Culture, Communication and Change:

Report on an investigation of the use and impact of modern media and technology in our lives

Anna Mieczakowski, Tanya Goldhaber and John Clarkson

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Abstract

As communications technology develops, the ways in which humans interact with and react to technology and one another change as well. This project investigates both the positive and negative impacts of use of Information and Communication Technology (ICT) in the populations of four countries: the UK, the US, Australia, and China. After a review of the existing research in this area, families in each country filled out diaries detailing their use of communications technology for one week and were subsequently interviewed about their use of and feelings towards ICT. A survey was also conducted with a larger number of participants in each country. Patterns of use and effects of ICT were fairly similar in the UK, US, and Australia, but were very different from patterns in China. ICT use ultimately can both help and hinder individuals and families, although it depends how the technology is used and not just how much technology is used. The negative effects could largely be mitigated by centralising the location of technology, creating rules and awareness, educating all family members about responsible technology use, and finding a good point of balance.

Project Documentation

There are three main documents that comprise the output of this research. The first ("Report") is the full research report that includes a literature review, description of methods, and both qualitative and quantitative data analysis. The second ("Summary") is a short report that summarises the main research results and conclusions. The third ("Reflections") is a supplementary book of thought pieces based on interviews with twelve experts in fields relating to the research.

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Disclosures of Analysis

There was a wealth of data generated by this research, not all of which was analysed directly by the authors. This section is meant to give a more complete picture of how data analysis was conducted.

Qualitative analysis of the UK data was carried out by the UK research team, comprising researchers from Cambridge (Tanya Goldhaber and Anna Mieczakowski) and BT (Mary Lumkin and Sue Hessey). Quantitative analysis of the survey data was carried out solely by the Cambridge researchers.

Qualitative analysis of the US data was carried out by the US research team (Juan Diaz and Ingrid Chaires) assisted by Mary Lumkin (UK BT research team). Quantitative analysis of the US survey data was carried out by the UK Cambridge research team.

Qualitative analysis of the Australian data was carried out solely by the Australian research team (Natasha Dwyer, Emma Koster, Cameron Laird, Ella Hewitt, Fehim Klebic and Argirios Mavroudis). Quantitative analysis of the Australian survey data was carried out by the UK Cambridge research team.

All Chinese data analysis was carried out by the Chinese research team (Xunhua Guo, Qiang Wei, Ye Liu, Ya Wang and Hao Wang), including qualitative analysis of the family study and quantitative analysis of the survey data, although instructions for analysis were passed on from the UK Cambridge research team. The analysis was translated from Mandarin Chinese into English for use by the UK team.

Glossary of Terms

ICT Information and Communication Technology
CMC Computer Mediated Communication
IM Instant Messaging
SNS Social Networking Site (e.g. Facebook, Linked-in)
CS Content Sharing (e.g. blogging sites, YouTube, forum sites)
FtF Face-to-Face
SMS Short Message Service

Contents

CHAPTER 1

Introduction

The world is changing, some say faster than ever, some say irreversibly, and all argue about whether the change is for the better or for the worse. What is driving this change is the immersion of our society into a new way of communicating. Where we once had to wait days, weeks, or months to talk to distant friends and family, we now view a delay of a few seconds as an inconvenience. We can take our letter-writing devices, phones, photos, and music, among other things, with us wherever we go, and our modern lives revolve around this ability.

There is no doubt that this ubiquity of Information and Communication Technology (ICT) has changed the ways individuals, groups, and societies think, feel, behave, and interact, but the extent and value of the change is largely unknown. As one of the major international ICT providers, BT strives to understand this change in order to be able to improve the lives of customers. More importantly, BT seeks to look at change objectively. A great deal of baseless fear and outrageous optimism permeates opinions about technological change, but only by looking at real data and sound research can the short and long-term effects of modern ICT be understood and, if necessary, moderated in a positive way.

This report examines some of the pre-existing literature before introducing the research methods adopted within the context of this project. It then reports on the findings of both the qualitative family study and the quantitative on-line survey before drawing upon those findings to reach conclusions.
The remainder of this section aims to summarise much of the research that has already been conducted in this area, starting with a look at historical reactions to communications technology and a review of statistics about how much time people spend using various kinds of media. Research about the personal and interpersonal effects of ICT has covered a great number of topics, which

we have categorised into three broad areas: intellectual effects, social effects, and effects on overall well-being. The areas of technology addiction and global perspectives will also be touched upon. A review of studies from each of the areas was undertaken to distil relevant conclusions.

1.1 Historical Change

One cannot understand current feelings about communications media without looking at how they were received in the past [1, 2]. As early as Socrates, who bemoaned the invention of the written word [3], arguing that it would create forgetfulness, new communications technologies have been greeted with fear and scepticism. In the last millennium, Conrad Gessner expressed fears about the flood of information unleashed by the printing press that are strikingly similar to modern views about the internet [4]. Each introduction of a new way of communicating spurred fear of change, from newspapers to radio to formalised education. The older generations inevitably bemoaned the loss of the "wholesome" communications media that they grew up with, which had doubtless been criticised by their own parents and grandparents [2].

The message here is not that technology does not change things within a society, because undoubtedly it does, and sometimes drastically. A look at societal and cultural structure before and after the invention of the printing press can attest to that, as can a number of other examples. The pattern, nonetheless, is of fear followed by acceptance and embracement. Sometimes, the fear is justified, as it was with television, which does seem to carry real health and cognitive risks [5, 6]. Many other times, however, the fear turns out to be totally unfounded, and the predicted societal destruction never comes to fruition.

It is imperative that all research about current use of ICT be studied objectively. Both excessive fear and optimism must be met with scepticism, and only data-supported conclusions should be taken seriously and acted upon. To do otherwise is to risk misunderstanding the true nature of ICT-mediated communications and their effects, risks, and benefits [7].

1.2 Statistics of ICT Use

According to the Office for National Statistics [8], in 2010, 43% of the UK internet population (19.2 million households) used social networking sites for communicating with others. Social networking activities were the most popular among the 16-24 age group with 75% of that group posting messages and 50% uploading self-created content. However, 31% of the age group between 45 and 54 years old has also regularly used social networking sites.

Ofcom research from (2010) [9] also points out that 48% of the 35-54 age group admits to using social networking sites, as do 20% of the 55-64 age group. This research, with 1138 individuals aged 16 or over, has shown that the average person fits about 8 hours and 48 minutes of media usage into just over 7 of their waking hours daily. People between the ages of 16 and 24 can even cram 9.5 hours of communications usage into about 6.5 hours of the actual time. This appears to be because, with the advent of communications devices such as smartphones, most people tend to use different channels of communication simultaneously (e.g. making a phone call while browsing the internet). However, this trend seems to be predominately driven by people under the age of 25 who spend about 29% of their media and communications activity multitasking. In comparison, the age group of 55+ spends 12% of their media and communications activity multitasking.

Furthermore, it has been, reported by Ofcom [9] that 67% of time that the surveyed young individuals (16-24s) spend using the internet is used for communicating with others, with 29% of that time being spent communicating via social networking sites, 19% of time using email and 19% of time using instant messaging. 20% of young people's time is being expended accessing the internet via games consoles and a quarter of the time they use their mobile phone is spent on voice calls.

According to the Pew Internet & American Life Project (hereafter referred to as Pew) research on the daily tasks and the use of the internet [10] carried out with 2,013 American citizens (out of which 1,358 were regular internet users), people's lives would be greatly affected if they could no longer use the internet. At the same time, it was found that traditional communication (e.g. face-to-face) was still more important to people than the use of the internet for communication. This research found that 78% of the sampled population communicated through the internet with friends and family at some point in their lives, 59% of the sample admitted that they communicated with others both online and offline, while 21% said that they communicated online only and 20% stated that they communicated offline only.

Another study by Pew of American teenagers and social media carried out in 2006 with 886 teenagers [11] has shown that teenagers who were regular users of social networking sites tended to use more of the other methods of communications (e.g. mobile phones, landline phones, instant messenger) than their non-social-networking counterparts. In terms of face-to-face interaction outside of school, 38% of the sampled users of social networking sites admitted to communicating face-to-face with friends on a daily basis, while 25% of non-social-networking users said that they spoke face-to-face to others everyday. It was also reported that looking across both groups of the sampled teenagers, 39% talked with friends on the landline phone on a daily basis after school, 35% talked using their mobile phones and 31% of teenagers spent time in person with their friends. While 28% of that cohort communicated via instant messenger daily, 27% sent text messages, 21% sent messages over social networking sites and 14% interacted via email. This survey has noted that email was falling into disfavour as the other aforementioned ways of communicating were proving to be faster than email.

In 2009 another Pew survey, with a nationally representative sample of 800 teens age 12-to-17 years old ("Parent-Teen Cell Phone Survey") [12] has shown that texting has become the primary way of communicating with friends among American teens with half of that sample sending about

50 text messages daily. However, most teenagers said that voice calling is the preferred way of contacting their parents.

The survey performed by Pew in 2010 on the future of social relations with 895 American people [13] has indicated that 85% of the surveyed cohort agreed with the following statement: *"In 2020, when I look at the big picture and consider my personal friendships, marriage and other relationships, I see that the Internet has mostly been a positive force on my social world. And this will only grow more true in the future".* 14% of the sample agreed with the opposing statement that "the Internet has mostly been a negative force on my social world", while 1% of the sample did not respond. People who saw the internet as a positive force also said that communicating online costs less in both money and time, cultivates a larger number of both close and distant relationships and allows easy access to geographically distant places. Both groups also noted some negatives such as the time spent online takes time away from important face-to-face interaction, the use of the internet to communicate with others exposes private information, fosters a lot of shallow relationships and engenders intolerance. Many survey participants said that while technologies change quickly, people adjust to them at a slower pace.

The findings of Pew's research from 2007 on the situation of teenagers, privacy and social networks in America [14] show that for 811 surveyed individuals there has been a 14% increase in parents monitoring and tracking their kids' online activity at home from the year 2000 when it was at 27%. Most of the surveyed teenagers were aware that their parents check up on their online activity. 74% of that cohort said that the computer with an internet connection is located in an open family area of the house. 85% of the sample consisting of 935 parents admitted that the use of the internet is the most regulated type of media in their household with parents establishing rules as to what types of sites their children are not allowed to access. Also, 935 parents admitted that they have rules about the types of video games their kids are allowed to play and 58% of the sample mentioned that they have rules regarding the amount of time their children can spend playing video games. Parents of young boys were shown to be more likely to have rules concerning the type of video games and the amount of time spent playing them.

1.3 Intellectual Effects of ICT Use

One major concern of researchers is that spending an increasing amount of time with communications media will impede intellectual ability [15]. This includes the ability to think deeply, the ability to concentrate and focus, the ability to be creative, the ability to make good decisions and reason logically, visuospatial reasoning ability, and overall cognitive development.

1.4 Effects on Children

As always, there is worry over the effects of exposure to media early in life. The brain is highly adaptable and impressionable in children and adolescents, and experiences, particularly in mid-childhood, can strongly affect the course of neurological development [16]. In addition, while some areas, like sensory areas, mature relatively early in life, areas involved in higher-level functioning such as pre-frontal cortex mature much later, often through adolescence and early adulthood [17, 18]. In particular, the pre-frontal cortex is associated with such abilities as self-control, attention, and executive function. As children begin to be exposed to more technology in this critical period of cortical development, the concern has arisen that such abilities may be degraded when these children grow up.

In addition, earlier research has found negative affects, such as attention problems, associated with television viewing [6, 19] as well as physical health problems [5] in children and adolescents. As children spend more time around similar screen-based technologies such as video games or computers, it is important to determine the extent to which these negative consequences will carry over [20]. Although video game and computer use are different in many ways to watching television, they are newer technologies used often in different circumstances, and therefore the effects, which often can be positive as well, are contested and need further study [21].

In contrast to concerns about cognitive effects of technology, it has been found that the ability to delay gratification in early years, long before pre-frontal cortex is developed, correlates strongly with the cognitive abilities and overall academic success of older children and adolescents [22-24]. It has also been found that overall intelligence and neural plasticity in adolescence are correlated [25], important because adolescent neural plasticity has fuelled much of the concern over the effects of technology on highly adaptable and impressionable brains. These findings confirm that while modern ICT almost certainly affects cognitive development, as do other long-term stimuli like education and parenting, the extent to which it will affect behaviour and cognitive skill later in life is highly dependent on many other factors, including the initial dispositions of the individuals concerned.

1.5 Effects on Adults

The plasticity of the child brain makes the increasing use of technology by children of particular popular concern, but adults have also been hypothesised to have cognitive detriments resulting from over-exposure to or overuse of certain kinds of modern ICT.

A common worry is that of increased multitasking. Modern technology allows users to switch between tasks almost constantly, leading to the concern that the ability to focus on just one thing will be degraded. It has long been known that task-switching impedes memory and knowledge retention, particularly for interruptions mid-task [26], although the long-term effects of prolonged multitasking were not known. More recently, Ophir et al. (2009) found that adults who frequently multitasked (i.e. switched between tasks on a regular basis) were much worse at focusing and filtering out irrelevant information than those who rarely multitasked [27], showing a potential link between multitasking and general cognitive skill degradation. Once again, a great deal of the concern is targeted at the younger generations who have grown up with technology, although Judd and Kennedy (2011) have shown that the "Net Generation" multitasks much less than previously thought [28].

There are similar concerns about the properties of technology that encourage multitasking behaviour in the first place. The famous psychologist B.F. Skinner discovered that a system that had an unpredictable rewards scheme actually motivated more work. Animals who knew that a certain number of presses of a lever released a food pellet generally only pressed the lever when hungry, but animals who learned that a random number of lever presses, sometimes two and sometimes a dozen, would release food ended up spending a good portion of their time pressing the food lever [29-32]. The vast majority of emails received in the course of a day are irrelevant, routine, or junk. However, there is the occasional "reward" – an important document or positive feedback from a manager - that motivates the user to keep checking for incoming messages [31, 32]. Often the user will perform these checks in the middle of other tasks such as a phone call or writing an important report, which is where multitasking can become an issue. However, evidence exists that self-initiated task-switching is easier to recover from than externally-initiated distractions [33], so toggling between windows on a computer is still probably less of a problem than a supervisor stopping by an employee's desk every five minutes. Even so, only about half of all task switches are self-initiated [33].

In addition, technologies like email create the potential for huge influxes of information, leading to what some have termed "information overload". The relative ease of communication coupled with increasing amounts of information that can be accessed makes email, along with other similar technologies, potentially problematic for productivity and the ability to process information effectively [34-36]. In addition, the need to process more information in a shorter timescale, and the resulting stress, could lead to an overall poorer quality of decision making [37]. Of course, the problem of information overload presents itself not just with email but also with the rest of the vast quantities of information easily accessible over the internet.

A separate but related issue is that of physical changes within the brain as a result of exposure to technology. Functional Magnetic Resonance Imaging (fMRI) studies have started to show some of the changes that take place in the brain as a result of certain kinds of activities. Information acquisition and memorisation in large quantities can actually drive changes on the neural level, as evidenced by a study showing that London taxi drivers had larger hippocampuses (a brain region involved in memory) after having to memorise the names and locations of all the streets in London [38]. On the technological level, Small et al. (2009) showed that the brain activation patterns of inexperienced internet users during an internet search task changed as they gained more experience. Additionally, surfing the internet appears to engage more of the brain than just reading a webpage [39]. However, the pervasive concern that technology is "rewiring our brains" [40,41] is misleading. The human brain is highly plastic, and all experience and learning rewires it to some extent [42]. Therefore, it is not a question *if* technology is changing the brain, but rather how that change can be optimised.

The problems that present themselves with current technology, however, are not irreversible. Many academic disciplines, from psychology to human-computer interaction (HCI) are exploring how both technology and teaching might be improved to help alleviate some of the disadvantages of the current systems. It appears that better user training systems [36] that encourage or enable self-control [43] and better all-around interface design [44] have the potential to relieve some of the burdens of current technology and the resulting cognitive drawbacks.

1.6 Social Effects of ICT Use

While it is likely that our cognitive capabilities are changing to some extent as a result of using technology, additional concern has arisen regarding its impact on social skills. As technologies like text messaging, instant messaging, and social networking sites have become widely available, many feel that real-world social interaction is being replaced by screens and that human social capabilities will subsequently decline [45, 46].

One thing that is important to keep in mind when discussing social change as the result of technological change, however, is the timescale of that technology being integrated into society. For example, in 1998, Kraut et al. [47] studied how social interaction through the internet was affecting individuals and found that social well-being inversely correlated with social internet usage, observing that: *"The paradox we observe, then, is that the internet is a social technology used for communication with individuals and groups, but it is associated with declines in social involvement and the psychological well-being that goes with social involvement".*

However, the internet as a social medium was still quite young in 1998[1]. The term "Web 2.0", commonly associated with internet-based social media, was not even in common usage until a few years after the turn of the millennium [48]. With this in mind, Kraut et al. (2002) [49] followed up with

[1]In fact, this study was run in 1995-96, although it was not published until two years later.

the participants in their study, along with a new group of subjects, several years later and found that as they had adjusted to using the internet for social interaction, and as more of their social circle had moved online as the internet was integrated into society, the negative effects found in their first work had largely disappeared. In fact, the observed effects with online social interaction were largely positive, with age not being a determining factor in the extent to which a subject had a positive or negative social experience. In addition, it was found to be a fallacy to categorise relationships as "online" or "offline". In general, social relationships crossed the boundary readily, with relationships formed online continuing offline and vice versa [49, 50].

Then, in 2010, Schiffrin et al. [51] found a negative correlation between well-being and higher levels of Computer Mediated Communication (CMC) in university students, dubbing this the "new internet paradox" (in reference to Kraut and colleagues' original 1998 paper) because participants perceived face-to-face communication to be more useful while spending increasing amounts of time communicating via technology. This study, however, followed a wave of new communications devices becoming widely available, but the longer-term adjustment to the use of these devices is obviously still in progress. What this set of studies, from Kraut et al. in 1998 to Schiffrin et al. in 2010, ultimately indicates is that the social technological experience cannot be understood through analysis at a single point in time. A constant monitoring of the effects and social use of technology is necessary in order to form a more complete and useful understanding of people's preferences for and experiences with technology.

The value of online social interaction is so often called into question because it is clear that online social interaction is different in many ways from face-to-face interaction. Many of the cues present in in-person social interaction are absent, such as tone of voice, body language, and facial expressions. Hancock and Dunham [52] examined how impressions of others were formed in a face-to-face versus CMC environment and found that the attribution of certain personality characteristics to one subject by another was more sparse but also more intense in the CMC condition. In other words, participants in the face-to-face interaction condition felt that they were able to rate more characteristics of their conversation partner, but the ratings were less extreme, whereas in contrast the CMC participants rated fewer characteristics, but those ratings were generally stronger or more exaggerated (e.g. "very productive" instead of just "productive"). One potential reason for this is that in the absence of sufficient cues or information, people tend to assume that another person is more like themselves. This lack of information generally leads people to initially like another person more, which can lead to a false sense of friendship or connection in a CMC relationship [53].

This leads to the concern that people, primarily of younger generations, are using social media to form new social relationships that will lack the depth of offline relationships, and may even be allowing these online relationships to replace offline social networks and communities [54]. However, it has been found that social networking sites such as Facebook are primarily used to

maintain relationships initially formed offline [55, 56], and other studies have confirmed an almost complete overlap between individuals' offline and online relationships [57]. In addition, it has been found that "moderate computer use does not negatively impact children's social skills and activities. On the contrary, e-mail and the internet may actually help maintain interpersonal communication and sustain social relationships" [21]. Furthermore, in contrast to the hypothesis that online communication will be used to compensate for or replace inadequate in-person social skills, the majority of research has found that socially competent individuals are also most socially active online [58, 59] and that online communication is positively correlated with closeness of friendships provided that those friendships also exist offline [58].

There is also the question of language and the extent to which changes in online linguistic conventions will affect "real world" speech [1]. For example, there is concern about "text speak", the abbreviated form of writing used to condense text messages and convey more information, and its potential to degrade written English [60]. However, it was recently found that children who text more actually have increased literacy skills, including spelling skills [61]. It has also been found that linguistic convention in instant messaging tends to follow real-world linguistic trends [62], implying that the acquisition of language is still largely taking place offline and migrating online via demonstrated offline competency, mirroring the way in which natural language evolution has always occurred. Finally, online textual conventions such as emoticons and special punctuation, or "paralanguage", allow users to draw some degree of linguistic or social information from a purely textual conversation [63], indicating a thorough understanding of the implied meaning of the paralanguage offline. In other words, users of CMC have developed certain textual indicators that allow them to signal certain qualities of offline conversation, but in order to understand the meaning of those online cues, a user must have both technical proficiency and adequate offline social competence [1, 62].

In addition, the creation and use of internet-specific jargon must also be viewed in a historical context. In the same way that it took time to create

conventions for talking on the telephone, where facial cues are absent, it will also take time to create accepted conventions for communicating and socialising over the internet. Furthermore, conventions and jargon tend to be both generationally and culturally specific, so what seems normal to one generation and culture might seem bizarre to another [1, 64-66]. The frustration, fear, or confusion expressed by older generations at youth internet culture is likely to be just another manifestation of this adaptive communication process.

What is emerging from the research so far is that the move of large quantities of social interaction to the online realm is not going to destroy the fabric of culture or social interaction. If anything, it may strengthen ties between individuals. However, technology is still changing rapidly, and so it is important that the social effects of technology continue to be studied. Nonetheless, it appears there is a great deal of potential for positive effects in the online social sphere.

1.7 A Note on Addiction and ICT

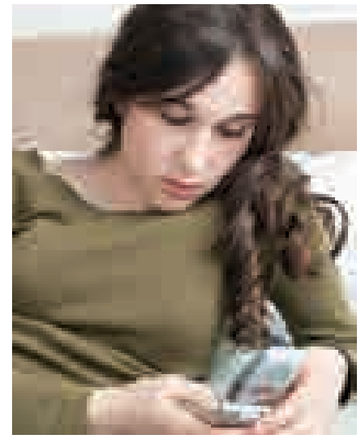
The number of applications and uses for the internet and modern ICT is nearly limitless, but excessive engagement with technology can reach the level of pathology. While there is nothing inherently addictive about the internet [67], people can form dependencies on the internet or on various internet applications such as games [68]. While internet addiction is a global problem, some countries, such as South Korea, consider it to be a serious national health threat [68].

The literature on internet addiction is extensive and will not be covered in depth here, but it bears mention as it is perhaps an extreme manifestation of some of the negative effects of ICT mentioned earlier. The issue is also complex, however, because the exact causes and nature of internet addiction remain unclear. Young observed in 1997 that internet applications that were highly interactive had a higher likelihood of becoming addictive [67], which is of concern as more and more Web 2.0 applications, and games in particular, have become more engaging to users.

What is clear is that internet addiction likely shares similar neural mechanisms with other behavioural addictions such as gambling. Often self-esteem problems lie at the root of addictive disorders, and early observations of computer addiction show that those with lower self-esteem seem predisposed to such addiction [69, 70]. Furthermore, more current data supports the low self-esteem theory of internet addiction, finding that those with pathologically high internet use predictably had lower levels of explicit self-esteem [71, 72]. In addition, basic psychological needs deprivation[2] correlates highly with the presence of compulsive or obsessive game play [73]. There are also physical manifestations of internet addiction that are similar to other addictions. For example, abnormalities in the P300 EEG[3] response of pathologically heavy internet users [74] have similarities to those in alcoholics [75] and compulsive gamblers [76]. This indicates that external circumstances have a high impact on whether or not game play or technology use can become addictive to a certain individual.

While internet games can be addictive, however, it is important to remember that the properties that make them so easy to overuse can also be harnessed for good. Many researchers are currently investigating how knowledge of what makes video and computer games fun and motivating can be applied to make other tasks, such as education, fun and motivating as well [77, 78].

What can be learned from the current studies on internet addiction is that while it is a threat, especially given the increasing number of highly interactive internet applications, there are likely to be other personality factors at play in those that become addicted. It is unlikely that the internet alone causes addiction, but rather that, like gambling or alcohol, it can create an addiction in those already predisposed to such behaviours. Going forward, it is critical that societal awareness of this potential consequence be created so that those who may be addicted or easily become addicted to the internet have the knowledge to modify their behaviours and create a healthy interaction with ICT. In addition, research must continue into how some of the behaviours around video and computer games can be harnessed positively.



1.8 A Global Perspective

When considering the effects of different kinds of technology and communications on individuals, families, and societies, it is important to understand cultural differences and how those change human interaction with ICT and each other. The project was run in four countries: the UK, the US, Australia and China. Considering the significantly different culture and way of life in China, in addition to a different body of research written in Chinese, a separate literature review was put together by the Chinese team taking into account statistics and research from Chinese academics and organisations [79].

The Chinese have also observed that modern communications technologies are reshaping the way that people go about their day-to-day life. While some of the affected activities, such as information acquisition and entertainment, are similar to those in the West, others that are most salient are perhaps surprising, namely self-expression and online shopping. In addition to the way that technology is changing Chinese society, the government and economic model upon which China is based is gradually shifting, meaning that some changes, such as the ability to express oneself more freely, are magnified [79].

Social science research in China is a relatively new field, so while there are many studies on the adoption rates of various technologies, research on the actual social effects are not common. However, publications such as business and technology magazines have speculated on the effects for quite some time [79].

The number of "net citizens" in China is exploding, with over 400 million active internet users and a net penetration rate of 50.1%. The average Chinese internet user spends almost 20 hours online per week and uses social networking sites, email, and instant messaging. However, cultural and

[2]Three basic psychological needs as defined by Self-Determination Theory [64-66] are autonomy, competence, and relatedness.

[3]Electroencephalography (EEG) is a method used in cognitive science that measures electrical impulses along the scalp. These impulses can help determine aspects of brain activity during various tasks. P300 is a certain kind of stimulus response that can be measured with EEG.

geographic differences within China still pervade, with significant gaps in use between East and West China and also between smaller and bigger cities [79].

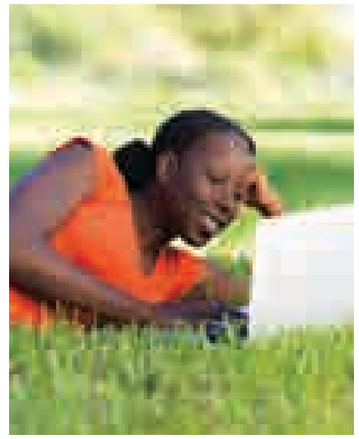
Network externalities[4] are also perceived to have a large effect on adoption in China, partly because of the emphasis on community and subjective social norms within the culture [79].

In a country that strictly controls the dissemination of information, some communication technologies have been instrumental in allowing Chinese people to more freely express themselves and share knowledge. For example, email and Short Message Service (SMS), which are not strictly controlled by the government, were instrumental in raising awareness of the SARS epidemic in China before the government publicly released information. With many people staying home during the epidemic, communications technologies such as webcams and online shopping sites allowed them to stay at home but stay in touch. These technologies remain an important part of information distribution in China, particularly of potentially sensitive or restricted information and are seen as "the first medium to realise free speech and self-governance, which may effectively break the monopoly on public information" [79].

With the benefits of modern technology come perceived drawbacks, however. For example, older Chinese people are reluctant to give up the traditions of visiting friends and family on important holidays, which they feel has largely been replaced by the younger generations with sending text messages or emails on those days. Some Chinese people feel that the younger generation will lose sight of established social norms. In addition, although 88% of users claim that social networking has strengthened their ties with friends, 30% also say that they feel lonelier than before they actively used SNS. However, the Chinese have a different attitude from much of the West about the changes brought about by new ICT. The Eastern concept of Yin-Yang emphasises that all good things have some inherent bad qualities and vice versa, so it is not surprising to most Chinese that technologies that bring about positive change have some negative consequences. As a culture and society, however, they are eager to optimise their interactions with technology to the extent possible [79].

On the severe negative end of the spectrum, however, is technology addiction, a serious concern in East Asian countries in particular? (see section 1.7). Apparently, the word "indoorsy" is a new trendy term to describe someone who uses technology as an excuse not to leave their residence, even to socialise. This is concerning to many Chinese because of the likely physical and mental health consequences. Surprisingly, this is not a gaming addiction, which is also a problem in China, but rather seen as a way of coping with the high stress of Chinese life. Conversely, heavy technology users describe the phenomenon of "technostress", or stress due to trying to manage too much technology usage [79].

One of the most appealing uses of the internet in China is online shopping, which is apparently changing the day-to-day life of many Chinese families. Many Chinese people view online shopping as a leisure activity and even as an opportunity to socialise and exchange information with family and friends. Both the convenience and lower prices of internet shopping make it appealing, and in addition it provides opportunities for small-scale entrepreneurship in populations like students and disabled people. However, since prices are so low online, this apparently creates a great deal of mistrust among buyers, and one of the major needs identified by the Chinese research community is the building of more trust in online environments [79].



In China, ICT is changing society very perceptibly, but many of the effects are different because of the different structure of both Chinese society and Chinese culture. It is important to maintain an international perspective going forward with research in this area because only by looking at drastically different cultures can the universal effects of ICT on societies in general be deduced. It is when we understand this more general pattern of effects that a truly healthy relationship with ICT can start to be established [79].

1.9 Well-Being and ICT

There is clear change in society as the result of ICT. New skills have been created and old skills have become almost obsolete. Ways of communication with others have changed. Accessibility to knowledge has increased, but inundation with too much information has threatened the ability to process that information and acquire new knowledge. There are clear positive and negative consequences to the pervasiveness of modern ICT, but with so much extreme fear and optimism surrounding the changes being experienced in the modern world, how is it possible to know which changes are ultimately good?

This is where the concept of well-being is critical. Well-being is essentially defined as a state of positive functioning. It is more than just personal happiness, also taking into account such factors as sense of purpose and direction [80]. As put by Huppert (2009), well-being is "the combination of feeling good and functioning effectively" [81]. While societal changes as a result of ICT will always be evaluated by older generations by comparisons to the societal norms with which they grew up, the only truly objective and useful way of evaluating ICT-induced change is by evaluating positive or negative changes in the well-being of individuals, families, and communities [82].

A variety of factors already affect well-being, including early parenting [83], genetics, certain personality traits, demographics, and trauma [81]. Importantly, early life experiences and traits can have a significant impact on well-being later in life. For example, those who are more extraverted in childhood have a higher likelihood of well-being as adults [84]. It is likely that use of technology will interplay with these other factors to affect overall well-being, although the extent of its role will be moderated to various degrees by the other factors mentioned.

At the moment, however, limited research exists examining how the use of technology affects overall well-being. Nonetheless, there are pieces of well-being research that can be applied to looking at how relationships with technology can be optimised. In particular, research looking at the positive

[4] "Network externalities refer to the phenomenon where the value of joining a network increases with the number of members in the network"[79].

effects of mindfulness training and personal feelings of control proves both insightful and useful.

It has been suggested by well-being researchers that activities over which an individual has control, or which have a high degree of individual intention, can increase the likelihood of positive experience and psychological well-being [73, 77, 81, 85, 86]. This is important because many users can feel out of control when it comes to use of technology, and users choose some technologies based on the feeling of control it affords them [87]. Presumably, behaviours and technologies that allowed users to feel more in control when using ICT would positively influence well-being.

Furthermore, a significant amount of well-being research supports the idea that having time for, and training in, mindfulness – essentially time to think, reflect, and let the mind wander – each day does a great deal for well-being [88-90]. However, those who are always "plugged-in" often do not get this mental downtime. The extent to which heavy technology use has negative or positive impacts varies on an individual basis, but based on this research it is fairly clear that it is important to take time each day to "unplug". Huang (2010) found a slight negative impact of high levels of overall internet use on well-being [91], which may reflect this. In other words, heavy technology use can likely be mitigated by consciously taking some time daily away from any sort of media or communications technology, and by doing this improve well-being and positive functioning.

When we study the effects of technology on the population, it is important to keep in mind that change is perpetual and unavoidable, so the nature of the change must be evaluated objectively. Studying well-being, the factors that affect it, and how technology plays a role in psychological well-being, is a crucial step in understanding the true nature of the individual and societal changes brought about by modern ICT.

1.10 In Summary

Change is inevitable. As society strives to achieve ever-loftier goals and improve the state of the world, whether it be on an individual, family, community, national, or global basis, the innovations created to enable the realisation of those ambitions will inevitably shift the ways in which the world, and the people in it, live. As humans, we seek change, and it is what drives and motivates many of our actions.

Yet, as humans, we also fear change. As the world shifts away from the mode of operation to which we have become accustomed through childhood, adolescence, and early adulthood, it is easy to feel as though things have lost a sense of balance and have shifted irreversibly to a state of inevitable decline or even disaster. However, it is important to remember that these feelings and fears are perennial [1, 2] and that they must only govern behaviour within the realm of actual evidence.

The purpose of this project was first to examine, in as much detail as possible, the evidence that already exists about the state of change due to developments in modern media and communications technology. This was followed by efforts to generate further relevant data to probe the extent to which the largely theoretical and clinical work summarised above was actually realised in the real world. Finally, to the extent possible, it is important to see where there is potential for people to improve their well-being through adjusting their use of and communication with and about technology [1], and research was focussed on finding and exploring such areas.

It is, of course, difficult to know exactly what to look for when leaving the lab and entering the homes and offices of real people using real devices in real life. It is important to ask how they use technology – how frequently, for how long, and for what? Do they multitask, and if so does it disrupt deep thought? Do they feel overwhelmed? Have they sensed a change as they acquire and use more technology, and if so, is it primarily positive or negative? Do they feel in control of their use of technology, and do they feel they have a choice when it comes to how much or how little to use? Have relationships benefited or suffered as a result of technology?

In addition, how are their children using technology? Do they have access, and how much? What do they use it for? Do they suffer the same negative effects as their parents? Are they able to learn and process information effectively? Are they social both online and offline? Are they educated as to how to use technology safely and responsibly?

These questions are imperative to understand both the current use of technology and how it affects the well-being of individuals and families. However, they are difficult to answer in a laboratory context. It is critical that researchers study how ICT is actually used in the everyday lives of real people, not experimental subjects, and use that information to form conclusions that can drive knowledge of how people can form an optimal relationship with technology and, through increased well-being, truly start to build a better world.

CHAPTER 2

Research Methods

This section describes the research methods used in order to carry out a detailed qualitative study with families and a quantitative study with the wider populace of each of the four countries.

2.1 Family Study

The Family Study comprises the qualitative part of this study. The ultimate goal was to gain detailed information about how families are using communications technology and be able to understand their levels and patterns of use, attitudes towards and opinions about ICT, and any effects that this technology has on them as individuals and family units.

The Family Study consisted of two parts: the Diary Study and the Interview. The Diary Study collected information about the types of technology that each family used to communicate, how and when that communication took place, and what the purpose of each communication was. The Interview was a semi-structured interview with each family after they had completed the diary and aimed to explore rationale behind and feelings towards the use of different types of communications technology.

The Family Study was run in all four participating countries with the same set of methods being used in each country (although in China all relevant materials and conversations were in Mandarin Chinese). Families were chosen based on socioeconomic status and geographic location; the research teams attempted to have an even spread across rural, suburban, and urban areas as well as across the socioeconomic spectrum.

2.1.1 Initial Contact

Families were recruited by recruiting agencies in each country who contacted them to determine interest. The research team then contacted that family, confirmed interest, and set up an initial meeting where the team travelled to the family's residence. Before each meeting, families were provided with consent forms to sign that informed them of their rights and indicated their voluntary willingness to participate in the study.

Two members of the research team visited each family on the specified date and explained the basic purpose of the study. It was requested ahead of time that all family members be present for the initial meeting, although in a few cases this was not possible, and the family members present were asked to convey all relevant information to the absent family member. The team then explained how to fill out the diary and left each family with one diary pack per family member. Both the consent forms and diaries had the contact information of a research team member included so that the families could contact the team at any time with questions. Consent forms were collected at the end of the initial meeting and families were also asked for any final questions. The team also scheduled both a follow-up call two to three days after the initial meeting and the final interview for two to three weeks after the initial meeting.

2.1.2 Diary

The purpose of the diary was to gain detailed information about how each family member communicated with others on a daily basis. Diary studies have been shown to be effective in a variety of contexts in order to look at patterns and levels of use of different kinds of technology [92-96]. Bolger et al. (2003) reviewed many previous diary studies and found that they were reliable for answering specific kinds of research questions, including *"obtaining reliable person-level information"*, or, in other words: *"What is the typical person like, and how much do people differ from each other?"* This is precisely the question that the present diary study sought to answer, specifically: How do people communicate on a daily basis?

A time-based design over a seven-day period was chosen because the research question was capturing how individuals communicated on a daily basis and not the change in communication habits over time. To make things simple, a paper-and-pencil template was used.

Participants were asked to fill out one diary sheet per day. Each sheet was divided into a matrix, with one-hour time slots for each row and six use categories for each column. It was requested that participants fill out the diary two to three times a day to maintain convenience but prevent forgetfulness.

The diary aimed to assess communication patterns, including but not limited to how technology played a role in communication for each individual. In order to do this, participants had to fill out information in six categories for

each hour (the option "other" was included in all categories, with space for participants to fill in their own text):

Communicated With: Family, Friend, Teacher, Student, Colleague, Client
Purpose: Family, Social, Work, Educational, Transactional
Location: Home, School, Work, Transit
Medium: Text, Voice, Face-to-face, Social Networking Site, Content Sharing Site, Games
Circumstance: Pre-planned, Break, Responsive
Mood: Positive, Negative, Indifferent

These categories allowed the research teams to capture in-person as well as technology-mediated communication. Participants were told only to fill in technology use if it was part of a communication (for example, reading an academic paper on a computer would not count, but reading email would). Participants were also asked to circle as many items as were applicable in a given hour. Although some detail is lost, this does still give an idea about overall levels and patterns of use, which is the main interest of the research.

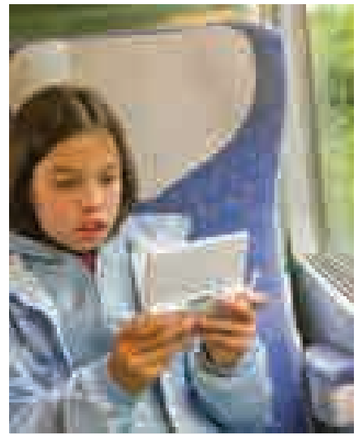
It is important to briefly explain the *Medium* and *Circumstance* categories. *Medium* intended to capture the general kind of technology used for communication. For example, "Text" refers to any text-based kind of communication, including email, text messaging, and Instant Messaging (IM). While the details of which technology was used are lost here, popular concern has focused on text-based communication in general, for example that a loss of social cues from this kind of interaction would impair social skills. Therefore, for the purpose of this research, it was appropriate to focus the diary categories on the kind of communication, not the exact type of technology. Furthermore, the *Interview* allowed researchers to clarify individual technology preferences.

Circumstance captured how the communication was initiated. "Pre-planned" communication was participant-initiated and planned in advance, for instance a work phone call at a particular time. "Break" indicated that the communication was user-initiated but was not planned – taking a break from homework to check Facebook, for example. Finally, "Responsive" indicated that the user did not initiate the communication and was instead interrupted, such as receiving a text while reading the newspaper. This category allowed the research teams to capture the extent to which people feel they are distracted by various kinds of communication.

It was acknowledged that sometimes filling out a diary can in itself change behaviour as a user becomes more aware of their patterns of action [92]. The research teams attempted to understand this potential change by asking explicitly in the *Interview* about any observed or intended change as a result of participating in the diary study.

Each participant filled out one diary sheet per day for seven days and then mailed the templates back to the research team. The researchers looked over the data in advance of the Interview in order to be able to ask family and individual-specific questions, particularly where interesting patterns of use emerged. A full diary template is included in Appendix 1.

2.1.3 Interview



After completing their diaries, each family was interviewed for no longer than one hour about their preferences and attitudes towards technology. Ideally all members of the family were present for the interview, but in a few cases one family member had to be interviewed by phone over the course of the interview (however, this was done over speaker-phone so that the family could still interact during responses).

The research team used semi-structured interviewing with each family. Semi-structured formats elicit interviews that are more like discussions: the researcher has an area of interest around which he or she writes broad questions or a list of topic. During the interview, these questions may be asked explicitly or implicitly, but the main goal is to have a discussion with the interviewee around the specified topics. This particular style of interviewing is flexible, particularly in that it allows the interview to take into account the preferences and interests of the people being interviewed [97, 98].

A list of topics and questions were taken to each interview, but which questions were asked explicitly depended on family responses. When discussions centred on a particular topic, interviewers ensured, to the extent possible, that each family member was given a chance to express their views on that topic. Some family members were also asked to explain specific patterns or notes in their diaries.

Some questions asked included:

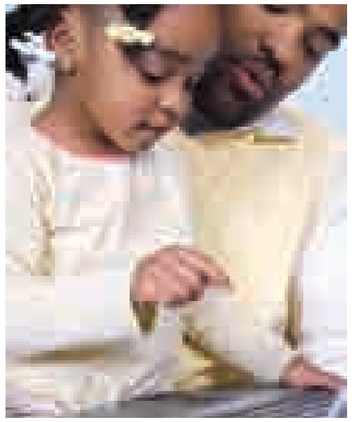
- *"Can you please evaluate how many hours a day you use communications technology to speak to other people? "*
- *"Which methods of communication, including face-to-face and electronic, do you like using the most?"*
- *"Do you ever think that your family could benefit from technology free time?"*
- *"Do you ever moderate your use of communications technologies?"*

At the conclusion of the interview, each family received £200 (or the equivalent sum in their country of residence) in vouchers. Participants were aware in advance that they would receive vouchers for their participation.

2.2 Survey

A survey was distributed to and completed by 1000 or more respondents in each participating country. According to Salant and Dillman (1994) [99], a sample size of 384 people is needed for 95% confidence in a population of 100 million people, so it was anticipated that 1000 survey responses in each country will give an accurate portrait of the traits, behaviours, and opinions of people in that country.

Survey questions were designed in order to lend broader significance to responses obtained during the Family Study. Because the Family Study was



primarily qualitative in nature, the Survey aimed to bring a quantitative aspect to its insights and observations.

An array of pilot questions were tested during the interview phase of the Family Study, and questions that provided interesting, unexpected, or varied responses were turned into questions that could be answered in an online survey format. The survey was piloted on friends and colleagues of members of the research team in each country, as well as on a sample of respondents approached by the recruiting agencies in each country, and subsequently edited before being released to the broader populace.

The survey was administered via the internet by an agency in each country, and the rewards scheme for respondents differed slightly among countries (for example, in the US, the agency worked with standard groups of respondents and offered rewards for each survey completed, whereas in the UK respondents were told that they would be entered into a draw to win one of three prizes), but it is not anticipated that this affected the results to any measurable degree. Demographic information such as age and socioeconomic indicators were also collected at the end of the survey, so as not to influence earlier survey responses.

In addition, the question *"Thinking about your own life and personal relationships, how satisfied are you with your life as a whole?"* was added as a subjective well-being indicator. Since one of the important outputs of this research is to form an understanding of how use of and relationships with technology affect well-being, it was important to have some idea of the well-being of each respondent. This question has been found to correlate well with more in-depth well-being inventories [100, 101], which were prohibitively long to include. The full list of survey questions is included in Appendix 2.

2.3 Potential Areas of Error

Families for the Family Study were recruited according to socioeconomic and geographic criteria by recruiting agencies in each of the four countries. Even so, response bias may have been a factor in family selection, as many families initially selected chose not to participate. In addition, out of necessity, families for the Family Study were in close geographical proximity to the research team in each country (East Anglia and London in the UK, Greater Boston Area in the US, Beijing area in China, and Melbourne area in Australia). While this did allow families from all socioeconomic backgrounds and from rural, suburban, and urban areas to participate, it cannot be presumed that these families are fully representative of the population of their countries at large. The survey aimed to correct this problem in part, and consequently survey questions were based on important issues that emerged from the Family Study. Furthermore, due to the nature of qualitative research, it was impossible to prevent slight method variation among families, which is not believed to have affected the results.

As is always the case with surveys, it is not possible to guarantee that the questions will be read as intended by the researchers. In an attempt to minimise this problem, the survey questions were reviewed by all members

of the research teams in all four countries, and potential issues with clarity and comprehension were identified. It is therefore believed that there were minimal clarity and comprehension problems with the survey. In addition, the categories for Question 25 mistakenly excluded the option "4-5 hours", but due to the distribution of use in the population, it is not anticipated that this greatly affected the results or final analysis.

The area of greatest potential methodological error for both the Family Study and the Survey was likely to be in the translation of methods into Chinese and the subsequent translation of results back into English. Although the members of the Chinese team spoke English, there were no native speakers and therefore it cannot be confirmed that the translation of materials was exact. However, the quality and nature of the data provided by the Chinese team gives confidence that translation and comprehension were not major issues.

CHAPTER 3

Results

3.1 Introduction

This project has generated a wealth of data about many different aspects of people's communication habits and their use of and relationships with technology. Within the scope of this short project, however, it has not been possible to analyse all of this data in full. What follows is an analysis of the data as it pertains to the specific questions posed in this project (summarised in the next section); however, there are plans for future data analysis in collaboration with both academic and industry groups. The results presented here should be treated both as a partial but focussed investigation and a sample of the sort of findings and conclusions that can be drawn from this kind of research.

3.2 Questions Asked

This analysis is focused around a set of questions that this project aimed to answer. The larger and most fundamental question being answered is:

What are both the positive and negative effects of using communication technology, and what causes these effects?

The relevant sub-questions investigated include:

- ***What kinds of ICT are people using and for what purposes?***
- ***How does the amount of ICT used affect overall well-being, relationships, and productivity?***
- ***How is ICT affecting families?***

- ***Do people consciously focus on or moderate their use of ICT?***
- ***What are people and families who are happy with the role that ICT plays in their life doing differently from those who are not?***

3.3 Respondents

This section describes the samples of respondents recruited for the Family Study and the Survey.

3.3.1 Family Study

In the UK, 35 families were initially contacted through an agency. Twelve families did not respond to the initial inquiry from the research team, and six dropped out after initial contact. 17 families were interviewed in total, but one family did not return their diaries, so their data could not be used.

In the US, 18 families were initially contacted through an agency. Two dropped out after initial contact. Diaries were acquired for seven sets of families.

In Australia, 15 families were initially contacted through an agency, and one dropped out after initial contact.

In China, 40 families were contacted, but 14 dropped out either after initial contact or at some point prior to the final interview. The data for the remaining 26 families was used for the final analysis.

3.3.2 Survey

Approximately 2.1 million people were initially contacted by an agency for the UK survey. The survey was closed with 1269 completed responses and 364 partial responses, the latter of which were not counted in the final data analysis.

For the US survey, 1020 respondents were contacted through an agency and filled out the survey in full. It should be noted that due to US regulation, it was not possible for the agency to send emails directly to legal minors, so it was necessary for parents to either forward the survey to their children or supervise them while filling it out.

The Australian survey had 1132 complete responses and 397 partial responses, the latter of which were not counted in the final data analysis.

In China, over 1 million families were contacted by an agency via email, web advertisements, and phone calls, and 1178 people filled out the survey. However, since not every question was made compulsory on the Chinese survey, not every respondent answered every question, meaning that there were between 1165 and 1178 responses for each question, although most questions had the full 1178 responses. The sample size is large enough that it is not believed that this small difference affected the final data analysis.

3.4 Use Patterns

In order to understand how technology use is affecting individuals and families, it is first necessary to understand how it is actually being used. It is common to hear fears surrounding the decline of face-to-face communication or the prevalence of texting, but progress can only be made when the true distribution of communication media is understood. The section looks at how and how much people are communicating, whether it be in-person or via technology.

Almost **1 in 5** people in the UK use communications technology for more than **7 hours** each day, and **1 in 13** use it for more than **10 hours**.

3.4.1 How much technology are people using?

How much time are people actually spending using communications technology? While the common vision may be of a teenager literally inseparable from his mobile phone or computer, the levels of use are moderate for a large proportion of the populace. The use patterns among the four countries are very similar, with most respondents using communications technology for 1-3 hours each day.

Figure 1 shows the survey results from the four countries to the question: ***Taking into account all the different ways you use communications technologies, please estimate how many hours a day you use some form of communications technology?***

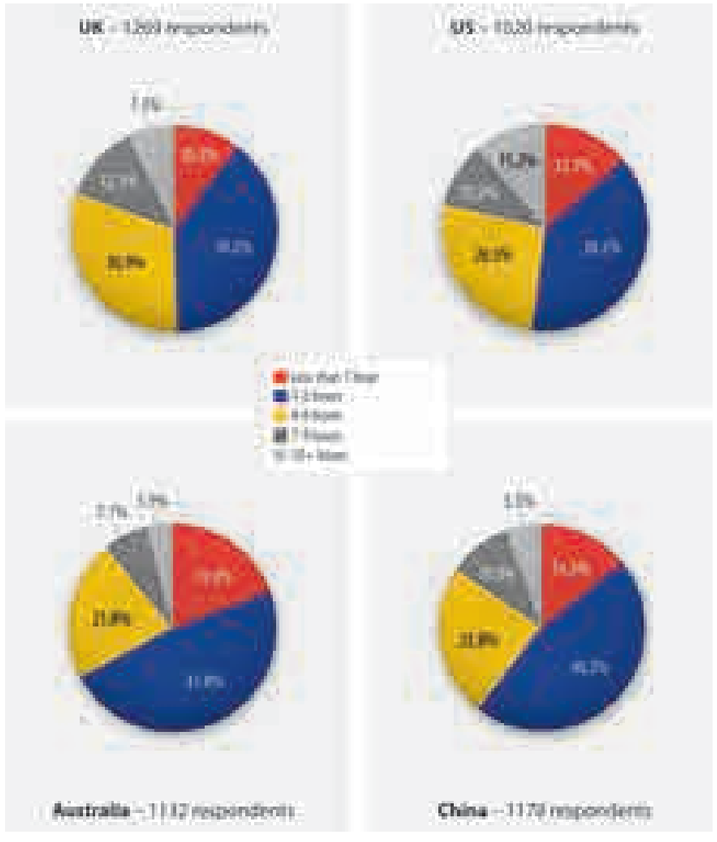


Figure 1:

Breakdown of hours spent using some method of communication in UK, US, Australia and China.

However, almost one in five people in the UK use communications technology for more than seven hours each day, and one in thirteen use it for more than ten hours. The US had the most people using ICT for over 10 hours a day, while Australia had both the most people using communications technology for less than one hour a day and the fewest people using more than 10 hours. While the distribution of hours of use is similar, a further breakdown is necessary to

understand the true similarities and differences among the populations of the four countries.

3.4.2 How are people using technology?

The following graphs show the relative use of communications in the Family Study by children (**Figure 2**) and parents (**Figure 3**) across the four countries of the study (UK, US, Australia and China).

Figure 2:

Use of different communications – diary data of children from 16 UK families, 7 US families, 14 Australian families and 26 Chinese families.

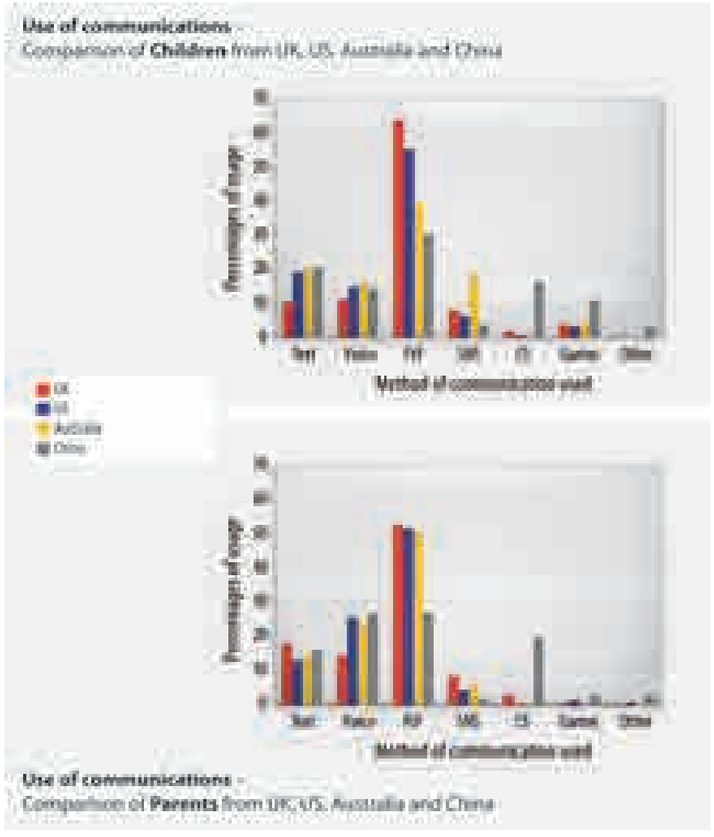


Figure 3:

Use of different communications – diary data of parents from 16 UK families, 7 US families, 14 Australian families and 26 Chinese families.

3.4.3 Preferences

While it is informative to look at overall levels of use across the population, it is also very important to understand individual preferences. How an individual feels about their technology use will likely be related to how well it matches with their preferred levels of use and media of choice. Therefore, both qualitative and quantitative data was collected on both which technologies people preferred to use for different types of communication and the reasons underlying those preferences.

Figure 4 shows the survey results from the four countries to the question: ***Of those methods of communication that you have experienced, which do you like using the most?***

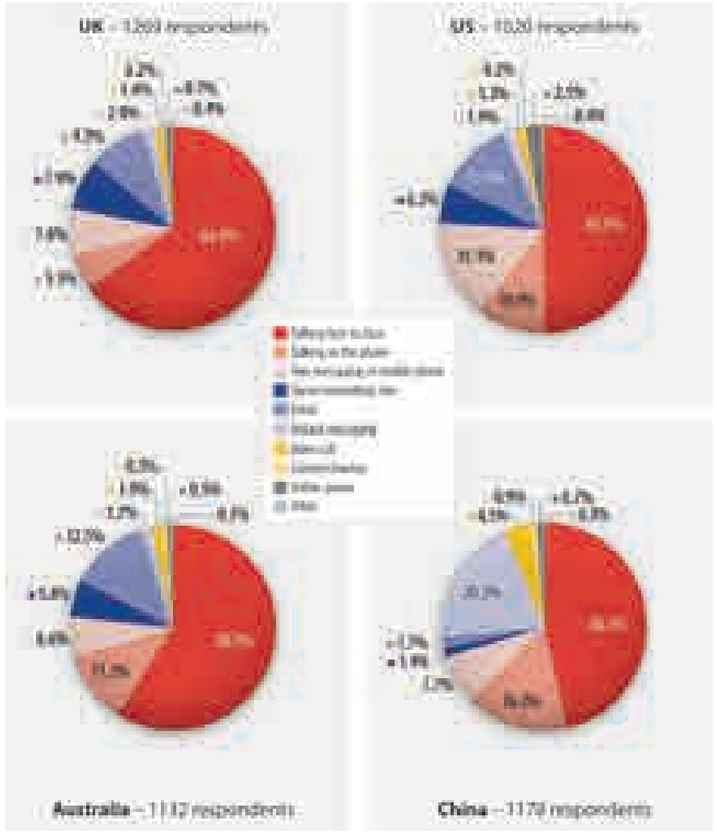


Figure 4:

Preferred methods of communicating with others for UK, US, Australian and Chinese respondents.

Overall, a majority of people still prefer communicating face-to-face over communicating using some sort of technology. In the UK, US, and Australia, the distribution of preferences was still similar, with talking on the phone, text messaging, social networking sites, and email being preferred over most other methods. People in the UK liked to communicate face-to-face more than any other country, with almost 65% of respondents preferring face-to-face

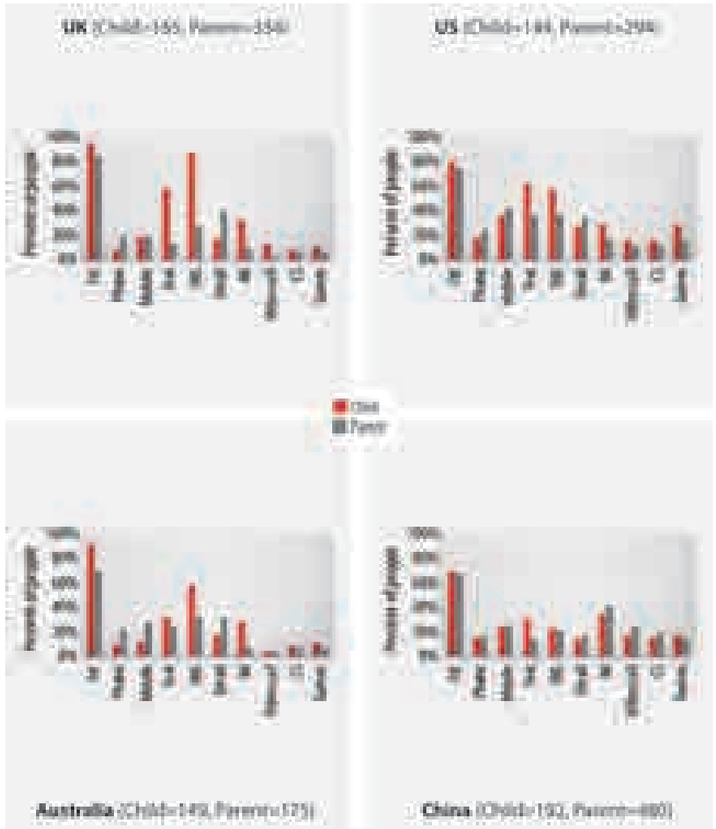
People in the UK liked to communicate face-to-face more than any other country, with almost **65%** of respondents preferring face-to-face over other methods with email a distant second at **9.3%** preference.

over other methods with email a distant second at 9.3% preference. However, in China the distribution was significantly different. Less than 50% of the population preferred face-to-face communication, and instant messenger was a clear second choice, with talking on the phone being the third most common preference. The different preferences in China are likely to affect the ways in which families, friends, and co-workers communicate, and possibly also the way that Chinese people feel about these interactions. These effects will be explored in the next sections.

Figure 5 shows the survey results from the four countries to the question: ***Indicate how much time you spend using each method of communication during your waking hours on an average weekday.***

Figure 5:

Comparison of amount of usage of different methods of communication for over one hour each day for children and parents from UK, US, Australia and China.



The percent of people who use each method of communication for more than one hour each day (based on survey response breakdown) is indicated for each country.

Irrespective of preference, most people still communicate face-to-face more than through any other method, and face-to-face communication makes up the majority of social interaction.

Perhaps unsurprisingly, children are more likely to supplement their face-to-face interactions with social networking sites and text messaging, whereas adults spend more time talking on the phone and emailing. The preference for IM expressed in China is clearly reflected in Figure 5, with China being the only country where adults IMed more than children. Social networking and text messaging are also much more popular among children in the UK and US compared to Australia and China, with the gaps between child and parent technology usage being the most drastic in the UK.

3.4.3.1 Preferences: Children

Despite the fear that children and adolescents are turning more to technology for communication, most people of all ages still prefer face-to-face communication for important messages, turning to use services such as email or texting more for information exchange. *"I prefer face-to-face, because I just find it easier…because you can tell people things, you can use facial expression properly. You can show people things and I think it just gets a bit annoying when you're on the phone and you can't have a proper conversation with someone really",* said one son (UK Family 1). This preference was also echoed internationally: *"I prefer face-to-face when I can",* said one daughter (Australia Family 6).

Even heavier users of ICT found that face-to-face was generally better, particularly for certain kinds of communication. *"It's more respectful and polite to talk face-to-face with someone if it's that important and you need to tell them it urgently",* said one girl (UK Family 8), who had 33 instances of text-based communication, 8 instances of voice-only communication and 7 instances of Social Networking Site (SNS) use over a one-week period, even saying at one point: *"My phone goes off all day long, all night long. In the end I just put it on silent so it goes zzz zzz on vibrate instead".*

This thought was reiterated by many children who expressed that they prefer face-to-face communication to talk about important or sensitive matters. *"It's more sensitive, isn't it?"* said one girl (UK Family 11), who only moments before had described how she texted friends constantly throughout the day.

One teenager (UK Family 6) elaborated: *"In text, email and social networking sites, because it's not a face-to-face thing, you can't really read emotion from it so you don't know how someone is saying something as easy".* Another boy (UK Family 1) explained that he preferred technology-mediated communication for information exchange, but not for deeper conversations: *"I like just chatting with my friends on games, texting and saying perhaps something that's happened or that's just an easy way of telling them something quickly. But I do like having proper conversations, so I don't think there's many up-sides, except for I suppose if you're using webcams or face time …or something like that".*

In fact, the vast majority of children preferred to use different pieces of technology for different kinds of communication, and preferences differed greatly by child and by family. For example, one girl (UK Family 8) indicated that she would schedule times to go on Facebook with her friends from school so that they could all chat together. Many other children also scheduled time to be on social networking sites or IM simultaneously with friends. For some, texting or social networking was only for information exchange and for others for more meaningful conversations. One daughter (UK Family 8) stated that she liked Facebook so much *"because you can do it any time. It's not like you have to go and meet them to go and talk to them. You can do it when you're in your pyjamas, in the morning like when you've just got up, late at night. It's just easier, faster. And it's also, everyone's got it. All my friends have it. They're always online so I just can talk to them really quickly".* Facebook was also popular in other countries: *"Facebook is pretty useful, when talking to people, like a big range of people, like, quick conversations and things, and it doesn't cost anything",* said one daughter (Australia Family 6).

The appeal of communication technology was also highly variable. For some, the convenience and immediacy of communication was a huge draw. *"You don't have to be with the person to talk to them"* said one boy (UK Family 10). Mobile devices in general tended to be popular: *"Mobile, mobile's what I love the best. It's easy, you know, I can get hold of people all the time",* said one daughter (Australia Family 6). Within one family, one son preferred talking on the phone because there was no delay in reply, while the other two children preferred social networking because of the ease of talking with multiple friends at once (UK Family 7). Texting was frequently brought up both as an easy way to convey information to friends and an annoying distraction, sometimes depending on the child talking, but often by the same child depending on the circumstance.

Perhaps surprisingly, many children also expressed ambivalence about using technology heavily to communicate. *"I don't really text",* said one child (UK Family 7). *"More, like… if I'm meeting up with friends, then I'll text them. But I don't text just, like, for no reason".*

3.4.3.2 Preferences: Adults

Adults overwhelmingly preferred face-to-face communication, particularly to deliver important or emotionally sensitive messages. As one mother (UK Family 1) explained:

"I've had lots of meetings with his old school, trying to sort things out and we have the emails that go and you try and word it correctly, so you know you get the right message across and the right tone and you have the telephone conversations where you can't really see what they are thinking and then you have the meetings where we go in and see them face-to-face and we used to get a lot more done, because you can tell by the way they raise their eyebrows or what they don't say about certain people and stuff, as to – you know it's a lot easier face-to-face".

Another father in the US concurred (US Family 6): *"I would prefer to talk face-to-face, if I'm at work I prefer to talk face-to-face. A lot of times I cancel, I email or I call on the phone. Thankfully, we have cell phones now so when I'm away from my desk doing my thing, I can communicate on the phone. But pretty much, my choice is face-to-face first because then you can look at the person, and a lot of times, I'm telling somebody to do something and I'll see in their eyes if they don't want to do it…For me, it's face-to-face first, phone second and then email. Unfortunately we have to do a lot of email".*

The idea of a *"proper conversation"* was also brought up in many families, and although there was never a definition offered, it seemed to refer to a relatively lengthy conversation involving more than just planning or the transfer of factual information. *"Proper conversations"* seemed to take place between friends or family members, and the general feeling among adults was that these conversations could not usually take place via text-based communications or SNS, although some adults had *"proper conversations"* on the phone. This opinion, however, was not shared by many children, who although rarely using the phrase *"proper conversation",* did feel that they had meaningful conversations through text and SNS.

For technology-enabled communications, preferences varied widely on an individual basis, although most adults could express why they preferred one method over another. *"Texting is good, because it's not intrusive for the person you're sending the text to... It's usually short and sweet, so it's nice - you know, simple",* said one father (UK Family 1). This thought was echoed by another mother (UK Family 13): *"I like being texted because it's instant. I always have my mobile with me. Yesterday somebody left me two messages on the house phone and I had no idea, until just before I went to bed when it was too late to call them back; whereas if they text me I'll get it straightaway".*

Despite the stereotype of teenagers being inseparable from their mobile, often adults also felt very dependent on this particular piece of technology. One parent (China Family 2) agreed: *"I would double check my belongings before I go out—keys, wallet and telephone. I would feel lost without telephone for even one minute".* Other parents had more mixed feelings about mobiles: *"I mean, the technology is wonderful, but frankly I've days I wish I didn't have a cell phone",* said one father (US Family 3). *"I'd love to be able to just put it up there, but it's just*

the changing way of our world, so… And it is great, I think the plusses outweigh those negatives; emergencies, the peace of mind of being able to communicate with your children".

Opinions also varied on the usefulness of some kinds of communications technology. One father (UK Family 1) said of email: *"It's [email] quite a slow form of communication, do you know what I mean?... [Having] an email conversation with somebody over several days is quite long and drawn out, whereas a telephone conversation is much easier I find".* In contrast, another father (UK Family 9) explained: *"I certainly get a hell of a lot more done because of technology…You can send an email to ten people in one go rather than have to ring everyone individually",* and one mother (UK Family 7) found the formalities of talking on the phone frustrating, saying she preferred email because *"it's quicker", adding that "a phone call you kind of have to say 'How are you, how's it going?' and spend a bit longer. Email you can just get your message across".*

Surprisingly, many adults also found social networking sites such as Facebook to be useful. *"I like using the social networking sites, Facebook because you can talk to anybody"*, said one mother (UK Family 10). *"It doesn't matter if you haven't seen them for five minutes or five years. There's not a barrier that you would have if you had face-to-face. So I like the balance of both…It's not an awkward situation".*

Adults generally seemed very aware of the complications posed by certain communications and that some communication methods were better suited for some types of conversations. This was perhaps summed up by one adult (UK Family 1): *"You know you can't use text messaging for certain things. I make phone calls for certain reasons, I'll use email for a certain person. I suppose in that sense, then yes you know I choose the most appropriate technology for the communication that I want to have".* Other parents agreed: *"Yeah, it's like, it's like with anything, you might read or you might hear, it's de-contextualised a bit, and umm, your immediate reaction might be to kind of jump to a conclusion which perhaps you shouldn't jump to"*, said one father (Australia Family 8). Another father (Australia Family 11) explained: *"You get that someone has completely misunderstood you. They're reading it so differently to what I've written. That can be frustrating".*

The permanency of things like email was also brought up as a concern: *"Text/ typing, I'm very mindful that once you've posted it it's there forever. So I personally believe you can't beat face-to-face communication to truly read somebody and I like that",* said one father (UK Family 3).

One mother (UK Family 6) also expressed frustration with the difficultly in making sure that text messages were perceived appropriately: *"One thing that I find emailing someone as opposed to having a conversation face-to-face with people is that I spend such a long time pondering how to put things in an email you know I could spend two hours thinking of how best to write five lines to somebody",* she explained. *"And as you say if you haven't got them there you can't pick up the visual clues to how they're feeling, how they might have taken something you've said. It's, in some ways it ends up being quite a slow process because you spend so much time analysing something that you're going to send to someone that you think 'Why did I ever bother?"".*

In the broader UK survey, **36%** from a sample of **354 parents** found technology at least sometimes disrupted family life, with **10.5%** finding that disruption regular.

3.5 Effects

This section describes the different effects that technology has on family life and individual well-being.

3.5.1 Impact on Family Life

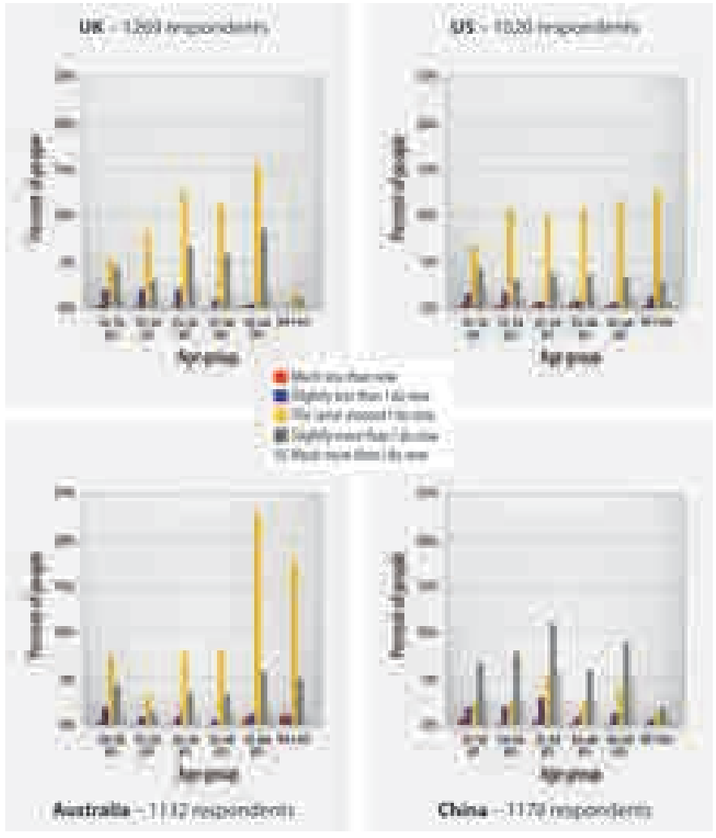
It is hard to generalise the impact that communications technology has on family life. However, any negative impacts seemed generally to occur within the immediate family. ICT was almost universally seen as a positive force for maintaining relationships with geographically distant family members, but many families found that ICT did disrupt home life in at least some respects.

Family members almost universally said that they used more communications technology over time, and that it was becoming a much more integral part of life. However, most respondents in all four countries indicated that they expected to use a similar amount of technology in the future, possibly indicating that many people do not want their technology use to increase any further.

Figure 6:

Predictions about future use of communications technologies for UK, US, Australian and Chinese respondents.

Figure 6 shows the survey results from the four countries to the question: ***How much do you think you will use communications technologies in the near future?***



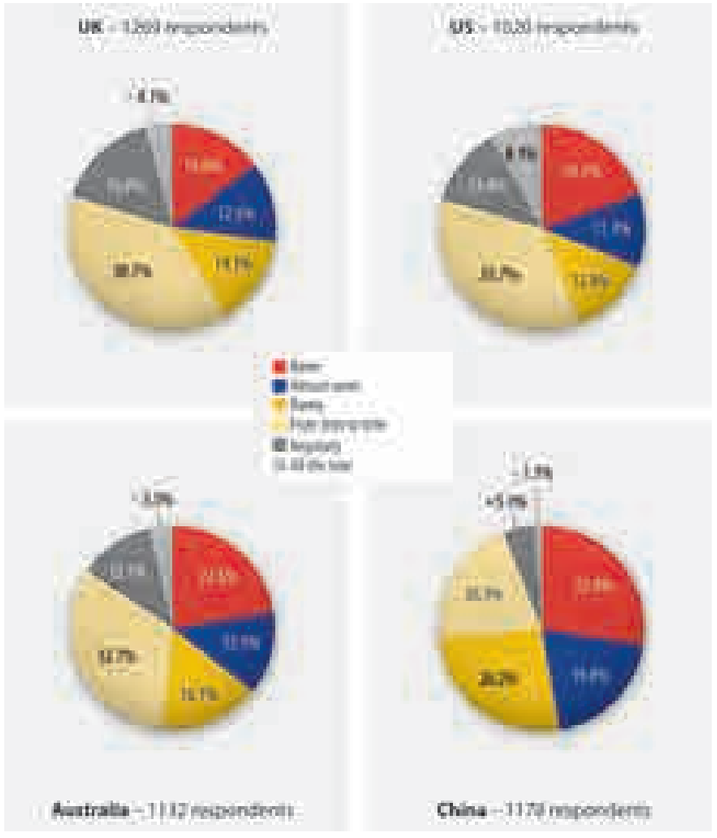
Many expressed frustration with the ubiquity and frequency of use, sometimes lamenting the perceived loss of time with family or uninterrupted interactions and activities. In fact, 36.4% from a sample of 354 parents in the UK found technology at least sometimes disrupted family life, with 10.5% finding that disruption regular. However, families that introduced rules and boundaries surrounding communications technology found that they could control their interactions much better and ultimately did not feel the same sorts of negative impacts.

The extent to which survey respondents felt their family would benefit from having technology free time is shown in the following charts (**Figure 7**).

Figure 7:

Feelings that family would benefit from having 'technology-free time' where all communications devices are switched off.

Figure 7 shows the survey results from the four countries to the question: ***Do you ever feel that you or your family would benefit from having 'technology-free time' where all communications devices are switched off?***



One mother complained that her daughter (UK Family 11) would text during dinner, saying: *"You think that she's not texting, and her hand is going under the table".* Some families, on the other hand, had rules in place about when technology could be used at certain times of the day or week, and all felt positively about these rules. *"During mealtimes, in the evening, we generally say 'shut down.' And we don't answer the phone, unless it's a member of the family and we think it's something we need to respond to… Generally I'm quite disciplined, I think"*, said one father (UK Family 11). Another father (UK Family 15) echoed this rule: *"We eat together when we can"*, he said, *"and we don't like it if they've got their phones by them, checking them. We wouldn't let them do that".* A third father (UK Family 13) agreed: *"Mealtimes we don't allow technology at all"*, he explained. This was also the case internationally, with one mother (US Family 2) in the US expressing: *"I don't allow them to text when we're eating. They're not allowed to text when we're at the table…I worked in a restaurant and …families would come in and he'd be texting, or the father would be on the internet, kids would be on their game consoles. So I don't allow any of that. When we're sitting as a family, we're not supposed to be doing any of that. That's how I try to control it".*

58.8% of people in the UK said they felt their family would benefit from technology-free time.

While some families have rules for specific times like mealtimes, others have found that they need to create rules as circumstances change to preserve family time. *"I have now turned the damn main computer off at 6 o'clock because it's there, it's always there",* said one father (UK Family 3). He found that it has had a very positive effect on his family life: *"we are now having…more family meals together… We are now making a massive effort… We're doing a lot more as a family after school than we were before",* he explained. Overall, 58.8% of people in the UK said they felt that their family would benefit from having technology-free time where all communications are switched off.

Although rules surrounding technology use were generally perceived positively by parents, some felt they did not go far enough to protect family interaction. "We don't allow any phone calls, or anything, when we're having our meals", said one mother (UK Family 11), *"but I think that's probably the only time when there's any sort of ban. And nearly all of us will answer the phone, or text, or do something, during the evenings. I think actually, it's quite a shame that the only time we're prepared to not be talking to someone else, is at mealtimes. But we all do it, all the time".*

However, other families found that frequent use of technology made technology-free time more special. One daughter (UK Family 17) described one of her family's rare technology-free evenings: *"Do you remember the time…had to sit at [a friend's] house and not watch the TV or something like that and we were like: 'oh, what are we going to do'… and we had nothing else. We had, no technology… and we found it really like alien, weird, and we did end up, like, playing games and talking to each other and being really interactive… It was different… It was nice cause it was a bonding session, but we've never done that since, have we? It's not something we could do every single day… it's one of those things that you cherish because they only happen now and again".*

In general, most families in the UK, US, and Australia felt that some degree of technology-free time would be beneficial, with just around half in each country expressing that it would be a good idea *"from time to time"* or more frequently. In China, however, most families felt that only "rarely" or less frequently would technology-free time be beneficial.

Some families went farther than mealtime technology bans to preserve time spent interacting as a family. Sometimes this involved all using a piece of technology, such as a video game, together. One son (UK Family 2) explained: *"We usually play Wii Sports Resort… family games".* Other times, efforts were made to do activities that did not require using technology, and all family members put down their devices for a period of time. *"I do try to actually have time where we all sit down together and we'll play games and have a talk and actually family time face-to-face where we all together do stuff together"* said one father (UK Family 2). *"Three, four times a week we go out and do an activity. And at that point I'm not doing anything else. We will be playing or we will be at the library or whatever"*, explained another mother (UK Family 13).

Generally, times when the family was able to turn off technology were remembered fondly by parents. *"We've got a mobile home…and we might say then: 'Right we don't want you all going on your phones.' There's no internet access there…We went away didn't we for four or five days and had no phone, no emails or anything. It was so nice"*, said one mother (UK Family 13).

For adults, the main problem with communications technology was the interference with work/life balance. Work communication was often found to disrupt family time. *"I had to make changes because [with work communication]… it got to the stage where we were having dinner and if the phone rang, I'd answer the phone"*, explained one father (UK Family 3). *"Every time my phone goes bleep, I pick it up and check what the email is. You can't not do it now. I couldn't be without a mobile phone now"*, said another father (UK Family 10). The interference was also a problem in other countries: *"I do find it frustrating is that when it [email] is work related, and it's coming in out of work times",* lamented one mother (Australia Family 12). *"And there is that expectation that from not just work but from students that you respond immediately...my phone buzzes beside the bed all night, as emails come in.... Yeah, I mean the number of emails you get in at nine o'clock at night and then you get one at seven o'clock in the morning saying: 'you haven't responded to me yet'".*

With regard to relationships with children, the common problem that was reiterated multiple times was the perception that children would rather engage with their devices than with their families, especially while at home. *"My daughter stops whatever she's doing to answer a text",* lamented one mother (UK Family 8). Another mother, reflecting on a recent evening when the whole family was home but each engaged with a different piece of technology, explained: *"I just kind of sat there, and I didn't even have my phone with me at the time, and I just thought: 'Oh my God, I haven't got anybody to talk to. I'm in a house with my entire family, and I'm all on my own'"* (UK Family 4). The problem is perceived to persist even when children come home for visits from University: *"We have been wishing our only kid to come home for half a year"*, said one parent (China Family 1), *"however, when she finally comes home, she is always busy with her notebook and can barely share even one minute with us parents, which makes me feel upset".*

Even so, technology was found to have a positive impact on family life in many instances. For example, many families also found that technology enabled them to keep in touch with family members that they might not be able to see often. *"If it wasn't for the technology, I wouldn't know what my sister [who lives abroad] was doing"*, said one mother (UK Family 2). One father (UK Family 11) was grateful that he could more easily communicate with his adult son who was living in another country. One young girl, who does not live with her father (UK Family 8), explained how she used her mobile to tell him about what was going on in her life and communicate about current events. One mother (UK Family 6) described how the family actually spent less time together when they removed the TV in the sitting room. Another mother (UK Family 11) said that Wii games have had a positive impact: *"As a family, we've recently started using the Wii, a lot – the Wii games – because it's something that we can all do. We can all do that together".*

This section provided a description of problems that families face with the use of communications technology. The next section goes into more detail about how some families formed more positive relationships with ICT and the behaviours that seem to allow families to bond and spend time together even in the presence of more technology.

3.5.2 Impacts on Individual Well-Being

It is often noted how much modern technology has changed the way we live and interact, but it is hard to qualify this change objectively. Many people compare the modern methods of interaction to previous methods and infer that this change must be negative or damaging. However, a more objective method is needed to actually investigate positive and negative impacts of communications technology in our lives.

Well-being, as noted in the literature review and methods section, is one way of looking at an individual's overall happiness and level of functioning. Although well-being measures do not necessarily give the whole story of the impacts of modern technology, looking at subjective well-being versus such things as levels of technology use should provide valuable insights. This section looks at some of the determinants of individual well-being, both qualitatively and quantitatively.

Figure 8 shows the survey results from the four countries to the question: ***Thinking about your own life and personal relationships, how satisfied are you with your life as a whole?***

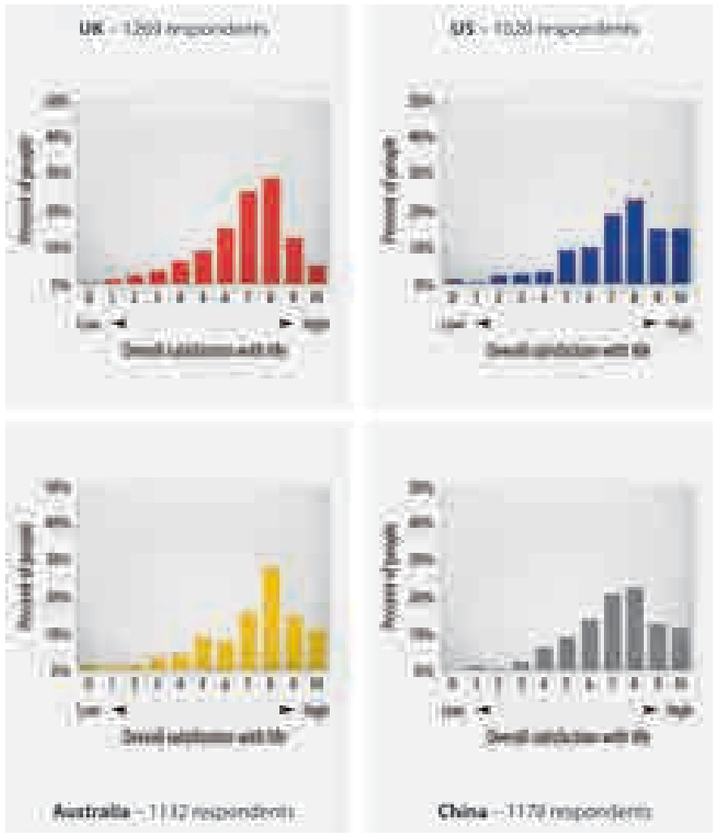


Figure 8:

Life satisfaction scores for UK, US, Australian and Chinese respondents. The distribution of well-being was very similar for all countries.

3.5.2.1 Levels of use

There is widespread concern that the amount of time people spend using ICT will have negative impacts. If this is true, then individual well-being should generally decrease as technology use increases. In order to investigate this, subjective well-being was compared with overall time spent using communications technology.

Figure 9 shows the survey results, scaled by levels of technology use, from the four countries to the question: ***Taking into account all the different ways you use communications technologies, please estimate how many hours a day you use some form of communications technology?***

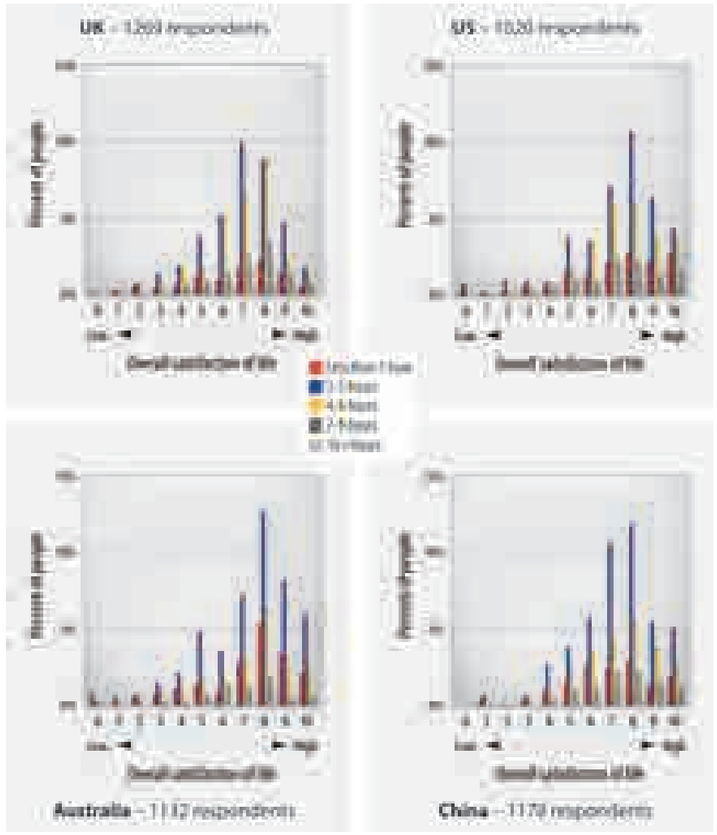


Figure 9:

The relationship between satisfaction with life and hours spent using communication technology for UK, US, Australian and Chinese respondents.

Statistical analysis of survey results show that self-reported levels of technology use do not affect well-being, except to a small extent in China (see Appendix 3, Section 1). As can be seen in the charts above, the general well-being distribution of the population is very similar even at very different levels of technology use, showing that heavy users of technology are not necessarily unhappy or unproductive. A comparison of Figures 8 and 9 shows similar patterns of well-being across different levels of technology use.

1 in 5 people in the UK admitted that they did not always feel in control of their use of communications technologies.

It was predicted that those who had some time away from communications technology every day would have higher well-being. This was partially confirmed in the results of our survey: in the UK and Australia, there was a weak relationship between time spent away from any form of communications technology and well-being (see Appendix 3, Section 2). The weak correlation could be for several reasons. Conscious and deliberate mental downtime has been shown to improve well-being. However, the breaks taken from technology by the respondents of this survey may not have been deliberate. In addition, because the survey only investigated the use of communications technology, it is possible that the respondents took time away from ICT but were still actively using other technologies. A more thorough survey would need to be conducted in order to more accurately explore the nature of this relationship.

3.5.2.2 Self-Control, Feelings of Control, and Feeling Overwhelmed

In interviews with families, it was often noted that some families tended to feel fairly in control of their use of technology, while others felt overwhelmed or even enslaved. In response to the larger survey, one in five people in the UK admitted that they did not always feel in control of their use of communications technologies. *"I think we've gone from being able to control our lives quite well to not being able to...So I'd hate to see it [technology] get any more controlling of our lives; we wouldn't have anything left. We'd have no time left",* said one mother (UK Family 6). In a similar vein, one father (UK Family 9) explained: *"You're always getting these things in the papers about PCs taking over your life and what have you. And I may have read such an article and thought 'Well you know that's me unfortunately at the moment and I need to try and control it.'"* Another mother (US Family 7) concurred: *"I don't [moderate use of technology]…I think technology has completely taken over our lives on a day to day basis".*

Other family members expressed that they felt more in control of some devices than others. For example, one daughter (UK Family 17) explained: *"I'm in control of my laptop but I'm not in control of my phone",* expressing the amount that she felt she could moderate her interactions with each.

The extent to which survey respondents felt in control of their communications technologies are shown in **Figure 10**.

Figure 10 shows the survey results from the four countries to the question: ***Do you feel in control of your use of communications technologies?***

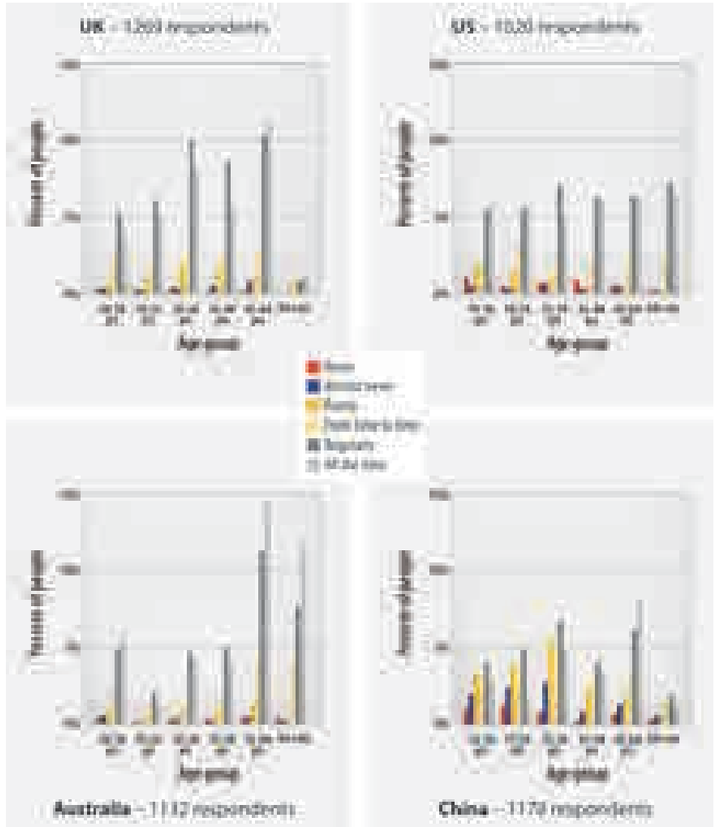


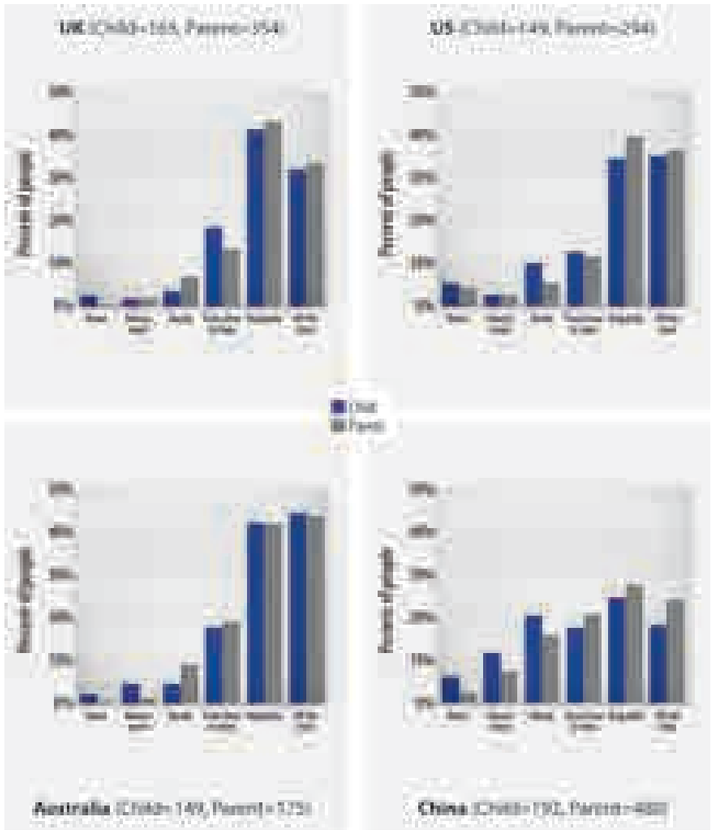
Figure 10:

Relationship between age groups and feeling in control for UK, US, Australian and Chinese respondents.

Figure 11 shows the survey results for children and parents from the four countries to the question: ***Do you feel in control of your use of communications technologies?***

Figure 11:

Comparison of children and parents' feelings of control when using communication technology for UK, US, Australia and China.



Most people of all ages in all four countries feel in control of their use of communications technology, which is a positive finding. Parents and children also had similar levels of feelings of control. However, a further investigation into the traits of those who feel out of control would also be useful. This is covered to some extent in this section and the next sections, but the idea of feeling in control is an important one and deserves a great deal of further research.

The source of lack of control was varied for different family members. Some children felt that they could no longer isolate themselves socially, even if they wanted to: *"There's kind of no way to hide any more, so even if I wanted to be antisocial, I think everyone could kind of get hold of me…I think technology is in control",* said one daughter (UK Family 17). Another daughter (UK Family 5) expressed similar frustrations: *"It can be quite annoying sometimes when people start talking to you, and then you, like, don't want to talk to them, and then you turn their chat off, and then they go: 'Why did you turn your chat off?' and I'm like: 'Because I didn't want to talk to you'. And then they get annoyed with you, and then you kind of fall out".*

Parents often felt that work communication interfered with family life, and that aside from feeling that they could not control their children's technology use, that this was their main source of frustration and lack of control. *"I worked for a guy who would use out of hours emails and phone calls as a control and bullying tactic",* said one father (UK Family 4). *"He would make a point about – you know, he would want to prove that you were always available to him by sending emails and insisting on answers at all hours of the night…it was dreadful. It's one of the reasons I loathe Blackberries".* He went on to say how he has had to consciously reduce how much he lets his work life interfere with his family life, saying: *"I have tried to reduce the number of times in an evening that I check for work emails".* Social networking sites also posed problems for some, with users having to moderate content more to maintain professionalism. As one father (Australia Family 5) explained:

> *"If I had my time again starting Facebook accounts, I'd probably start a work Facebook account and a personal Facebook account, just to separate those two areas. Because sometimes, you know, you do forget to filter. I've got filter groups set up: the ones that shouldn't go to everybody that sometimes do, the ones that should go to work colleagues…People you're actually researching with or have a more business relationship with shouldn't see some of those things that sometimes they'll see because they slip through that net. So, having two separate accounts for business and work would have been a good way to start it, but today it's so ingrained, it's almost impossible to separate those out into two separate accounts easily".*

1 in 3 people has felt overwhelmed to the point of needing to escape from communications technologies.

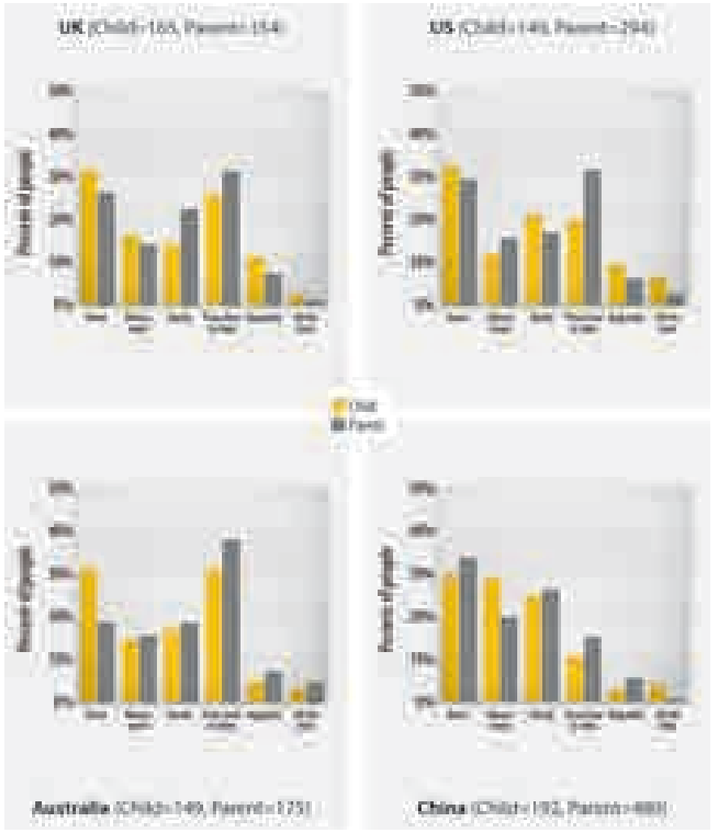
Some people felt out of control to the point of being overwhelmed. In the broader UK population, one in three people have felt overwhelmed to the point of needing to escape from communications technologies. However, not everyone feels that way. One father (UK Family 14) expressed how he does not feel unable to keep from spending hours on a piece of technology: *"I think I've got control of it. I don't feel like I'm compelled to stay on there and do another little bit and do another little bit. It's just something that you pick up and do for a little while and then come off".* One son (UK Family 7) also expressed the ability to control playing video games: *"I'd say when I've been on the Xbox for, like, a couple of hours, then I tend to get off it because I think: 'Slow down a second, I've been on it too long'".*

Families that expressed feelings of control also tended to feel more positively towards their interactions with technology. It was therefore hypothesised that feelings of control towards technology would contribute to overall well-being, whereas feeling overwhelmed would lead to decreased well-being.

Figure 12 shows the survey results for children and parents from the four countries to the question: ***Do you ever feel overwhelmed by communications technologies to the point that you feel the need to escape them?***

Figure 12:

Comparison of children and parents' feelings of being overwhelmed by communication technology for UK, US, Australia and China.



The frequency of feeling overwhelmed was very similar for the UK, US, and Australia. However, the pattern was strikingly different in China, with most respondents indicating that they rarely if ever felt overwhelmed by communications technology. This is, however, in line with the lack of felt need for technology-free time and increased feelings of control. The reasons behind the difference in attitudes towards and reactions to ICT in China should be explored in more depth in future work.

As predicted, frequently feeling overwhelmed did correlate negatively with well-being in three of the four countries. Statistical analysis revealed a significant negative relationship between well-being and feeling overwhelmed in the UK, Australia and China (see Appendix 3, Section 3). In other words, those who frequently felt overwhelmed by communications technology were more likely to have a reduced well-being.

Also as predicted, feelings of control towards technology use appeared to positively affect well-being as well in the UK, Australia, and China (see Appendix 3, Section 4), although this effect was not observed in the US. What this indicates is that feeling in control of technology use could improve well-being, which is supported by previous research on well-being, and further research should be carried out with US participants to understand the nature in that country of both feeling overwhelmed and feelings of control.

3.5.2.3 Distraction

Another frequently mentioned problem was that communications technologies caused distraction. Distraction from family life by work was often mentioned by parents, whereas distraction from work or homework by personal communications was a concern of parents about children and young adults.

Being distracted from work by personal communications was significantly negatively correlated with well-being in the UK, Australia, and China (see Appendix 3, Section 5), although the correlations were still small. There was, however, only a slight significant negative correlation between distraction from personal life by work communications and well-being only in the UK and China and not in the US or Australia (see Appendix 3, Section 6). Nonetheless, it does appear that frequent distraction can negatively affect well-being depending on the circumstances.

Additionally, because the nature of frustrating distractions was often different between parents and children, separate correlations were obtained for different kinds of distraction (work-related distraction for personal life and personal distraction from work) for parents and children.

Distraction from work was slightly negatively correlated with well-being for children in Australia and parents in the US (see Appendix 3, Section 7). Distraction from personal life was not at all correlated with life satisfaction for parents, except weakly in China, and was only correlated with life satisfaction for children in the UK and weakly in China (see Appendix 3, Section 8).

This analysis indicates that there are probably other variables that affect how distraction influences well-being, although some sorts of distractions appear to be related to reduced well-being. As mentioned in the literature review, self-initiated distractions are preferable to external distractions, a feature that was not explored in the Survey. There are also likely to be other factors that would need to be taken into account in order to understand the true effect of distraction from work and personal life on life satisfaction.

3.5.2.4 Awareness and Moderation

The extent to which survey respondents felt that too much time was being spent using communications technologies is shown the following charts (**Figure 13**).

Figure 13 shows the survey results from the four countries to the question: ***Do you ever feel that you spend too much time using communications technologies?***

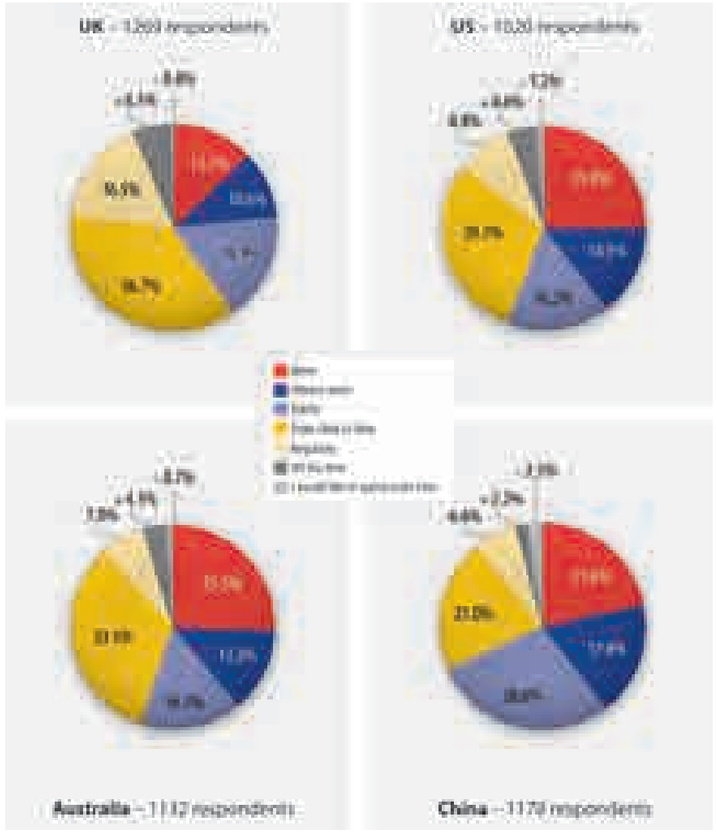


Figure 13:

Feelings that too much time is spent using communications technologies for UK, US, Australian and Chinese respondents.

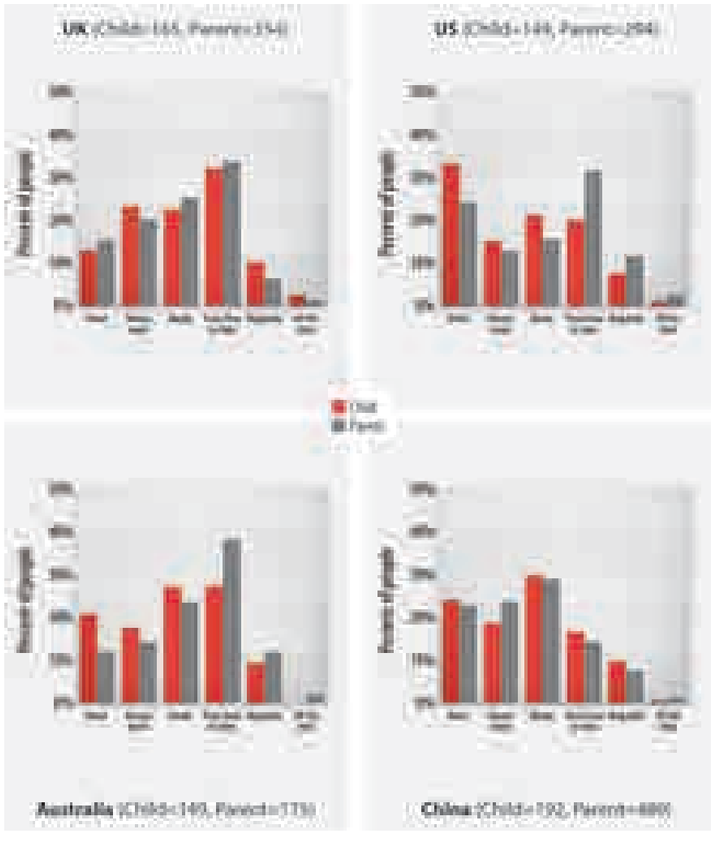
Just under **60%** of people in the UK felt that they spend too much time using communications technology.

As previously, there is a great deal of similarity between the UK, US, and Australia in feelings that too much time is spent using communications technology, with just under 60% of people in the UK feeling that they spend too much time using ICT at least "from time to time". For some, this may be the beginning of feeling overwhelmed. However, very few Chinese respondents felt that they spend too much time using communications technology.

Findings from the Family Study indicated that many individuals were not aware of the extent of their technology use after many expressed surprise with the results of their diaries. However, surveys in the UK, US, Australia, and China showed that those who felt the most overwhelmed by technology also were the most likely to consciously moderate it; a strong significant positive correlation was observed between those who responded that they frequently felt overwhelmed by technology and those who answered that they frequently consciously moderated their use of technology (see Appendix 3, Section 9). In the Family Study, adults were much more aware of their technology use and more likely to consciously moderate it than children, but some children did recognise it as a distraction from things like homework and revising for exams. No correlation was observed in the Survey directly between conscious moderation of technology use and well-being (see Appendix 3, Section 10). However, this is likely because those who were consciously moderating also felt overwhelmed, which correlated with decreased well-being, masking the potential positive benefits of moderation.

The extent to which both children and parents make a conscious effort to moderate their communications technology is shown for the four participating countries.

Figure 14 shows the survey results for children and parents from the four countries to the question: ***How often do you consciously try to reduce your use of communications technologies?***



In the UK, **1 in 3** people reported consciously trying to reduce their use of communications technology. Of these, most are trying to reduce use of social networking sites, text messaging and email.

Figure 14:

Comparison of children and parents' conscious moderation of communication technology for UK, US, Australia and China respondents.

In the UK, one in three people reported consciously trying to reduce their use of communications technology. Of these, most are trying to reduce use of social networking sites, text messaging and email.

Children in the US and Australia moderated their technology use less than parents overall, with children in the UK engaging in the most self-moderation of the four countries with levels similar to that of UK parents. In China, there was less conscious moderation, but children and parents moderated about the same amount.

3.5.3 International Perspectives

The preferences, levels of use, and feelings of control and being overwhelmed were very similar in the UK, US, and Australia. People in those countries generally felt in control and not acutely overwhelmed by technology but also sometimes moderated their use of ICT and felt that their families could benefit from technology-free time.

However, the distribution of results in China was significantly different. Individuals in China did not report feeling overwhelmed as frequently, nor did they try to reduce their use of technology or feel they could benefit from technology-free time and furthermore did not feel as strong a preference for face-to-face communication. Similarly, they reported feeling more in control of their use of communications technology. Despite some negative feelings towards ICT expressed in the Family Study, the answers to the Chinese survey indicate that people in China feel that they have a more positive relationship with technology, even though China was the only country for which high levels of overall ICT use contributed negatively to well-being. Further investigations into Chinese use of technology, including a further analysis of the data from the Chinese Family Study, could prove very informative and provide insight not just for researchers but for individuals and families in other countries as well.

CHAPTER 4

Discussion

This study aimed to answer the question: ***What are both the positive and negative effects of using communications technology, and what causes these effects?*** In both the qualitative and quantitative aspects of the study, individuals and families have been both helped and hindered to varying extents by using communications technology, and the patterns of and causes for this were explored.

In the following section, answers are offered to the questions posed at the beginning of the Results section based on our data from the UK, the US, Australia, and China exploring the effects that communications technology has in those countries.

4.1 What kinds of ICT are people using and for what purposes?

Despite fears that CMC will replace face-to-face interaction, the overwhelming majority of people in all four countries still communicate face-to-face more frequently than any other type of communication. Moreover, most people prefer face-to-face communication over other methods, particularly for conveying important messages or having "proper conversations". Face-to-face interaction was also most commonly cited as the most trusted form of communication. Critically, this preference was shared by children and adults.

Preferences for technology-mediated communication, whether by phone, text, SNS, or one of the myriad of other options, varied widely among individuals, families, and ages. As expected, children were generally more comfortable with the idea of communicating via technology, viewing it as natural, although most children expressed that they still liked seeing their friends in-person

Despite fears that CMC will replace face-to-face interaction, the overwhelming majority of people in all four countries still communicate face-to-face more frequently than any other type of communication.

when possible. In addition, most adults also used communications technology as part of their daily communications, although sometimes more frequently for work purposes than for social or family purposes.

Text-based communications emerged as a favourite for pure information exchange, with many people citing the ease with which information could be distributed to large numbers of people with minimal effort. However, the challenge of conveying any sort of emotional content via text was frequently brought up as an issue. Many people preferred to call or speak in-person for any potentially sensitive matter. Adults also raised the problem of information overload, expressing frustration with the sheer volume of communication they had to deal with on a daily basis, primarily from work, and expressed that this not only hampered their productivity but also could interfere with family life.

Although many adults used SNS services such as Facebook, children generally seemed to feel more positively about SNS and used it for more purposes, such as using the chat capability service to talk about homework, playing games, or scheduling times for groups of friends to all go online at the same time. Adults tended more to use SNS to keep in touch with distant friends and family members.

Adults frequently mentioned the use of forum sites and seemed to use content sharing sites more to exchange information (e.g. parenting forum sites), whereas most children seemed to use them mostly for entertainment (e.g. YouTube).

4.2 How does the amount of ICT used affect overall well-being, relationships, and productivity?

No relationship emerged between the amount of ICT used and overall well-being. However, the manner of ICT use did seem to affect well-being, particularly where people felt overwhelmed or perpetually distracted. To improve well-being, it is more important to look at how technology is being used and whether or not the user feels in control of that use.

4.3 How is ICT affecting families?

In terms of keeping in touch with distant family members, families felt almost uniformly positive about ICT. Whether by using video calls, social networking, or email, families felt that ICT allowed them to keep in touch with family members who might be living farther away.

Families had mixed reactions as to how ICT affected home life, however. While not every family felt negative effects, many did have at least a few problems. For adults, the main problems mentioned were that ICT allowed for work to disrupt their home life. Smartphones and laptops made it possible to check on things at work at any time of the day as well as enabling co-workers to contact them more frequently. Moreover, it made it harder to resist the urge to check on things quickly, which often turned into several hours of use.

Parents also frequently complained that ICT use by children was isolating and interfered with family interaction. The most common complaint was that family members would prefer to be interacting with or through their devices than with others at home. This often happened when children had devices in their own room or when mobile devices were used frequently at home. Centralising device location (e.g. having one main computer in the family room instead of each child having his or her own computer) and making rules around when technology could be used (e.g. no technology at dinner) did much to alleviate these problems.

Some families also found ways to have ICT bring them together. For example, many families used systems like Wii gaming as family activities. Others might video chat with distant family members together. Even having a centrally located TV was seen positively by some. While ICT can have negative impacts on families, moderated use tends to mitigate these effects. The nature of the effects varied widely based on where technology was located, when it was used, what it was used for and how frequently, and if there were any rules governing use.

4.4 Do people consciously focus on or moderate their use of ICT?

Although many people seemed unaware of just how much ICT they were using, those that felt the most overwhelmed did try to moderate their use at least to some extent. Parents were likely to moderate their own use when they felt that their work interfered with their family life, although some families reported further moderating use after completing the diary study. In general, children did not feel much of a need to moderate their use of ICT, although they were often forced to via parental rules, which were received with various degrees of positivity. Some children would moderate their use in extreme circumstances, such as when they were revising for exams or when they felt that they had used a particular piece of technology for too long. In general, mobile devices proved the hardest to moderate, with people often reporting that they felt the most dependence on those devices while simultaneously feeling the least control.

4.5 What are people and families who are happy with the role that ICT plays in their life doing differently from those who are not?

In the course of this study, it was found that individuals and families vary widely in their attitudes towards and relationships with communications technology. These attitudes are summarised below along with descriptions of how some individuals and families formed more positive relationships with communications technology.

Ultimately, it was found that five main factors positively affected family relationships in the presence of ICT: Location, Rules, Awareness, Education, and Balance.

While some families felt strongly that technology had negatively affected family relationships and closeness, other families felt that they had a healthier relationship with technology and found few if any negative impacts. Importantly, the latter set of families had taken some conscious steps to take control of how they interacted with the technologies in the household.

What follows is a description of common steps taken that have helped ease some of the pressures of modern technology on families. Ultimately, it was found that five main factors positively affected family relationships in the presence of ICT: Location, Rules, Awareness, Education, and Balance.

4.5.1 Location

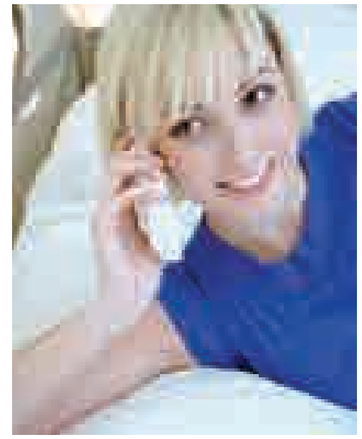
Many parents felt that communications technology lured children away from family interactions. *"I think I've found since he [son] had the Xbox and the computer up in his room, we don't really see [him] in the evening"*, said one parent (UK Family 7). Similarly, some children commented that work took parents away from family time. Some families successfully solved this problem by having a central location for most technology. For example, several families had their computers, video games, and televisions in the family room so that they could both monitor use and keep their children from disappearing into their own rooms when they wanted to use technology. This gave parents a sense of control over how their children were using technology, and this reduced anxiety both increased their positive feelings towards technology and reduced feelings that technology was disrupting family life.

One mother (UK Family 14) described how she used a central location to monitor her children's technology use: *"I mean, yes, we open and see her account, she uses it in here [the family room] when we're here. If we're both at work…they're not allowed on so, yes, it's solely when we're here to watch and see".*

However, centralising the location of technology is only helpful for stationary technology like PCs. Technology such as mobile phones poses a challenge to families who seek to mitigate the potentially physically isolating effects of communications technology. Some parents got around this problem by limiting the number of texts their children could send and receive and giving them fewer mobile minutes. Other families had rules governing when mobiles could be used (see Section 4.5.2).

One mother (UK Family 14) described how she taught her daughter to moderate her mobile phone use: *"I think the first month you [daughter] sort of learned – because you got your phone, didn't you, and I think within two weeks, it may not even been that long, but she'd used all her minutes instantly so all she had left was texts which was fine because if we needed her we could still communicate with her, that wasn't a problem. But I think you sort of felt hard done by because, you know, she suddenly realised that 'I'm going to get no more minutes this month'. And she had to wait until a certain date when she sort of could get more, her monthly quota. And from that day she's never used all of her minutes, there's always been some left over. So I think, yes, she's probably sort of learned the lesson from that".*

Another mother (UK Family 14) described how she made sure her daughter was using her mobile responsibly: *"Her phone's under my name, so I am actually in charge of her account. So we know exactly who she's talking to and who she's texting so, yes, I think we do monitor extremely well".*



Fewer families had rules governing mobile usage compared to computer or game use, but the families that did found it beneficial. As explained by one mother (UK Family 15): *"We don't like it if they've got their phones by them, checking them. We wouldn't let them do that…But like when you [children] were 11-12 and you started having phones, we wouldn't have let you, and you used to try. I'd be like 'No, not at the table'".*

4.5.2 Rules

Some families had a variety of rules in place to govern technology usage, and these families almost universally felt positively[5] about the effects the rules had on their family life. One family that used to feel overwhelmed by technology found that turning it off altogether during, for example, mealtimes made it easier to cope with. *"We're very much able to…just make that decision that for the next half an hour or for the next hour, we are out of communication",* the mother explained (UK Family 3). Another parent found that initiating rules governing when technology could be used brought her sons together more, saying: *"when we stopped them using [the] computer and watching television during the week as a matter of force, they started playing board games"* (UK Family 13). Similarly, one daughter commented: *"I'm not allowed on it [Facebook] if I haven't done my work"* (UK Family 11). Another parent (UK Family 2) explained: *"We've got the video locked away in a cupboard",* adding that it helped them control when the children play video games and watch TV.

Often rules were based around specific times. Many families banned technology at the dinner table. Others banned use during homework time: *"If it's homework time then it's in the dining room, at the table, no television, on their own, no communication just focusing on the task at hand"*, said one father (UK Family 10). Another mother (UK Family 3) agreed: *"To be honest, we don't really let them [use technology while doing homework]. If they're doing homework, they're doing homework and there's no other distractions that are allowed into that".* Internationally, the rules-based approach was very popular: *"It is hard to educate a teenager to control themselves"*, said one father from China, adding that *"the easiest way of keeping them away from addiction to communication technology is to cut their access to these things".* He also insisted that he would not give his child a mobile phone until high-school.

Some people, mainly adults, set rules for themselves to help control their own use. One father (UK Family 3) explained: *"I've now got it [my Blackberry] set to turn off at 5 o'clock in the evening and it turns on at 9 o'clock in the morning",* going on to say how it helped him separate work and family time. Even some children, however, would moderate their own technology use at certain times. *"I wouldn't have Facebook open while I'm doing homework… I'd completely ignore it",* said one son (UK Family 3), for example. The survey of

[5] In the UK

During the interviews for the Family Study, several families thanked the research teams for allowing them to participate. Their reason was that the diary study had helped them increase their awareness of their use of technology, and for some, this led them to be able to moderate their use more effectively.

the UK population showed that, in fact, those who felt most overwhelmed by technology did make the most conscious effort to moderate it.

No matter the form or whether the rules were set by parents or children, having them in place had a profoundly positive effect on individuals and families alike. Although the rules differed in nature and severity, they reduced some of the anxiety, concern, and feelings of helplessness that often surround the pervasiveness of modern communication technology.

4.5.3 Awareness

During the interviews for the Family Study, several families thanked the research teams for allowing them to participate. Their reason was that the diary study had helped them increase their awareness of their use of technology, and for some, this led them to be able to moderate their use more effectively.

Many family members described how much more aware they were of their own use. *"It highlighted to me that I just get up, go to work, fight with people, come home and watch TV. And that's it really, that's all I do Monday to Sunday"*, said one father (UK Family 10). *"I didn't realise quite how much I used my mobile until recording it down",* said another parent (UK Family 12). Even some children were surprised, one (UK Family 5) saying: *"I was like, whoa! I spend a lot of time on Facebook!"*

Many family members also decided to make changes after filling out the diaries. *"It [the diary] actually made me stop wasting a lot of my time as well, because I thought 'Oh no, I can't say that I was on Facebook that long. Won't turn the computer on until lunchtime'… I think it made me more aware of the fact that you know normally I'd feed [my son] and I'd turn it on to check if I had any emails or what everybody was doing, and so I didn't actually do that. I thought 'Oh God, no I can't look that sad,' and so it has made me stop and think and look at it that way…. Monday I found that I didn't turn the computer on through the day. So yes, it has changed",* said one mother (UK Family 2), who was grateful that filling out the diary had made her more conscious of some habits that she wanted to change. She also added that it had given the family a chance to reflect on their use together: *"I really, really liked the fact that it gave us chance to sit down and actually talk through everything, because we sat down with the boys afterwards and went through",* she said.

Many more family members, including many parents, told the researchers how their behaviour had changed as a result of the study. *"It [the diary] made me think what I was doing. I didn't change what I was doing, but I have changed what I'm doing now. I don't spend so much time on forums and things",* said one mother (UK Family 1). Another mother (UK Family 8) expressed that *"instead of using Facebook too much or texting I'm probably going to try and communicate face-to-face with people. So that I'm actually next to them when I'm actually speaking to them".*

Awareness of use is the key to achieving balance and well-being when using communications technology, largely because most people appear to be unaware just how pervasive and habitual their use is. Talking as a family, or even going as far as to record personal levels of use for a few days, can be informative in raising awareness. Once individuals and families know how much communications technology they are using, they can try to aim for a more ideal level, whatever they define that level to be.

4.5.4 Education

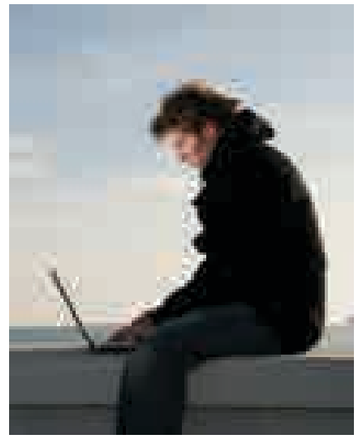
As technology continues to change, it is critical that children be educated about safe and responsible technology use. Because children will likely be using different technologies over time, it is important that a good basis for determining sensible behaviour towards technology be instilled at a young age. As put by one mother (UK Family 13): *"As they grow up they will face different threats, so what they are… the sort of sites they go to now or they would be likely to go to now, that's going to change and they could get drawn into different communities and different areas which would potentially pose a threat to them. So as they get older, I think because the threat changes it's something that we will constantly have to be aware of and we're constantly educating them until they're at a point where they can trust their own judgement on it".*

Many schools now have IT education programmes that focus on teaching not just technological skills but also safe and mindful use. Some parents also talked about ways that they either moderated use or educated their children to encourage responsible future use. *"We try and teach them responsible use...of the computers",* said one mother (UK Family 12). *"It's sort of restricted… they rely on us to log onto that so they don't do any of that type of thing [use the computer irresponsibly]"*, added their father.

Other families used things like centralised location, filters blocking certain kinds of content, and explicit rules to govern how their children used technology. Most felt that these actions benefited both their children and their family life. Many felt that there were certain ages at which certain kinds of technology were appropriate, although these ages differed by family, one family (UK Family 13), for example, saying that their children could not have their own computers until they turned thirteen.

4.5.5 Balance

Moderation of communications technology, whether it be by location, rules, or something else, is ultimately in service of balance. Many concerns about the influence of communications technology refer to the extent to which it takes us away from "traditional" forms of communication, interaction, and behaviour. The concept of balance refers to using technology in such a way that it preserves the benefits of things like face-to-face interaction without preventing individuals and families from enjoying the positives of using technology.



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Some families in the study recognised the need for a balanced and rational approach to technology use. As put by one father (Australia Family 8): *"It's a matter of balancing all the kind of competing influences in your life. I probably allow my kids to self-regulate. Sometimes I probably have a thought bubble they're using it too much during a day, I guess, the addictive possibilities, I suppose, but I really don't have to worry about. In the case of my kids, they've got other things in their lives. So, quite frankly, what's the difference between them talking to their friends using social media, than it might be from 'my Mum is on the phone for two hours?'"*

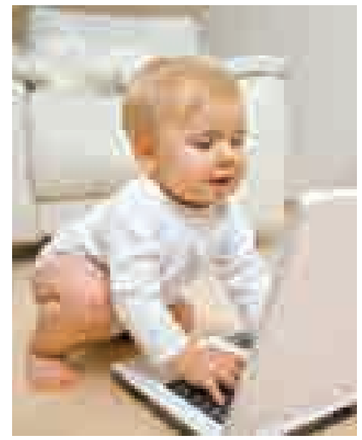
The point of balance is unique to each individual. Some people feel lost without their mobiles while others relish time such as on planes when they cannot use it. Some children feel that Facebook is helpful for collaboration while doing homework while others find it a distraction. The goal of this project was not to prescribe a set of actions for everyone, but rather to understand the steps that individuals and families take to bring themselves to a point of balance with the hope that those who feel out of balance can make useful changes.

Besides central location and rules, the biggest thing that seemed to help families was some degree of technology-free time. Whether this happened every night at mealtimes or only on long, secluded holidays, all families who consciously took time to be away from communications technology found it to be a beneficial experience.

"We don't have [technology-free] days as such unless we're away", said one parent (UK Family 15). *"And we say to them [the children]: 'No we're not having any'. And actually they like it then as well. They often say it's nice not having that distraction".* Another mother (UK Family 13) made sure to take some technology-free time for herself: *"I go out on a Tuesday night and the most wonderful thing is to be able to turn my phone on silent and for a couple of hours…just ignore everything, and have a social time without any technology at all",* she said. *"I find that very refreshing".*

Sometimes, turning off technology can also reduce feelings of dependence. One daughter (UK Family 17) described how she deactivated her Facebook account for a few days while studying for exams and afterwards spent much less time using it. "*If I get rid of my Facebook then I have time to do other things"*, she said. *"Because I managed to… last two days without it, now that I have it [again], I don't really use it any more – I can do so much else instead of being on Facebook".* Other children also found that moderating the use of some technologies at certain times could be useful: *"I used to always have Facebook open when I'm doing my homework, but not anymore because I know I can't concentrate with it open, so I try and just get my homework done and then go on Facebook",* said one daughter (US Family 3).

Some people did find occasionally getting away from technology refreshing but also found it hard to do it when they were not forced to. For example, one father (UK Family 13) said: *"I do find it difficult to completely turn off. For me, one of the best times that I have is when I get onto a plane and they say, 'right you've got to turn everything off', because for me that's just… no-one can get hold of you. No-one can contact you".* He then added: *"I'd love it if there was more ability to do that. I don't ever turn my phone off".* The families who do make the effort to turn off, largely by making rules around when technology can or cannot be used, do find it very helpful, as explained previously.



Besides central location and rules, the biggest thing that seemed to help families was some degree of technology-free time.

CHAPTER 5

Conclusions

This project was designed to provide a picture of how modern communications technology is being used by individuals and families and the subsequent effects. Furthermore, the factors that help some individuals and families form a healthier relationship with technology were identified.

The actual level of use of technology varies greatly across the population, but only a minority of people are heavy users, with the majority of people using communications technology for less than six hours a day on average. The preferences of the population were also highly variable, but face-to-face contact was still the strongest communications preference in all four countries studied. In addition, most people were aware that different kinds of ICT were best for different purposes and tried to modify their communications use accordingly.

The impacts of communications technology on individuals and families were both positive and negative in nature. While the raw amount of use did not appear to affect well-being in most cases, families did report that work communications sometimes interfered with family time and that children sometimes appeared to want to engage with technology more than with the family. Some people also reported feeling overwhelmed or out of control, which did appear to detract from overall well-being, even when those individuals tried to moderate their use. Furthermore, the frequent technology-related distractions often mentioned by families also appeared to influence well-being in some circumstances.

Conversely, feeling in control was associated with increased well-being. Steps taken by families towards feeling in control often involved increasing awareness of use and consciously moderating activity. This allowed families to reap some of the benefits of using technology, for example by talking to

distant family members or using gaming interfaces together. Many individuals also expressed that communications technology gave them an increased feeling of connectedness with friends and relatives, particularly those living farther away. Ultimately, finding an ideal location for technology, formulating rules, creating awareness, educating both parents and children about responsible use, and finding balance are key components in being able to harness the positives of technology while avoiding many of the negatives.

It is important to keep in mind that technological change is inevitable, so finding an optimal relationship and use pattern is a continual process. Societal advancement depends on technology, but that technology can also have unanticipated side-effects that must be mitigated. Having an understanding of what a satisfying relationship with ICT looks and feels like is helpful guidance for future changes. Ultimately, with the correct balance, the use of communications technology will enable individuals and families to achieve things never dreamt of in the past while maintaining a sense of humanity and well-being.

Steps taken by families towards feeling in control often involved increasing awareness of use and consciously moderating activity.

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Appendix 1: Diary Template used in the Family Study

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Personal Diary - Day 1

Enter day of the week:

Name: | Date of Birth:

Occupation: | Gender:

Current Location:

Please circle the appropriate word(s) in each of the 6 boxes for every time slot. Use the Legend provided for guidance. You may circle more than 1 word in each box.

Legend

Communicated With:	Family, Friend, Teacher, Student, Colleague, Client, Other (please specify)
Purpose:	Family, Social, Work, Educational, Transactional, Other (please specify)
Location:	Home, Work, School, Transit, Other (please specify)
Medium:	Text-based, Voice-only, Face-to-Face (FtF), Social Networking Site (SNS), Content Sharing (CS), Games, Other (please specify)
Circumstance:	Pre-planned use, Break from something else, Responsive, Routine, Other (please specify)
Mood:	Positive, Negative, Indifferent, Other (please specify)

Use of Communications

	Communicated With (please circle appropriate)	Purpose (please circle appropriate)	Location (please circle appropriate)	Medium (please circle appropriate)	Circumstance (please circle appropriate)	Mood (please circle appropriate)
Waking – 7.00	Family Friend Teacher Student Colleague Client Other -.....	Family Social Work Educational Transactional Other -.....	Home Work School Transit Other -	Text Voice FtF SNS CS Games Other -.....	Pre-planned Break Responsive Routine Other -	Positive Negative Indifferent Other - .....
7.00 – 8.00	Family Friend Teacher Student Colleague Client Other -.....	Family Social Work Educational Transactional Other -.....	Home Work School Transit Other -	Text Voice FtF SNS CS Games Other -.....	Pre-planned Break Responsive Routine Other -	Positive Negative Indifferent Other - .....
8.00 – 9.00	Family Friend Teacher Student Colleague Client Other -.....	Family Social Work Educational Transactional Other -.....	Home Work School Transit Other -	Text Voice FtF SNS CS Games Other -.....	Pre-planned Break Responsive Routine Other -	Positive Negative Indifferent Other - .....
9.00 – 10.00	Family Friend Teacher Student Colleague Client Other -.....	Family Social Work Educational Transactional Other -.....	Home Work School Transit Other -	Text Voice FtF SNS CS Games Other -.....	Pre-planned Break Responsive Routine Other -	Positive Negative Indifferent Other - .....
10.00 – 11.00	Family Friend Teacher Student Colleague Client Other -.....	Family Social Work Educational Transactional Other -.....	Home Work School Transit Other -	Text Voice FtF SNS CS Games Other -.....	Pre-planned Break Responsive Routine Other -	Positive Negative Indifferent Other - .....
11.00 – 12.00	Family Friend Teacher Student Colleague Client Other -.....	Family Social Work Educational Transactional Other -.....	Home Work School Transit Other -	Text Voice FtF SNS CS Games Other -.....	Pre-planned Break Responsive Routine Other -	Positive Negative Indifferent Other - .....
12.00 – 13.00	Family Friend Teacher Student Colleague Client Other -.....	Family Social Work Educational Transactional Other -.....	Home Work School Transit Other -	Text Voice FtF SNS CS Games Other -.....	Pre-planned Break Responsive Routine Other -	Positive Negative Indifferent Other - .....
13.00 – 14.00	Family Friend Teacher Student Colleague Client Other -.....	Family Social Work Educational Transactional Other -.....	Home Work School Transit Other -	Text Voice FtF SNS CS Games Other -.....	Pre-planned Break Responsive Routine Other -	Positive Negative Indifferent Other - .....
14.00 – 15.00	Family Friend Teacher Student Colleague Client Other -.....	Family Social Work Educational Transactional Other -.....	Home Work School Transit Other -	Text Voice FtF SNS CS Games Other -.....	Pre-planned Break Responsive Routine Other -	Positive Negative Indifferent Other - .....
15.00 – 16.00	Family Friend Teacher Student Colleague Client Other -.....	Family Social Work Educational Transactional Other -.....	Home Work School Transit Other -	Text Voice FtF SNS CS Games Other -.....	Pre-planned Break Responsive Routine Other -	Positive Negative Indifferent Other - .....
16.00 – 17.00	Family Friend Teacher Student Colleague Client Other -.....	Family Social Work Educational Transactional Other -.....	Home Work School Transit Other -	Text Voice FtF SNS CS Games Other -.....	Pre-planned Break Responsive Routine Other -	Positive Negative Indifferent Other - .....
17.00 – 18.00	Family Friend Teacher Student Colleague Client Other -.....	Family Social Work Educational Transactional Other -.....	Home Work School Transit Other -	Text Voice FtF SNS CS Games Other -.....	Pre-planned Break Responsive Routine Other -	Positive Negative Indifferent Other - .....
18.00 – 19.00	Family Friend Teacher Student Colleague Client Other -.....	Family Social Work Educational Transactional Other -.....	Home Work School Transit Other -	Text Voice FtF SNS CS Games Other -.....	Pre-planned Break Responsive Routine Other -	Positive Negative Indifferent Other - .....
19.00 – 20.00	Family Friend Teacher Student Colleague Client Other -.....	Family Social Work Educational Transactional Other -.....	Home Work School Transit Other -	Text Voice FtF SNS CS Games Other -.....	Pre-planned Break Responsive Routine Other -	Positive Negative Indifferent Other - .....
20.00 – 21.00	Family Friend Teacher Student Colleague Client Other -.....	Family Social Work Educational Transactional Other -.....	Home Work School Transit Other -	Text Voice FtF SNS CS Games Other -.....	Pre-planned Break Responsive Routine Other -	Positive Negative Indifferent Other - .....
21.00 – 22.00	Family Friend Teacher Student Colleague Client Other -.....	Family Social Work Educational Transactional Other -.....	Home Work School Transit Other -	Text Voice FtF SNS CS Games Other -.....	Pre-planned Break Responsive Routine Other -	Positive Negative Indifferent Other - .....
22.00 – 23.00	Family Friend Teacher Student Colleague Client Other -.....	Family Social Work Educational Transactional Other -.....	Home Work School Transit Other -	Text Voice FtF SNS CS Games Other -.....	Pre-planned Break Responsive Routine Other -	Positive Negative Indifferent Other - .....
23.00 – 00.00	Family Friend Teacher Student Colleague Client Other -.....	Family Social Work Educational Transactional Other -.....	Home Work School Transit Other -	Text Voice FtF SNS CS Games Other -.....	Pre-planned Break Responsive Routine Other -	Positive Negative Indifferent Other - .....
00.00 – [ ]	Family Friend Teacher Student Colleague Client Other -.....	Family Social Work Educational Transactional Other -.....	Home Work School Transit Other -	Text Voice FtF SNS CS Games Other -.....	Pre-planned Break Responsive Routine Other -	Positive Negative Indifferent Other - .....
Please enter time slot [ ]	Family Friend Teacher Student Colleague Client Other -.....	Family Social Work Educational Transactional Other -.....	Home Work School Transit Other -	Text Voice FtF SNS CS Games Other -.....	Pre-planned Break Responsive Routine Other -	Positive Negative Indifferent Other - .....

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Personal Diary

Instructions for Filling Out Your Diary

Diary Instructions

Passive and Active Communications:

- **Please record both passive and active communications. Even if someone talks to you, emails you, texts you, etc. and you don't respond, it still counts as communication.**

Medium:

You are asked to record which medium of communication you used. Here are some examples of what qualifies for each category. Please note that these are only examples and there are many more in each group that qualify. Use your best judgment to determine which medium you used.

- **Text-based: Email, Text messaging, IM (Instant Messenger)**
- **Voice-only: Phone call, Skype audio chat**
- **Face-to-Face: In-person conversation, Video chat**
- **Social Networking Site: Facebook, Linked-in, Twitter**
- **Content Sharing: Blogging sites, YouTube, Forum sites**
- **Games: Wii, World of Warcraft, Civilization.**

Circumstance:

You are asked to record what made you start using a communications technology. Here are some explanations of the circumstances we have provided.

- **Pre-planned use: You decide ahead of time that you will start using a particular piece of technology for a certain purpose. For example, you might call a friend or check your email.**
- **Break from something else: In the middle of another task, you decide to take a break by using a piece of communications technology. For example, you might check Facebook while in the middle of writing an essay.**
- **Responsive: This is when you are interrupted by a communication. For example, your phone might ring, you might receive a text message, or you might be notified that you have a new email. If you stop whatever you are doing to deal with this, then it is a responsive communication.**
- **Routine: A task which you perform on most days. For example, making plans for meals or transportation with family in the morning or greeting a receptionist on the way into work.**

Mood:

You are asked to record how you feel while you are using communications technology. This should do specifically with how you feel about the interaction with the technology or any change in your mood resulting from the interaction, not your general mood at the time.

- **Positive: Happy, engaged, humourous, pleasantly surprised**
- **Negative: Sad, upset, disappointed, annoyed**

Thank You

For Your Participation

Appendix 2: **Survey Questions**

Thank you for agreeing to participate in this survey.

Recently, there has been a lot of discussion about how communications technologies (e.g. mobile phones, email, Facebook, etc.) affect our lives. These technologies have many benefits but also have some potential drawbacks. The purpose of this survey is to investigate the effects, both positive and negative, that communications technologies have on individuals and society as a whole. This survey is aimed at providing recommendations to help people make more informed decisions about their use of communication technologies to lead a more balanced, happy, and productive life.

Please remember:
Your views are important to us and your answers will be kept in the strictest confidence.
None of the responses you give will be directly linked to you as an individual. They are used purely for statistical purposes only.
Honest and thoughtful answers to this survey are vital to the integrity of our research.

1. What is your gender?

   - ○ Male
   - ○ Female

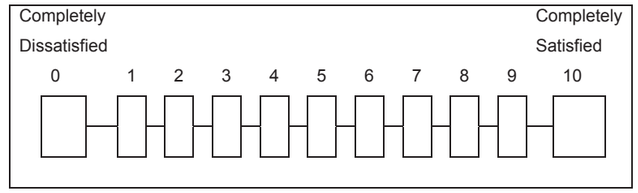
2. What age group do you belong to?

   - ○ 10-18 years old
   - ○ 19-24 years old
   - ○ 25-34 years old
   - ○ 35-44 years old
   - ○ 45-64 years old
   - ○ 65+ years old

3. On average, how much time do you spend online (using the internet) each day?

   - ○ 1 hour or less
   - ○ 1-3 hours
   - ○ More than 3 hours

4. Thinking about your own life and personal relationships, how satisfied are you with your life as a whole? Tick an appropriate box.



5. Use the table to indicate the extent to which you feel happy or unhappy in your relationships with your family and friends.

	Very Unhappy	Unhappy	Neither Unhappy nor Happy	Happy	Very Happy
Immediate Family	○	○	○	○	○
Extended Family	○	○	○	○	○
Close Friends	○	○	○	○	○
Distant Friends	○	○	○	○	○

6. What communications technologies do you use? Select all that apply.

   - ○ Landline phone
   - ○ Standard mobile phone
   - ○ Smart phone (e.g. iPhone, Android, Blackberry)
   - ○ Desktop computer with internet connection
   - ○ Laptop with internet connection
   - ○ Tablet PC (e.g. iPad) with internet connection
   - ○ Online games with other players via a games console
   - ○ Other ……...

7. Which method(s) of communication do you use for personal (e.g. family, friends, social) matters? Select all that apply.

- Talking face-to-face
- Talking on the phone (e.g. landline phone call, mobile phone call, Skype audio call)
- Text messaging on mobile phone
- Social networking sites (e.g. Facebook, Twitter)
- E-mail
- Instant messenger (e.g. MSN, AIM, Skype messaging)
- Video call (e.g. Skype video)
- Content sharing (e.g. blogs, forums, YouTube, etc.)
- Online games with other players via a games console
- Other ……...

8. Which method(s) of communication do you use for work/school matters? Select all that apply.
   - Talking face-to-face
   - Talking on the phone (e.g. landline phone call, mobile phone call, Skype audio call)
   - Text messaging on mobile phone
   - Social networking sites (e.g. Facebook, Twitter)
   - E-mail
   - Instant messenger (e.g. MSN, AIM, Skype messaging)
   - Video call (e.g. Skype video)
   - Content sharing (e.g. blogs, forums, YouTube, etc.)
   - Online games with other players via a games console
   - Other ……...

9. Taking into account all the different ways you use communications technologies, please estimate how many hours a day you use some form of communications technology.
   - Less than 1

- 1-3
- 4-6
- 7-9
- 10+

10. Use the table to indicate how much time you spend using each method of communication during your waking hours on an average weekday.

	None	Less Than 1 Hour	1-3 Hours	4-6 Hours	7-9 Hours	10+ Hours
Face-to-Face	○	○	○	○	○	○
Talking on Landline Phone	○	○	○	○	○	○
Talking on Mobile Phone	○	○	○	○	○	○
Text Messaging	○	○	○	○	○	○
Social Networking Site	○	○	○	○	○	○
Email	○	○	○	○	○	○
Instant Messenger	○	○	○	○	○	○
Video call	○	○	○	○	○	○
Blogs/ Forums	○	○	○	○	○	○
Online games with other players via a games console	○	○	○	○	○	○

11. Of those methods of communication that you have experienced, which do you like using the most?

- Talking face-to-face
- Talking on the phone (e.g. landline phone call, mobile phone call, Skype audio call)
- Text messaging on mobile phone
- Social networking sites (e.g. Facebook, Twitter)
- E-mail
- Instant messenger (e.g. MSN, AIM, Skype messaging)
- Video call (e.g. Skype video)
- Content sharing (e.g. blogs, forums, YouTube, etc.)
- Online games with other players via a games console
- Other ……...

"Please explain the reasons for your choice"

Enter text here….

12. Of those methods of communication that you have experienced, which do you like using the least?
    - Talking face-to-face
    - Talking on the phone (e.g. landline phone call, mobile phone call, Skype audio call)
    - Text messaging on mobile phone
    - Social networking sites (e.g. Facebook, Twitter)
    - E-mail
    - Instant messenger (e.g. MSN, AIM, Skype messaging)
    - Video call (e.g. Skype video)
    - Content sharing (e.g. blogs, forums, YouTube, etc.)

- Online games with other players via a games console
- Other ……...

"Please explain the reasons for your choice"

Enter text here….

13. What method(s) of communication do you prefer that other people use to reach you? Select all that apply.
    - Talking face-to-face
    - Talking on the phone (e.g. landline phone call, mobile phone call, Skype audio call)
    - Text messaging on mobile phone
    - Social networking sites (e.g. Facebook, Twitter)
    - E-mail
    - Instant messenger (e.g. MSN, AIM, Skype messaging)
    - Video call (e.g. Skype video)
    - Content sharing (e.g. blogs, forums, YouTube, etc.)
    - Online games with other players via a games console
    - Other ……...

14. How often do you feel that your personal use of different communication technologies (e.g. email and social networking sites) distracts you from your school/professional work?
    - Never
    - Almost never
    - Rarely
    - From time to time
    - Regularly

- All the time

15. How often do you feel that your use of different communication technologies for professional work (e.g. email and Smartphone) distracts you from your personal relationships?

    - Never
    - Almost never
    - Rarely
    - From time to time
    - Regularly
    - All the time
    - I am not in professional work

16. Use the table to indicate the extent to which your use of communications technologies has a positive or negative impact on your personal relationships with people.

    1 = very negative, 2 = negative, 3 = neither positive nor negative, 4 = positive, 5 = very positive, 6=not applicable

	Immediate Family	Extended Family	Close Friends	Distant Friends
Talking on Landline Phone	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Talking on Mobile Phone	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Text Messaging	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Social Networking Site	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Email	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Instant Messenger	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Video call	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Blogs/ Forums	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

Online games with other players via a games console	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

17. How often do you use more than one method of communication at the same time (e.g. texting while talking to a friend or checking email while making a phone call)?

    - Never
    - Almost never
    - Rarely
    - From time to time
    - Regularly
    - All the time

18. Please indicate which methods of communication you multitask with. Select all that apply.

    - Talking face-to-face
    - Talking on the phone (e.g. landline phone call, mobile phone call, Skype audio call)
    - Text messaging on mobile phone
    - Social networking sites (e.g. Facebook, Twitter)
    - E-mail
    - Instant messenger (e.g. MSN, AIM, Skype messaging)
    - Video call (e.g. Skype video)
    - Content sharing (e.g. blogs, forums, YouTube, etc.)
    - Online games with other players via a games console
    - Other ……...

19. Do you ever feel that you spend too much time using communications technologies?

- Never
- Almost never
- Rarely
- From time to time
- Regularly
- All the time
- I would like to spend more time using communications technologies

20. Do you ever feel that you or your family would benefit from having 'technology-free time' where all communications devices are switched off?
    - Never
    - Almost never
    - Rarely
    - From time to time
    - Regularly
    - All the time

    "Please explain the reasons for your choice"

    Enter text here….

21. How often do you consciously try to reduce your use of communications technologies?
    - Never
    - Almost never
    - Rarely
    - From time to time
    - Regularly

- All the time

22. If you do consciously try to reduce your use of communications technologies, which types do you try to reduce your use of? Select all that apply.
    - Talking face-to-face
    - Talking on the phone (e.g. landline phone call, mobile phone call, Skype audio call)
    - Text messaging on mobile phone
    - Social networking sites (e.g. Facebook, Twitter)
    - E-mail
    - Instant messenger (e.g. MSN, AIM, Skype messaging)
    - Video call (e.g. Skype video)
    - Content sharing (e.g. blogs, forums, YouTube, etc.)
    - Online games with other players via a games console
    - Other ……...
    - I do not consciously try to reduce my use of communications technologies

23. How much do you think you will use communications technologies in the near future?
    - Much less than now
    - Slightly less than I do now
    - The same amount I do now
    - Slightly more than I do now
    - Much more than I do now

24. If you had to convey a really important message to a friend, co-worker, or family member, how trustworthy would you find the following methods of communication in effectively conveying it?

	Not Trustworthy At All	Quite Untrustworthy	Neither Trustworthy nor Untrustworthy	Quite Trustworthy	Very Trustworthy	Do Not Know
Face-to-Face	○	○	○	○	○	○
Talking on Landline Phone	○	○	○	○	○	○
Talking on Mobile Phone	○	○	○	○	○	○
Text Messaging	○	○	○	○	○	○
Social Networking Site	○	○	○	○	○	○
Email	○	○	○	○	○	○
Instant Messenger	○	○	○	○	○	○
Video call	○	○	○	○	○	○
Blogs/ Forums	○	○	○	○	○	○
Online games with other players via a games console	○	○	○	○	○	○

25. How much of the time during your waking hours on an average weekday are you NOT using any information and communications technology (ICT)?

- ○ Less than 15 minutes
- ○ 15 minutes to 1 hour
- ○ 1-2 hours
- ○ 2-3 hours
- ○ 3-4 hours
- ○ 5-6 hours
- ○ More than 6 hours

26. Do you ever feel overwhelmed by communications technologies to the point that you feel the need to escape them?

- ○ Never
- ○ Almost never
- ○ Rarely
- ○ From time to time
- ○ Regularly
- ○ All the time

27. Do you feel in control of your use of communications technologies?

- ○ Never
- ○ Almost never
- ○ Rarely
- ○ From time to time
- ○ Regularly
- ○ All the time

28. Are you a parent with a child/children aged under 18?

- ○ Yes
- ○ No

29. Do you feel qualified to advise your children on how to use communications technologies responsibly?

- ○ Yes
- ○ No

30. During this survey, have you noticed anything about your use of communications technologies that you didn't notice before?

- ○ Yes
- ○ No

"If Yes, please give more information"

Enter text here….

About You

31. Which of these best describes your ethnic background?
    - White
    - Mixed: White and Black Caribbean
    - Mixed: White and Black African
    - Mixed: White and Asian
    - Mixed: Other
    - Black Caribbean
    - Black African
    - Black: Other
    - Asian: Indian
    - Asian: Pakistani
    - Asian: Bangladeshi
    - Asian: Chinese
    - Asian: Other
    - Any other ethnic background

32. Which of these best describes your current employment situation?
    - Working
    - Out of work and looking for work
    - Out of work but not currently looking for work
    - A homemaker
    - Retired
    - Unable to work
    - In school and working
    - In school and not working

33. If you are in education, what is your current stage?
    - Not in education
    - Primary school
    - Secondary school
    - College
    - University: undergraduate
    - University: postgraduate

34. What is the last level of school you completed?
    - Primary or Elementary School
    - Some High School
    - Completed High School
    - Technical/ Trade School
    - Some University
    - Completed University- Bachelor's Degree
    - Some Postgraduate
    - Completed Postgraduate Degree

35. What is your household income before taxes?
    - Less than £25K
    - £25-50K
    - £51-75K
    - £76-100K
    - £101-125K
    - £126-150K
    - More than £150K

Appendix 3: **Statistics**

For all statistical correlations shown below, a desired alpha of 0.01 was selected due to the large sample size, as a larger alpha could have resulted in type I error. However, all correlations with $p < 0.05$ were reported as per convention, although correlations where $0.01 < p < 0.05$ were designated as "weak", whereas correlations where $p < 0.01$ were designated as "strong".

Section 1:

Statistical correlation performed using Spearman test between questions:

- ***Thinking about your own life and personal relationships, how satisfied are you with your life as a whole?*** [Question 4 from the Survey]
- ***Taking into account all the different ways you use communications technologies, please estimate how many hours a day you use some form of communications technology?*** [Question 9 from the Survey]

	UK		US		Australia		China	
Correlation Type	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**
Well-being (Q4) v. Overall use (Q9)	0.041	0.144	0.006	0.839	-0.031	0.295	0.097	0.001

Section 2:

Statistical correlation performed using Spearman test between questions:

- ***Thinking about your own life and personal relationships, how satisfied are you with your life as a whole?*** [Question 4 from the Survey]
- ***How much of the time during your waking hours on an average weekday are you NOT using any information and communications technology (ICT)?*** [Question 25 from the Survey]

	UK		US		Australia		China	
Correlation Type	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**
Well-being (Q4) v. Time away from ICT (Q25)	0.064	0.022	-0.056	0.074	0.072	0.015	-0.046	0.112

Section 3:

Statistical correlation performed using Spearman test between questions:

- ***Thinking about your own life and personal relationships, how satisfied are you with your life as a whole?*** [Question 4 from the Survey]
- ***Do you ever feel overwhelmed by communications technologies to the point that you feel the need to escape them?*** [Question 26 from the Survey]

	UK		US		Australia		China	
Correlation Type	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**
Well-being (Q4) v. Feeling overwhelmed (Q26)	-0.130	<0.001	-0.010	0.755	-0.117	<0.001	-0.126	<0.001

Section 4:

Statistical correlation performed using Spearman test between questions:

- ***Thinking about your own life and personal relationships, how satisfied are you with your life as a whole?*** [Question 4 from the Survey]
- ***Do you feel in control of your use of communications technologies?*** [Question 27 from the Survey]

	UK		US		Australia		China	
Correlation Type	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**
Well-being (Q4) v. Feeling in control (Q27)	0.161	<0.001	0.026	0.399	0.164	<0.001	0.113	<0.001

Section 5:

Statistical correlation performed using Spearman test between questions:

- ***Thinking about your own life and personal relationships, how satisfied are you with your life as a whole?*** [Question 4 from the Survey]
- ***How often do you feel that your personal use of different communication technologies (e.g. email and social networking sites) distracts you from your school/professional work?*** [Question 14 from the Survey]

	UK		US		Australia		China	
Correlation Type	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**
Well-being (Q4) v. Distraction from work (Q14)	-0.081	0.004	0.022	0.491	-0.124	<0.001	-0.091	0.002

Section 6:

Statistical correlation performed using Spearman test between questions:

- ***Thinking about your own life and personal relationships, how satisfied are you with your life as a whole?*** [Question 4 from the Survey]
- ***How often do you feel that your use of different communication technologies for professional work (e.g. email and Smartphone) distracts you from your personal relationships?*** [Question 15 from the Survey]

	UK		US		Australia		China	
Correlation Type	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**
Well-being (Q4) v. Distraction from personal relationships (Q15)	-0.136	<0.001	0.002	0.951	-0.010	0.724	-0.113	<0.001

Section 7:

Statistical correlation performed using Spearman test for children and parents' groups between questions:

- ***Thinking about your own life and personal relationships, how satisfied are you with your life as a whole?*** [Question 4 from the Survey]
- ***How often do you feel that your personal use of different communication technologies (e.g. email and social networking sites) distracts you from your school/professional work?*** [Question 14 from the Survey]

	UK		US		Australia		China	
Correlation Type	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**
Well-being (Q4) v. Distraction from work (Q14) children	-0.123	0.120	-0.139	0.091	-0.222	0.006	0.014	0.850
Well-being (Q4) v. Distraction from work (Q14) parents	-0.090	0.092	0.166	0.004	-0.132	0.082	-0.090	0.092

Section 8:

Statistical correlation performed using Spearman test for children and parents' groups between questions:

- ***Thinking about your own life and personal relationships, how satisfied are you with your life as a whole?*** [Question 4 from the Survey]
- ***How often do you feel that your use of different communication technologies for professional work (e.g. email and Smartphone) distracts you from your personal relationships?*** [Question 15 from the Survey]

	UK		US		Australia		China	
Correlation Type	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**
Well-being (Q4) v. Distraction from personal relationships (Q15) children	-0.043	0.583	-0.139	0.091	-0.119	0.150	-0.165	0.022
Well-being (Q4) v. Distraction from personal relationships (Q15) parents	-0.249	<0.001	-0.013	0.827	-0.058	0.444	-0.100	0.028

Section 9:

Statistical correlation performed using Spearman test for children and parents' groups between questions:

- ***How often do you consciously try to reduce your use of communications technologies?*** [Question 21 from the Survey]
- ***Do you ever feel overwhelmed by communications technologies to the point that you feel the need to escape them?*** [Question 26 from the Survey]

	UK		US		Australia		China	
Correlation Type	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**
Conscious moderation (Q21) v. Feeling overwhelmed (Q26)	0.491	<0.001	0.495	<0.001	0.513	<0.001	0.425	<0.001

Section 10:

Statistical correlation performed using Spearman test for children and parents' groups between questions:

- ***Thinking about your own life and personal relationships, how satisfied are you with your life as a whole?*** [Question 4 from the Survey]
- ***How often do you consciously try to reduce your use of communications technologies?*** [Question 21 from the Survey]

	UK		US		Australia		China	
Correlation Type	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**	**Spearman's Correlation**	**p-value**
Well-being (Q4) v. Conscious moderation (Q21)	-0.016	0.575	0.057	0.070	-0.044	0.138	-0.052	0.074

Culture, Communication and Change:

Report on an investigation of the use and impact of modern media and technology in our lives

Anna Mieczakowski, Tanya Goldhaber and John Clarkson

Modern communication technology makes it possible to stay connected anywhere, all the time, and the flow of information is nearly limitless. With all the benefits afforded by this newfound capability, however, come potential consequences. Following the ever increasing flow of information through our computers, televisions, and phones has been a stream of concerns about the change in how we, as humans, communicate. Will the new ways in which we acquire, process, and relate information in turn change us as individuals, families, and societies?

The University of Cambridge, in partnership with BT, ran an international research project investigating these questions. Importantly, this work was aimed at stimulating a debate based on real research and not on speculation or fear. This book is part of the output of the project: a detailed report on literature review, description of methods and data analysis, and in-depth conclusions of the research. A summary of the background, major results and conclusions of the research are available in the short report; this document gives a detailed analysis of the project as a whole.

More information about this research project can be found at: **http://www-edc.eng.cam.ac.uk/comms**

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