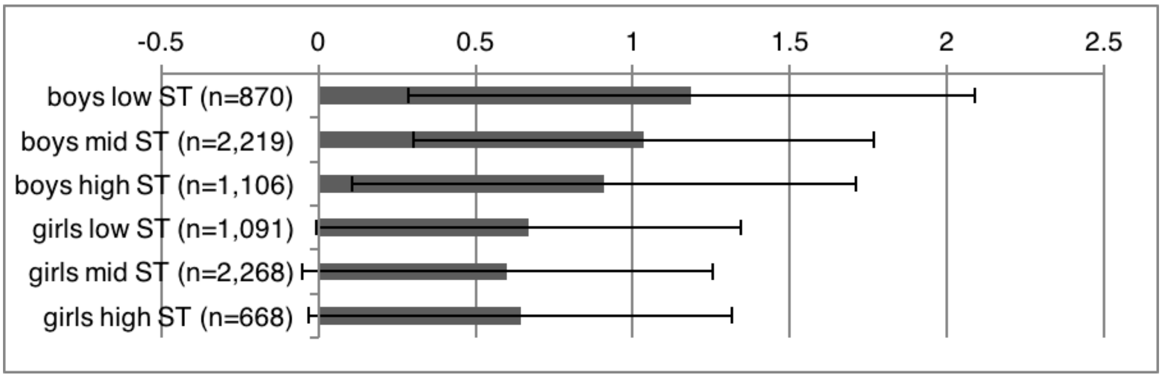

Figure J.2. Average SDQ conduct subscale scores (teacher's rating) broken down by screen time group and gender. Higher scores indicate more Conduct Problems. T9 = teacher's rating at Wave 1. Error bars represent ± 1 SD.

There was a statistically significant difference between the screen time groups and scores on the SDQ Hyperactivity/Inattention subscale for boys with Welch's $F(2, 1{,}982) = 8.04$, $p < .001$. As is visible in Figure J.3, the low screen time group scored significantly higher ($M = 3.56$, $SD = 3.19$) than both the mid ($M = 3.12$, $SD = 2.93$, d(low-mid) = 0.14, very small effect size) and the high screen time group ($M = 13.02$, $SD = 2.94$, d(low-high) = 0.18, very small effect size). There was no significant difference for girls. Figure J.3 shows a slight raise for the high screen time group but the difference was not statistically significant.

Figure J.3 T9 SDQ Hyperactivity/Inattention Subscale and Screen Time Groups

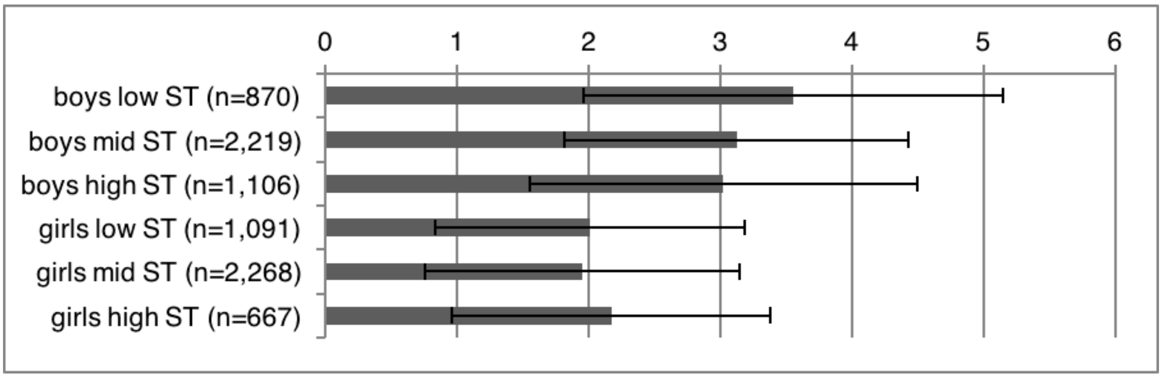

Figure J.3. Average SDQ Hyperactivity/Inattention scores (teacher's rating) broken down by screen time group and gender. Higher scores indicate more Hyperactivity/Inattention. T9 = teacher's rating at Wave 1. Error bars represent ± 1 SD.

There was no significant difference between the screen time groups and scores on the SDQ Peer Relationship Problems subscale for boys. There was a significant difference for girls with Welch's $F(2, 1585) = 4.04$, $p = .018$. The mid ($M = 0.93$, $SD = 1.53$) and the high screen time groups ($M = 1.14$, $SD = 21.78$, d =(mid-high) = -0.14, very small effect size) differed significantly from each other, as can be seen in Figure J.4.

Figure J.4 T9 SDQ Peer Relationship Problems Subscale and Screen Time Groups

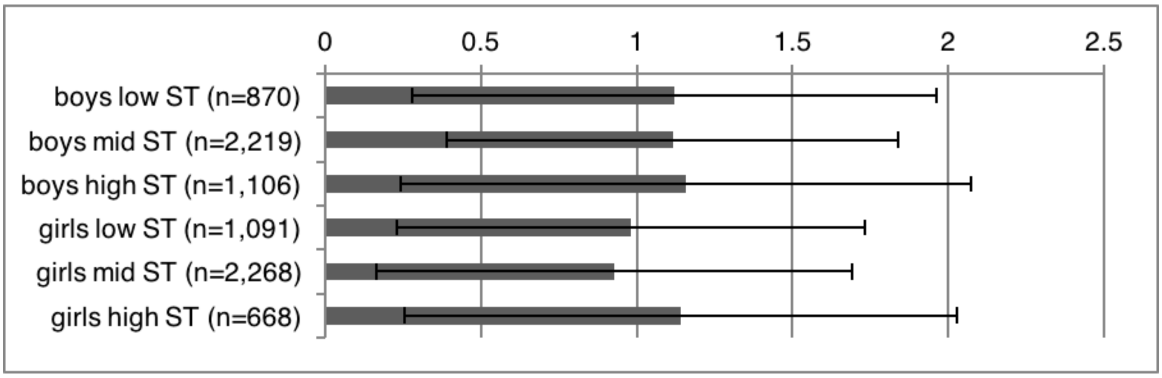

Figure J.4. Average SDQ Peer Relationship Problems subscale scores (teacher's rating) broken down by screen time group and gender. Higher scores indicate more Peer Relationship Problems. T9 = teacher's rating at Wave 1. Error bars represent ± 1 SD.

There were no significant differences between the screen time groups and scores on the SDQ Prosocial Behaviour subscale for boys. There was a significant difference for girls with Welch's $F(2, 1{,}610) = 4.66$, $p = .011$. As Figure J.5 shows, the mid screen time group scores highest ($M = 8.82$, $SD = 1.75$) and their average score differed significantly from the low screen time group ($M = 8.63$, $SD = 1.91$, d(low-mid) = -0.10, very small effect size).

Figure J.5 T9 Prosocial Behaviour subscale and Screen Time Groups

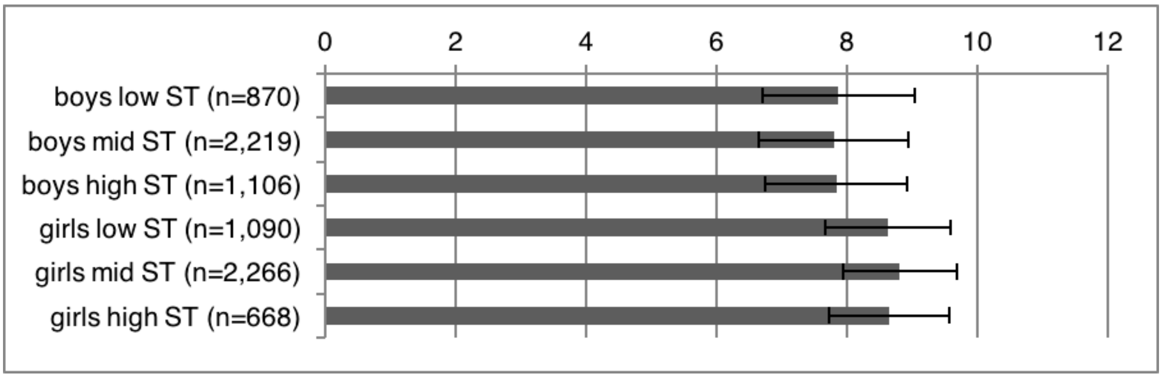

Figure J.5. Average SDQ prosocial subscale scores (teacher's rating) broken down by screen time group and gender. Higher scores indicate more Prosocial Behaviour. T9 = teacher's rating at Wave 1. Error bars represent ± 1 SD.

Appendix K Adverse Life Events

Adverse Life Events

Adverse Life Event	% of children (n)
Death of a Parent	2.5% (*n* = 216)
Death of a close family member	42.2% (*n* = 3,613)
Death of a close friend	6% (*n* = 518)
Divorce/separation of parents	14.6% (*n* = 1,254)
Moving House	41.8% (*n* = 3,579)
Moving Country	10.3% (*n* = 879)
Stay in foster home/residential care	1.3% (*n* = 115)
Serious illness/injury	4.7% (*n* = 405)
Serious illness/injury of a family member	13.3% (*n* = 1,136)
Drug taking/alcoholism in the immediate family	3.4% (*n* = 295)
Mental disorder in the immediate family	3.5% (*n* = 302)
Conflict between parents	12.2% (*n* = 1,048)
Parent in prison	0.9% (*n* = 79)
Other disturbing event	1.8% (*n* = 153)
None of the above	21.3% (*n* = 1,826)

Note. Percentage of children who had ever experiences one of the adverse life events listed according to their primary caregiver (*N* = 8,568).

Appendix L SDQ P9 Boys' Statistics

Descriptive Statistics of Average Scores for Dummy Variables used in Regression

SDQ P9	N	Mean	SD
Boys overall	4197	8.25	5.46
Screen time (ref:mid 50%)			
Low screen time	870	7.98	5.80
High screen time	1106	9.04	5.72
Health: sometimes/always unwell	53	11.90	7.34
Chronic, physical, or mental illness	517	11.79	7.15
Obese (according to BMI)	545	13.31	6.36
Learning difficulty	208	10.21	6.07
Temperament (ref:mid 50%)			
Low shyness	1068	7.33	4.78
High shyness	1051	9.82	6.00
Low emotionality	1188	9.78	6.23
High emotionality	970	7.94	5.05
Low sociability	789	9.56	5.77
High sociability	1169	7.81	5.43
Drumcondra test scores (ref:mid 50%)			
Low reading score	1065	10.43	6.24
High reading score	1054	6.93	5.12
Low maths score	1053	10.52	6.28
High maths score	1175	6.64	4.85
Structured activities (ref:1-2)			
No activity	423	10.27	5.95
3+ activities	350	7.94	5.52
Number of close friends (ref:2-5)			
0-1 close friends	325	12.79	7.24
6+ close friends	752	6.93	4.68
Victim of bullying	963	11.68	6.31
Parenting style other than authoritative	904	8.64	5.51
Family time (ref:mid 50%)			
Low family time	1268	8.97	5.71
High family time	1024	7.63	5.24

Table continued

Parent-Child relationship (ref:mid 50%)			
Low conflict	1217	5.12	3.74
High conflict	1039	12.86	6.00
Low closeness	1090	10.07	5.91
High closeness	823	7.55	5.24
Low dependence	966	6.78	4.48
High dependence	1042	10.44	6.15
Adverse life events (ref:1-2)			
No adverse life events	946	6.90	4.64
3+ adverse life events	830	10.13	5.98
PC meets depression cut-off point	324	11.71	6.07
PC level of education (ref:mid 50%)			
Low PC education	1174	9.78	5.92
High PC education	780	6.69	4.66
Household income (ref:2nd quintile)			
Lowest quintile	737	9.23	5.61
3rd quintile	821	8.12	5.24
4th quintile	762	8.29	5.80
Highest quintile	854	7.08	4.89
Single-parent family	705	10.32	5.90
Siblings (ref:1-2 siblings)			
No siblings	385	9.24	5.32
3-5 siblings	1079	8.21	5.82
Urban area	1839	8.48	5.52
Neighbourhood safety (ref:mid 50%)			
Low safety	1029	9.84	5.92
High safety	1225	7.05	5.00

Note. N refers to the number of boys in the respective category of the dummy variables created for the regression analysis.

Appendix M SDQ P9 Girls' Statistics

Descriptive Statistics of Average Scores for Dummy Variables used in Regression

SDQ P9	N	Mean	SD
Girls overall	4025	7.74	5.18
Screen time (ref:mid 50%)			
Low screen time	1093	7.11	5.24
High screen time	669	9.02	5.60
Health: sometimes/always unwell	77	9.59	5.71
Chronic, physical, or mental illness	390	10.55	6.06
Obese (according to BMI)	286	9.90	6.08
Learning difficulty	325	12.21	6.20
Temperament (ref:mid 50%)			
Low shyness	1127	9.33	5.49
High shyness	1127	9.33	5.49
Low emotionality	1026	8.94	5.64
High emotionality	1055	7.76	5.16
Low sociability	982	9.06	5.78
High sociability	849	7.30	5.02
Drumcondra test scores (ref:mid 50%)			
Low reading score	942	9.74	5.83
High reading score	935	6.18	4.45
Low maths score	987	9.76	5.85
High maths score	828	6.08	4.14
Structured activities (ref:1-2)			
No activity	436	9.44	5.71
3+ activities	578	7.70	5.00
Number of close friends (ref:2-5)			
0-1 close friends	356	10.28	6.41
6+ close friends	672	7.19	4.77
Victim of bullying	959	10.37	5.77
Parenting style other than authoritative	843	7.69	5.01
Family time (ref:mid 50%)			
Low family time	957	9.02	5.66
High family time	1024	7.63	5.24

Table continued

High dependence	1251	9.40	5.47
Adverse life events (ref:1-2)			
No adverse life events	823	6.67	4.69
3+ adverse life events	848	9.57	5.51
PC meets depression cut-off point	358	10.63	5.91
PC level of education (ref:mid 50%)			
Low PC education	1311	9.24	5.80
High PC education	642	5.97	4.46
Household income (ref:2nd quintile)			
Lowest quintile	800	9.30	6.09
3rd quintile	738	7.61	4.94
4th quintile	752	7.05	4.76
Highest quintile	695	6.42	4.46
Single-parent family	785	9.24	5.27
Siblings (ref:1-2 siblings)			
No siblings	453	9.26	5.93
3-5 siblings	1027	7.41	5.23
Urban area	1810	7.77	5.26
Neighbourhood safety (ref:mid 50%)			
Low safety	1163	9.14	5.68
High safety	1031	6.79	4.51

Note. N refers to the number of girls in the respective category of the dummy variables created for the regression analysis.

Appendix N SDQ T9 Boys' Statistics

Descriptive Statistics of Average Scores for Dummy Variables used in Regression

SDQ T9	N	Mean	SD
Boys overall	4196	6.70	6.19
Screen time (ref:mid 50%)			
Low screen time	869	7.14	6.30
High screen time	1106	6.59	6.13
Health: sometimes/always unwell	51	9.12	7.91
Chronic, physical, or mental illness	514	9.61	7.88
Obese (according to BMI)	206	6.81	6.00
Learning difficulty	538	11.61	7.51
Temperament (ref:mid 50%)			
Low shyness	1076	7.08	6.05
High shyness	1044	6.82	6.65
Low emotionality	1185	7.50	6.86
High emotionality	967	6.80	5.58
Low sociability	784	7.01	6.03
High sociability	1166	6.79	6.22
Drumcondra test scores (ref:mid 50%)			
Low reading score	1061	9.22	6.79
High reading score	1054	5.21	5.63
Low maths score	1051	9.17	6.72
High maths score	1172	4.37	5.02
Structured activities (ref:1-2)			
No activity	425	8.87	6.75
3+ activities	348	7.65	6.58
Number of close friends (ref:2-5)			
0-1 close friends	322	9.88	7.91
6+ close friends	751	5.55	5.19
Victim of bullying	961	9.59	7.43
Parenting style other than authoritative	900	7.28	6.22
Family time (ref:mid 50%)			
Low family time	1274	6.54	5.79
High family time	1020	7.05	6.80

Table continued

Parent-Child relationship (ref:mid 50%)			
Low conflict	1215	4.98	5.04
High conflict	1033	8.74	7.15
Low closeness	1087	7.68	6.67
High closeness	820	6.48	6.25
Low dependence	964	5.88	5.49
High dependence	1042	7.71	6.85
Adverse life events (ref:1-2)			
No adverse life events	947	5.64	5.47
3+ adverse life events	830	8.26	7.01
PC meets depression cut-off point	320	7.89	6.69
PC level of education (ref:mid 50%)			
Low PC education	1176	8.07	6.46
High PC education	779	5.39	5.57
Household income (ref:2nd quintile)			
Lowest quintile	734	9.02	7.23
3rd quintile	827	6.33	5.69
4th quintile	766	5.96	5.79
Highest quintile	848	5.69	5.76
Single-parent family	713	9.04	7.19
Siblings (ref:1-2 siblings)			
No siblings	392	8.26	7.34
3-5 siblings	1075	7.27	6.63
Urban area	1834	7.06	6.45
Neighbourhood safety (ref:mid 50%)			
Low safety	1030	7.50	6.64
High safety	1226	6.63	6.18

Note. N refers to the number of boys in the respective category of the dummy variables created for the regression analysis.

Appendix O SDQ T9 Girls' Statistics

Descriptive Statistics of Average Scores for Dummy Variables used in Regression

SDQ T9	N	Mean	SD
Girls overall	4027	5.11	5.26
Screen time (ref:mid 50%)			
Low screen time	1091	5.03	5.12
High screen time	667	5.65	5.43
Health: sometimes/always unwell	77	6.37	4.89
Chronic, physical, or mental illness	391	7.60	6.90
Obese (according to BMI)	291	6.74	6.82
Learning difficulty	321	9.45	6.74
Temperament (ref:mid 50%)			
Low shyness	857	5.50	5.49
High shyness	1122	5.45	5.75
Low emotionality	1026	5.65	5.89
High emotionality	1056	5.21	4.99
Low sociability	982	5.36	5.43
High sociability	850	5.30	5.42
Drumcondra test scores (ref:mid 50%)			
Low reading score	945	8.00	6.35
High reading score	933	3.43	4.10
Low maths score	986	7.43	6.16
High maths score	828	3.32	4.08
Structured activities (ref:1-2)			
No activity	435	6.17	5.83
3+ activities	578	5.23	5.18
Number of close friends (ref:2-5)			
0-1 close friends	362	6.10	6.03
6+ close friends	670	5.18	5.38
Victim of bullying	959	6.91	6.05
Parenting style other than authoritative	847	5.30	5.54
Family time (ref:mid 50%)			
Low family time	952	5.48	5.71
High family time	1270	4.99	5.10

Table continued

High dependence	1251	5.30	5.24
Adverse life events (ref:1-2)			
No adverse life events	828	4.20	4.70
3+ adverse life events	849	6.39	5.42
PC meets depression cut-off point	359	6.65	5.81
PC level of education (ref:mid 50%)			
Low PC education	1308	6.69	6.03
High PC education	642	3.75	4.41
Household income (ref:2nd quintile)			
Lowest quintile	804	7.30	6.45
3rd quintile	739	4.52	4.48
4th quintile	755	3.92	4.16
Highest quintile	693	3.75	4.25
Single-parent family	784	7.09	6.05
Siblings (ref:1-2 siblings)			
No siblings	447	6.79	5.72
3-5 siblings	1031	5.33	5.66
Urban area	1805	5.39	5.42
Neighbourhood safety (ref:mid 50%)			
Low safety	1165	6.04	5.99
High safety	1032	4.77	4.79

Note. N refers to the number of girls in the respective category of the dummy variables created for the regression analysis.

Appendix P Piers-Harris 2 C9 Boys' Statistics

Descriptive Statistics of Average Scores for Dummy Variables used in Regression

Piers-Harris 2 C9	N	Mean	SD
Boys overall	3908	46.48	8.81
Screen time (ref:mid 50%)			
Low screen time	812	45.88	9.64
High screen time	1035	46.81	8.36
Health: sometimes/always unwell	48	44.98	6.82
Chronic, physical, or mental illness	465	45.89	8.47
Obese (according to BMI)	202	45.46	8.60
Learning difficulty	464	42.45	9.17
Temperament (ref:mid 50%)			
Low shyness	1012	46.37	9.29
High shyness	959	46.01	8.98
Low emotionality	1078	45.70	8.85
High emotionality	916	46.97	8.87
Low sociability	717	44.98	8.48
High sociability	1096	47.09	9.19
Drumcondra test scores (ref:mid 50%)			
Low reading score	967	43.50	8.82
High reading score	976	48.60	8.03
Low maths score	972	43.41	9.11
High maths score	1114	49.07	7.46
Structured activities (ref:1-2)			
No activity	386	44.70	7.91
3+ activities	327	46.82	8.95
Number of close friends (ref:2-5)			
0-1 close friends	282	44.91	8.72
6+ close friends	711	47.05	9.09
Victim of bullying	906	44.07	9.45
Parenting style other than authoritative	844	44.71	9.25
Family time (ref:mid 50%)			
Low family time	1195	46.11	9.03
High family time	945	46.51	9.07

Table continued

High dependence	956	45.59	9.19
Adverse life events (ref:1-2)			
No adverse life events	883	47.37	8.04
3+ adverse life events	743	44.92	9.89
PC meets depression cut-off point	294	45.28	8.94
PC level of education (ref:mid 50%)			
Low PC education	1095	46.17	8.28
High PC education	732	47.39	8.30
Household income (ref:2nd quintile)			
Lowest quintile	667	44.56	9.27
3rd quintile	773	46.82	8.65
4th quintile	721	46.94	8.34
Highest quintile	794	47.09	9.11
Single-parent family	642	44.72	10.24
Siblings (ref:1-2 siblings)			
No siblings	369	45.96	9.45
3-5 siblings	992	46.51	8.61
Urban area	1728	46.60	9.26
Neighbourhood safety (ref:mid 50%)			
Low safety	965	45.99	9.05
High safety	1133	46.61	8.77

Note. N refers to the number of boys in the respective category of the dummy variables created for the regression analysis.

Appendix Q Piers-Harris 2 C9 Girls' Statistics

Descriptive Statistics of Average Scores for Dummy Variables used in Regression

Piers-Harris 2 C9	N	Mean	SD
Girls overall	3774	46.16	8.53
Screen time (ref:mid 50%)			
Low screen time	1008	46.00	8.50
High screen time	630	45.62	8.27
Health: sometimes/always unwell	74	47.03	7.72
Chronic, physical, or mental illness	350	45.44	8.99
Obese (according to BMI)	267	44.66	8.75
Learning difficulty	276	41.49	9.18
Temperament (ref:mid 50%)			
Low shyness	816	46.58	8.75
High shyness	1050	45.57	8.16
Low emotionality	955	45.05	9.00
High emotionality	990	46.41	8.29
Low sociability	910	45.39	8.43
High sociability	799	47.81	7.87
Drumcondra test scores (ref:mid 50%)			
Low reading score	878	42.81	9.08
High reading score	890	48.05	8.16
Low maths score	903	43.02	9.28
High maths score	789	48.51	7.76
Structured activities (ref:1-2)			
No activity	409	44.47	9.47
3+ activities	545	46.18	8.69
Number of close friends (ref:2-5)			
0-1 close friends	323	43.64	9.40
6+ close friends	638	46.16	8.69
Victim of bullying	887	43.53	9.14
Parenting style other than authoritative	809	46.00	8.46
Family time (ref:mid 50%)			
Low family time	908	45.11	9.02
High family time	1185	46.83	8.20

Table continued

Adverse life events (ref:1-2)			
No adverse life events	787	47.06	8.16
3+ adverse life events	783	45.11	8.89
PC meets depression cut-off point	328	43.94	9.50
PC level of education (ref:mid 50%)			
Low PC education	1201	45.11	8.65
High PC education	601	47.31	7.80
Household income (ref:2nd quintile)			
Lowest quintile	728	43.65	9.51
3rd quintile	707	46.90	8.49
4th quintile	715	47.22	7.91
Highest quintile	656	46.88	8.29
Single-parent family	723	44.90	9.23
Siblings (ref:1-2 siblings)			
No siblings	414	45.98	8.66
3-5 siblings	943	45.44	8.33
Urban area	1683	46.93	8.23
Neighbourhood safety (ref:mid 50%)			
Low safety	1099	45.28	9.11
High safety	982	46.18	8.34

Note. N refers to the number of girls in the respective category of the dummy variables created for the regression analysis.

Appendix R Hypotheses Study III

Bivariate Analyses (Age 13)

$\mathbf{H^{13B}1_A}$: There is an association between ST groups at age nine and overall SDQ scores for boys (parent rating).

$\mathbf{H^{13B}1_0}$: There is no association between ST groups at age nine and overall SDQ scores for boys (parent rating) at age 13.

$\mathbf{H^{13B}2_A}$: There is an association between ST groups at age nine and overall SDQ scores for girls (parent rating) at age 13.

$\mathbf{H^{13B}2_0}$: There is no association between ST groups at age nine and overall SDQ scores for girls (parent rating) at age 13.

$\mathbf{H^{13B}3_A}$: There is an association between ST groups at age nine and overall Piers-Harris 2 scores for boys (child rating) at age 13.

$\mathbf{H^{13B}3_0}$: There is no association between ST groups at age nine and overall Piers-Harris 2 scores for boys (child rating) at age 13.

$\mathbf{H^{13B}4_A}$: There is an association between ST groups at age nine and overall Piers-Harris 2 scores for girls (child rating) at age 13.

$\mathbf{H^{913B}4_0}$: There is no association between ST groups at age nine and overall Piers-Harris 2 scores for girls (child rating) at age 13.

Regression Analyses (Age 13)

$H^{13R}1_A$: ST group affiliation at age nine can predict overall SDQ scores for boys at age 13 (parent rating) once PPCT factors are considered.

$H^{13R}1_0$: ST group affiliation at age nine cannot predict overall SDQ scores for boys at age 13 (parent rating) once PPCT factors are considered.

$H^{13R}2_A$: ST group affiliation at age nine can predict overall SDQ scores for girls at age 13 (parent rating) once PPCT factors are considered.

$H^{13R2}{}_0$: ST group affiliation at age nine cannot predict overall SDQ scores for girls at age 13 (parent rating) once PPCT factors are considered.

$H^{13R}3_A$: ST group affiliation at age nine can predict overall Piers-Harris 2 scores for boys at age 13 (child rating) once PPCT factors are considered.

$H^{13R}3_0$: ST group affiliation at age nine cannot predict overall Piers-Harris 2 scores for boys at age 13 (child rating) once PPCT factors are considered.

$H^{13R}4_A$: ST group affiliation at age nine can predict overall Piers-Harris 2 scores for girls at age 13 (child rating) once PPCT factors are considered.

$H^{13R}4_0$: ST group affiliation at age nine cannot predict overall Piers-Harris 2 scores for girls at age 13 (child rating) once PPCT factors are considered.

Appendix S SDQ Subscales P13

There was a significant difference between screen time groups on the Emotional Symptoms subscale for boys with Welch's $F(2, 1{,}778) = 13.54$, $p < .001$. As can be seen in Figure S.1, the high screen time group scored highest ($M = 1.97$, $SD = 2.04$) and was significantly different from the low ($M = 1.52$, $SD = 1.81$, d(low-high) = -0.23, small effect size) and the mid screen time group ($M = 1.63$, $SD = 1.91$, d(mid-high) = -0.17, very small effect size).

There was also a significant difference for girls with Welch's $F(2, 1{,}431) = 11.41$, $p < .001$. Again, the high screen time group scored highest ($M = 2.49$, $SD = 2.26$) and was significantly different from the low ($M = 1.98$, $SD = 2.01$, d(low-high) = -0.25, small effect size) and the mid screen time group ($M = 2.03$, $SD = 2.01$, d(mid-high) = -0.22, small effect size).

Figure S.1 P13 SDQ Emotional Symptoms Subscale and Screen Time Groups

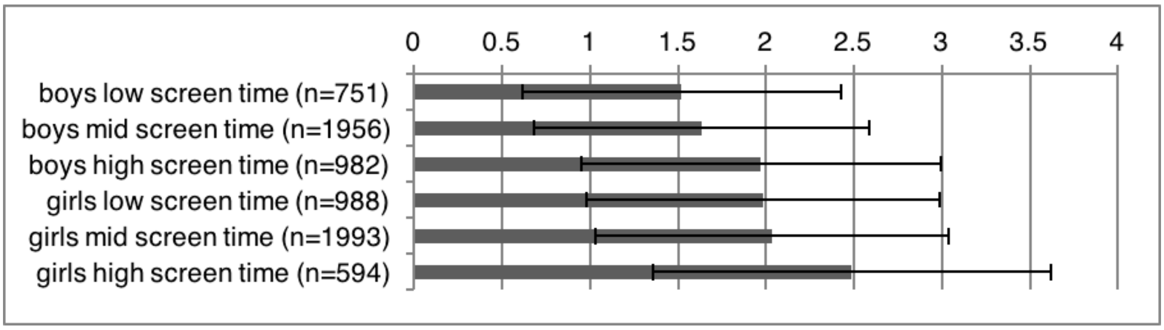

Figure S.1. Average SDQ Emotional Symptoms subscale scores (parental rating) broken down by screen time group and gender. Higher scores indicate more emotional difficulties. P13 = primary caregiver's rating at Wave 2. Error bars represent ± 1 SD.

There was no difference between the screen time groups and scores on the conduct subscale for boys. Figure S.2 shows that the scores were very close together. There was a difference for girls with $F(2, 3{,}571) = 4.17$, $p = .015$. The high screen time group scored highest ($M = 1.36$, $SD = 1.54$), and was significantly different from the mid screen time group ($M = 2.03$, $SD = 2.01$, d(mid-high) = -0.13, very small effect size), which scored lowest.

Figure S.2 P13 SDQ Conduct Problems subscale and Screen Time Groups

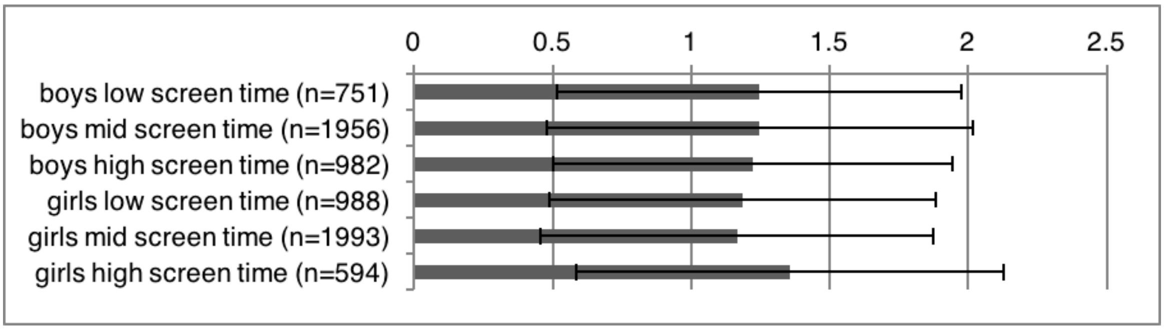

Figure S.2. Average SDQ Conduct Problems subscale scores (parental rating) broken down by screen time group and gender. Higher scores indicate more Conduct Problems. P13 = primary caregiver's rating at Wave 2. Error bars represent ± 1 SD.

There was no difference in scores on the Hyperactivity/Inattention subscale among the different screen time groups for boys, but there was a significant difference for girls with Welch's $F(2, 1{,}432) = 5.75$, $p = .003$. As can be seen in Figure S.3, the high screen time group scored highest ($M = 2.78$, $SD = 2.48$), and was significantly different from the low ($M = 2.39$, $SD = 2.41$, d(low-high) = -0.17, very small effect size) and the mid screen time group ($M = 2.42$, $SD = 2.27$, d(mid-high) = -0.15, very small effect size.

Figure S.3 P13 SDQ Hyperactivity/inattention Subscale and Screen Time Groups

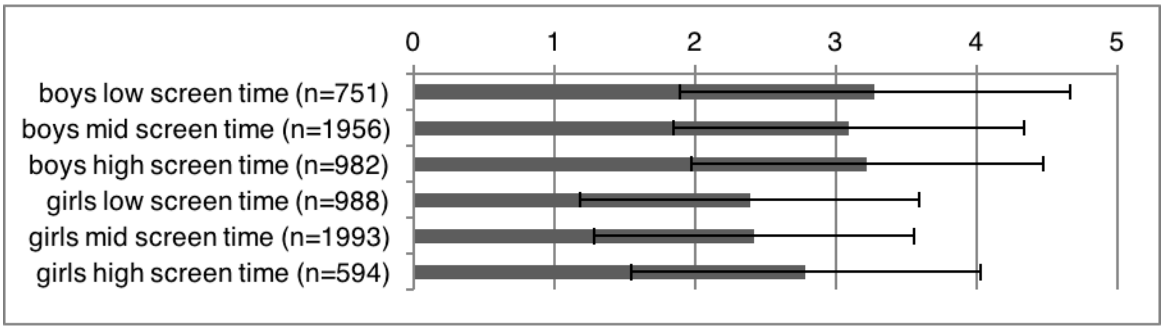

Figure S.3. Average SDQ Hyperactivity/Inattention subscale scores (parental rating) broken down by screen time group and gender. Higher scores indicate more hyperactivity. P13 = primary caregiver's rating at Wave 2. Error bars represent ± 1 SD.

There was a significant difference in Peer Relationship Problems among the screen time groups for boys with Welch's $F(2, 1{,}689) = 7.28$, $p = .001$. As can be seen in Figure S.4, the high screen time group scored highest ($M = 1.31$, $SD = 1.60$), and was significantly different from the low ($M = 1.15$, $SD = 1.58$, d(low-high) = -0.11, very small effect size) and the mid screen time group ($M = 1.08$, $SD = 1.43$, d(mid-high) = -0.15, very small effect size). Even though Figure S.4 shows a difference between screen time groups among girls, the differences are not significant in the post test.

Figure S.4 P13 SDQ Peer Relationship Problems Subscale and Screen Time Groups

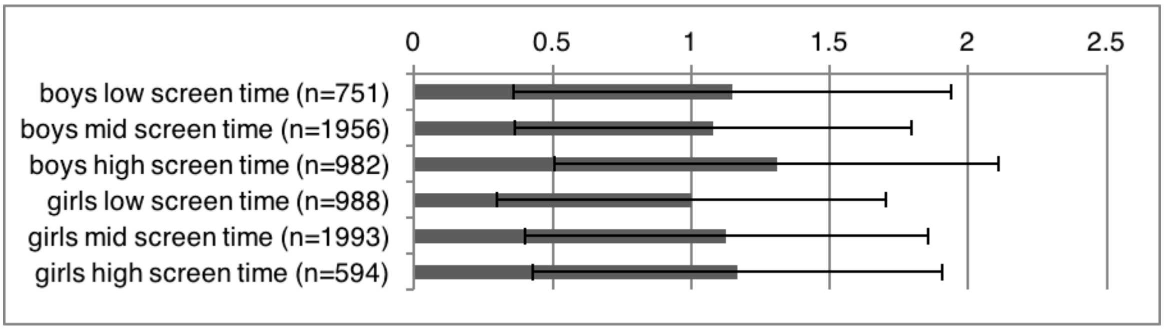

Figure S.4. Average SDQ Peer Relationship Problems subscale scores (parental rating) broken down by screen time group and gender. Higher scores indicate more Peer Relationship Problems. P13 = primary caregiver's rating at Wave 2. Error bars represent ± 1 SD.

There were no significant differences among screen time groups on the prosocial subscale scores for boys. There was a difference for girls with Welch's $F(2, 1{,}509) = 3.12$, $p = .033$. The low screen time group scored highest on the Prosocial subscale ($M = 9.06$, $SD = 1.30$) and was significantly different from the high screen time group, which scored highest ($M = 8.88$, $SD = 1.40$, d(low-high) = 0.13, very small effect size). Figure S.5 shows the breakdown of prosocial subscale scores.

Figure S.5 P13 SDQ Prosocial Subscale and Screen Time Groups

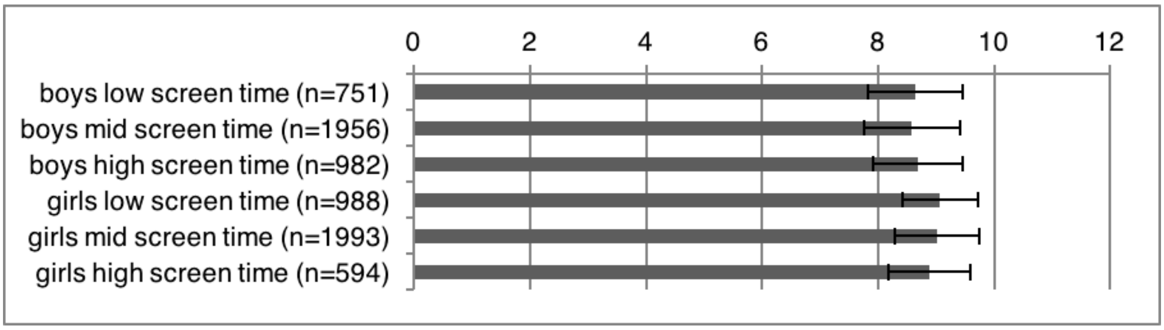

Figure S.5. Average SDQ Prosocial Behaviour subscale scores (parental rating) broken down by screen time group and gender. Higher scores indicate more Prosocial Behaviour. P13 = primary caregiver's rating at Wave 2. Error bars represent ± 1 SD.

Appendix T Piers-Harris 2 Subscales P13

There was a significant difference between screen time groups on the Behavioural Adjustment subscale among boys with Welch's $F(2, 1{,}798) = 5.23$, $p = .005$. As Figure T.1 shows, the low screen time group scored lowest ($M = 12.57$, $SD = 1.97$), and the score was significantly different from the mid ($M = 12.31$, $SD = 2.27$, d(low-mid) = 0.12, very small effect size) and the high screen time group ($M = 12.29$, $SD = 2.27$, d(low-high) = 0.13, very small effect size). There was no difference among the girls' screen time groups.

Figure T.1 C13 Piers-Harris 2 Behavioural Adjustment Subscale and Screen Time Groups

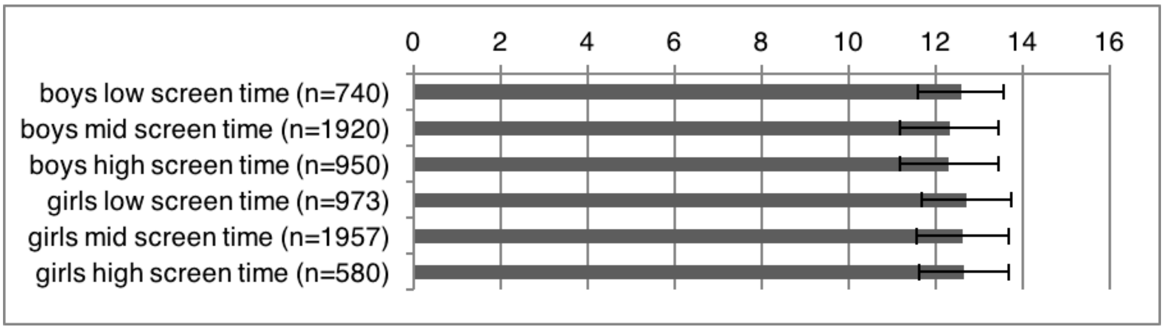

Figure T.1. Average Piers-Harris Behavioural Adjustment subscale scores broken down by screen time group and gender. Higher score indicate more self-confidence. C13 = children's rating at Wave 2. Error bars represent ± 1 SD.

There was no significant differences in the Intellectual and School Status subscale for boys' screen time group, but among girls, there was a significant difference with Welch's $F(2, 1{,}439) = 10.17$, $p < .001$. The low screen time group scored highest ($M = 12.13$, $SD = 3.14$), and was significantly different to the mid ($M = 11.62$, $SD = 3.31$, d(low-mid) = 0.15, very small effect size) and the high screen time group ($M = 11.50$, $SD = 3.40$, d(low-high) = 0.19, very small effect size). Figure T.2 shows the breakdown of Intellectual and School Status subscale scores.

Figure T.2 C13 Piers-Harris 2 Intellectual and School Status Subscale and Screen Time Groups

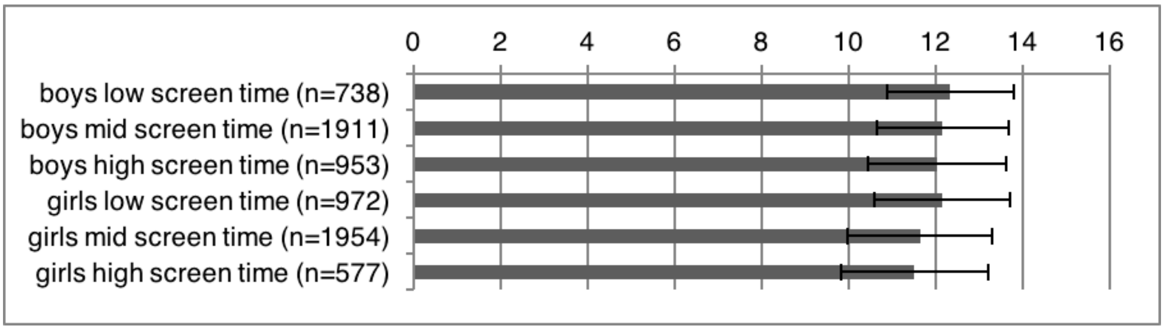

Figure T.2. Average Piers-Harris Intellectual and School Status subscale scores broken down by screen time group and gender. Higher score indicate more self-confidence. C13 = children's rating at Wave 2. Error bars represent ± 1 SD.

There was a significant difference between screen time groups on the Physical Appearance and Attributes subscale for boys with $F(2, 3{,}582) = 3.90$, $p = .002$. As can be seen in Figure T.3, the high screen time group scored lowest ($M = 8.13$, $SD = 2.45$), and was significantly different to the mid screen time group ($M = 8.38$, $SD = 2.31$, d(mid-high) = 0.11, very small effect size). There was also a difference for girls with $F(2, 3{,}492) = 10.26$, $p < .001$. The low screen time group scored highest ($M = 7.65$, $SD = 2.34$), and was significantly different to the mid ($M = 7.24$, $SD = 2.40$, d(low-mid) = 0.17, very small effect size) and the high screen time group ($M = 7.25$, $SD = 2.39$, d(low-high) = 0.17, very small effect size).

Figure T.3 C13 Piers-Harris 2 Physical Appearance and Attributes Subscale and Screen Time Groups

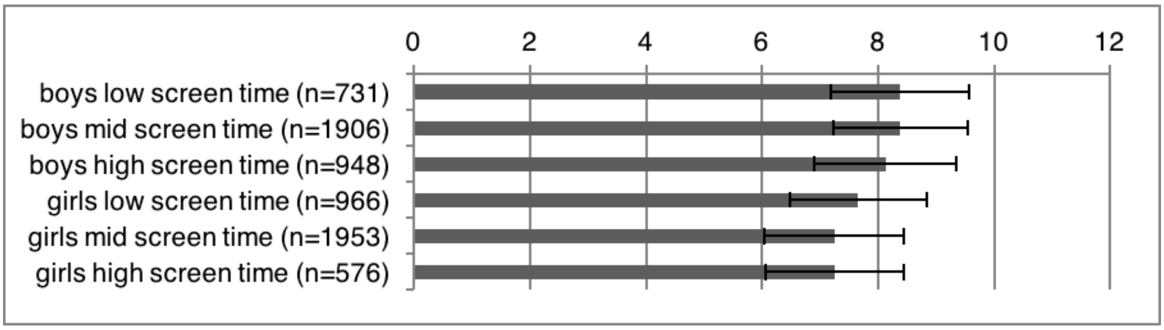

Figure T.3. Average Piers-Harris Physical Appearance and Attributes subscale scores broken down by screen time group and gender. Higher score indicate more self-confidence. C13 = children's rating at Wave 2. Error bars represent ± 1 SD.

There was no difference in mean scores on the freedom of anxiety subscale for the boys' screen time groups, but the groups' scores differed significantly for girls with *F*(2, 3,511) = 4.65, *p* = .01. As can be seen in Figure T.4, the low screen time group scored highest (*M* = 10.27, *SD* = 3.17), and was significantly different to the mid (*M* = 9.92, *SD* = 3.25, *d*(low-mid) = 0.11, very small effect size) and the high screen time group (*M* = 9.84, *SD* = 3.12, *d*(low-high) = 0.13, very small effect size).

Figure T.4 C13 Piers-Harris 2 Freedom from Anxiety Subscale and Screen Time Groups

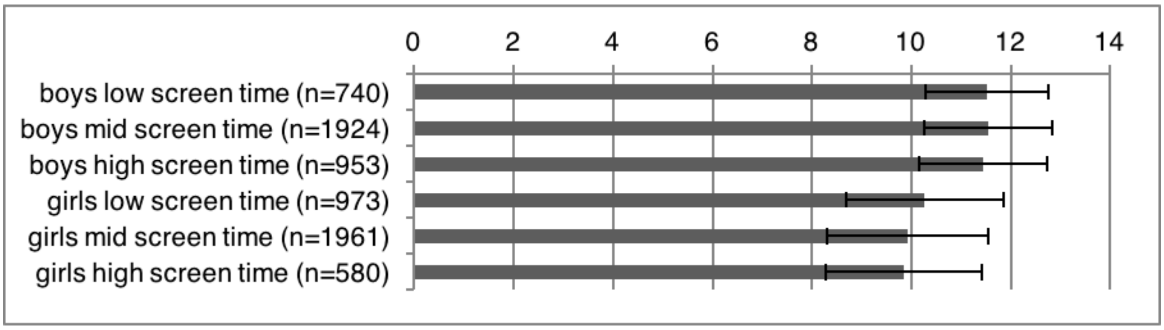

Figure T.4. Average Piers-Harris Freedom from Anxiety subscale scores broken down by screen time group and gender. Higher score indicate more self-confidence. C13 = children's rating at Wave 2. Error bars represent ± 1 SD.

There was a significant difference in Popularity subscale scores between the boys' screen time groups with Welch's *F*(2, 1,690) = 4.97, *p* = .007. As can be seen in Figure T.5, the high screen time group scored lowest (*M* = 9.64, *SD* = 2.26), and was significantly different to the mid screen time group (*M* = 9.92, *SD* = 2.26, *d*(mid-high) = 0.13, very small effect size). There was no significant difference for the girls' screen time groups.

Figure T.5 C13 Piers-Harris 2 Popularity Subscale and Screen Time Groups

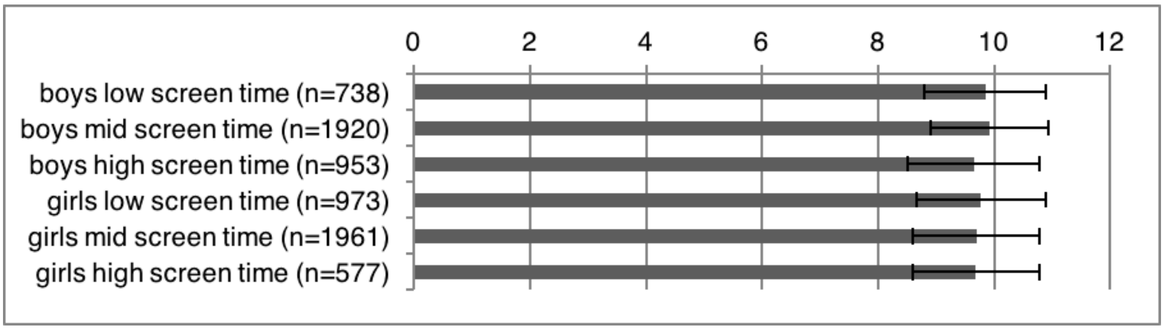

Figure T.5. Average Piers-Harris Popularity subscale scores broken down by screen time group and gender. Higher score indicate more self-confidence. C13 = children's rating at Wave 2. Error bars represent ± 1 SD.

There was no significant difference in Happiness and Satisfaction subscale scores for boys' screen time groups. There was a significant difference among girls with Welch's *F*(2, 1,474) = 6.84, *p* = .001. The low screen time scored highest (*M* = 8.57, *SD* = 1.66), and was significantly different to the mid screen time group, which scored lowest on average (M = 8.32, SD = 1.82, d(low-mid) = 0.14, very small effect size). Figure T.6 shows the breakdown of Happiness and Satisfaction subscale scores.

Figure T.6 C13 Piers-Harris 2 Happiness and Satisfaction Subscale and Screen Time Groups

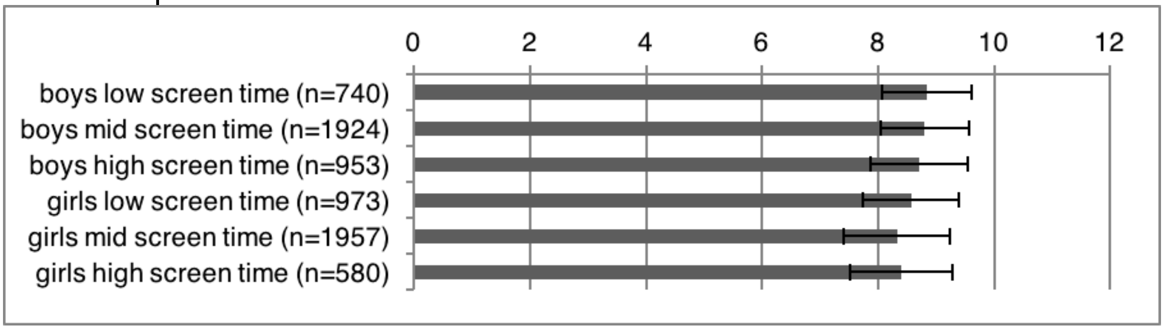

Figure T.6. Average Piers-Harris Happiness and Satisfaction subscale scores broken down by screen time group and gender. Higher score indicate more self-confidence. C13 = children's rating at Wave 2. Error bars represent ± 1 SD.

Appendix U SDQ P13 Boys' Statistics

Descriptive Statistics of Average Scores for Dummy Variables used in Regression

SDQ P13	N	Mean	SD
Boys overall	3690	7.25	5.40
Screen time (ref:mid 50%)			
Low screen time	751	7.18	5.55
High screen time	982	7.72	5.45
Health: sometimes/always unwell	40	10.73	7.11
Chronic, physical, or mental illness	468	10.75	6.90
Obese (according to BMI)	169	7.74	5.50
Learning difficulty	476	11.77	6.72
Temperament (ref:mid 50%)			
Low shyness	938	6.67	5.05
High shyness	918	8.24	5.77
Low emotionality	1020	8.35	6.05
High emotionality	862	7.22	5.31
Low sociability	689	8.09	6.21
High sociability	1045	7.25	5.56
Drumcondra test scores (ref:mid 50%)			
Low reading score	883	9.01	6.21
High reading score	976	6.23	5.02
Low maths score	877	9.08	6.02
High maths score	1093	5.86	4.91
Structured activities (ref:1-2)			
No activity	358	8.99	5.79
3+ activities	300	7.09	5.25
Number of close friends (ref:2-5)			
0-1 close friends	287	11.40	7.53
6+ close friends	663	6.25	4.66
Victim of bullying	844	9.74	6.38
Parenting style other than authoritative	761	7.57	5.47
Family time (ref:mid 50%)			
Low family time	1139	7.68	5.84
High family time	878	6.64	5.12

Table continued

Adverse life events (ref:1-2)			
No adverse life events	833	6.00	4.56
3+ adverse life events	708	9.13	6.15
PC meets depression cut-off point	270	9.87	6.29
PC level of education (ref:mid 50%)			
Low PC education	1007	8.61	5.75
High PC education	683	6.04	4.53
Household income (ref:2nd quintile)			
Lowest quintile	604	8.61	5.75
3rd quintile	712	7.35	5.49
4th quintile	677	7.24	5.61
Highest quintile	801	6.17	4.87
Single-parent family	609	9.56	6.10
Siblings (ref:1-2 siblings)			
No siblings	350	8.60	5.75
3-5 siblings	942	7.51	5.71
Urban area	1630	7.58	5.54
Neighbourhood safety (ref:mid 50%)			
Low safety	879	9.06	6.11
High safety	1067	6.22	4.76

Note. N refers to the number of boys in the respective category of the dummy variables created for the regression analysis.

Appendix V SDQ P13 Girls' Statistics

Descriptive Statistics of Average Scores for Dummy Variables used in Regression

SDQ P13	N	Mean	SD
Girls overall	3575	6.87	5.35
Screen time (ref:mid 50%)			
Low screen time	988	6.55	5.43
High screen time	594	7.79	5.72
Health: sometimes/always unwell	69	9.65	5.81
Chronic, physical, or mental illness	337	9.33	6.43
Obese (according to BMI)	243	8.18	6.30
Learning difficulty	308	11.67	7.01
Temperament (ref:mid 50%)			
Low shyness	777	6.63	5.26
High shyness	999	7.82	5.71
Low emotionality	910	7.43	5.84
High emotionality	934	7.13	5.40
Low sociability	880	7.50	5.60
High sociability	753	6.75	5.58
Drumcondra test scores (ref:mid 50%)			
Low reading score	816	9.21	6.28
High reading score	870	5.27	4.40
Low maths score	855	9.34	6.53
High maths score	733	5.17	4.18
Structured activities (ref:1-2)			
No activity	360	8.89	5.79
3+ activities	513	7.14	5.31
Number of close friends (ref:2-5)			
0-1 close friends	311	9.35	6.84
6+ close friends	571	6.40	4.95
Victim of bullying	906	8.93	6.19
Parenting style other than authoritative	764	6.76	5.33
Family time (ref:mid 50%)			
Low family time	811	7.85	5.85
High family time	1126	6.56	5.20

Table continued

High dependence	1084	8.09	5.64
Adverse life events (ref:1-2)			
No adverse life events	739	5.94	4.55
3+ adverse life events	743	8.43	5.97
PC meets depression cut-off point	323	9.84	6.69
PC level of education (ref:mid 50%)			
Low PC education	1153	8.29	6.20
High PC education	592	5.39	4.36
Household income (ref:2nd quintile)			
Lowest quintile	725	8.49	6.51
3rd quintile	649	6.62	5.17
4th quintile	655	6.19	4.76
Highest quintile	627	5.42	4.22
Single-parent family	682	8.07	5.59
Siblings (ref:1-2 siblings)			
No siblings	406	8.10	6.23
3-5 siblings	920	6.66	5.50
Urban area	1609	7.06	5.46
Neighbourhood safety (ref:mid 50%)			
Low safety	1053	8.18	5.77
High safety	896	6.05	4.86

Note. N refers to the number of girls in the respective category of the dummy variables created for the regression analysis.

Appendix W Piers-Harris 2 C13 Boys' Statistics

Descriptive Statistics of Average Scores for Dummy Variables used in Regression

Piers-Harris 2 C13	N	Mean	SD
Boys overall	3591	48.86	7.83
Screen time (ref:mid 50%)			
Low screen time	736	49.15	7.59
High screen time	948	48.33	8.06
Health: sometimes/always unwell	34	45.91	7.08
Chronic, physical, or mental illness	426	47.50	7.90
Obese (according to BMI)	161	48.05	9.71
Learning difficulty	441	45.89	8.28
Temperament (ref:mid 50%)			
Low shyness	923	49.46	7.63
High shyness	897	48.02	7.89
Low emotionality	992	47.31	8.30
High emotionality	836	49.51	7.73
Low sociability	667	47.32	8.23
High sociability	1020	49.90	7.30
Drumcondra test scores (ref:mid 50%)			
Low reading score	865	48.05	8.04
High reading score	955	48.81	7.92
Low maths score	853	47.87	7.94
High maths score	1083	49.25	7.66
Structured activities (ref:1-2)			
No activity	332	46.83	8.65
3+ activities	291	49.43	7.27
Number of close friends (ref:2-5)			
0-1 close friends	276	46.83	8.48
6+ close friends	649	49.81	7.40
Victim of bullying	818	47.04	8.53
Parenting style other than authoritative	740	48.04	8.11
Family time (ref:mid 50%)			
Low family time	1111	48.56	7.70
High family time	842	49.50	8.02

Table continued

High dependence	902	48.11	8.00
Adverse life events (ref:1-2)			
No adverse life events	817	49.36	7.77
3+ adverse life events	684	47.97	8.23
PC meets depression cut-off point	266	47.05	7.48
PC level of education (ref:mid 50%)			
Low PC education	967	48.99	7.68
High PC education	663	49.42	7.52
Household income (ref:2nd quintile)			
Lowest quintile	579	48.46	8.26
3rd quintile	702	48.90	7.43
4th quintile	665	48.78	8.32
Highest quintile	782	48.99	7.82
Single-parent family	576	47.51	8.35
Siblings (ref:1-2 siblings)			
No siblings	327	47.89	8.74
3-5 siblings	919	49.15	7.52
Urban area	1568	48.41	8.13
Neighbourhood safety (ref:mid 50%)			
Low safety	854	47.99	8.14
High safety	1041	49.28	7.40

Note. N refers to the number of boys in the respective category of the dummy variables created for the regression analysis.

Appendix X Piers-Harris 2 C13 Girls' Statistics

Descriptive Statistics of Average Scores for Dummy Variables used in Regression

Piers-Harris 2 C13	N	Mean	SD
Girls overall	3498	46.49	8.74
Screen time (ref:mid 50%)			
Low screen time	969	47.37	8.41
High screen time	577	46.07	8.50
Health: sometimes/always unwell	69	42.22	9.18
Chronic, physical, or mental illness	327	45.34	9.09
Obese (according to BMI)	240	44.77	9.09
Learning difficulty	283	43.66	8.74
Temperament (ref:mid 50%)			
Low shyness	768	46.94	8.65
High shyness	977	45.17	9.11
Low emotionality	882	44.84	9.40
High emotionality	915	46.81	8.79
Low sociability	862	44.83	9.18
High sociability	744	47.57	8.50
Drumcondra test scores (ref:mid 50%)			
Low reading score	793	45.28	8.47
High reading score	861	47.23	8.83
Low maths score	827	45.08	8.53
High maths score	727	47.66	8.71
Structured activities (ref:1-2)			
No activity	349	44.74	9.71
3+ activities	504	46.25	8.72
Number of close friends (ref:2-5)			
0-1 close friends	294	42.74	10.44
6+ close friends	562	46.46	8.97
Victim of bullying	881	44.42	9.32
Parenting style other than authoritative	752	46.15	8.42
Family time (ref:mid 50%)			
Low family time	792	45.42	8.84
High family time	1104	47.29	8.57

Table continued

High dependence	1049	46.16	8.96
Adverse life events (ref:1-2)			
No adverse life events	722	47.57	7.79
3+ adverse life events	726	44.92	9.43
PC meets depression cut-off point	314	44.55	9.50
PC level of education (ref:mid 50%)			
Low PC education	1109	45.55	9.26
High PC education	584	47.12	8.14
Household income (ref:2nd quintile)			
Lowest quintile	702	44.79	8.89
3rd quintile	640	47.85	8.17
4th quintile	647	46.63	9.14
Highest quintile	624	47.42	7.91
Single-parent family	667	44.10	9.89
Siblings (ref:1-2 siblings)			
No siblings	400	45.83	9.51
3-5 siblings	894	45.71	8.92
Urban area	1574	45.69	9.02
Neighbourhood safety (ref:mid 50%)			
Low safety	1026	45.06	9.53
High safety	892	46.81	8.38

Note. N refers to the number of girls in the respective category of the dummy variables created for the regression analysis.