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**ADOLESCENT GIRLS, SOCIAL
COGNITION AND TECHNOLOGY**

Diane Thembekile Levine

**A thesis submitted in fulfillment of the
requirements for the degree of Doctor of
Philosophy**

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Table of Contents

Table of Contents	1
List of tables	5
List of Figures	7
List of key findings	10
Abbreviations	13
Acknowledgements	15
Abstract	17
1. Prevalence of technology and socio-technical change.....	19
2. Why focus on adolescent girls?	21
3. Broad versus deep	23
4. The purpose of this study	24
5. Novelty.....	25
6. Developing the research questions: a personal perspective.....	27
7. Thesis organization.....	30
Chapter 2: Key Concepts	33
1. The review process	33
2. Adolescence and puberty	35
2.1 Puberty in the context of this study.....	35
2.2 What are puberty and adolescence?.....	35
2.3 What happens at pubertal onset?.....	37
2.4 Biology and behaviours.....	38
2.5 A sociological description of adolescence.....	41
2.6 Life course perspectives.....	46
3. Technological concepts	47
3.1 Adolescent girls and technology.....	49
4. Social cognition	53
4.1 Attachment and relationships.....	55
4.2 Self and identity.....	64
4.3 Self: a brief theoretical overview.....	65
4.4 Identity: a brief theoretical overview.....	72
4.5 Attribution	79
4.6 Mentalizing/theory of mind	81
5. The conceptual framework: a network of ideas	88
5.1 More cross-fertilization and connection than anticipated.....	90

5.2 Hubs	93
5.3 Outliers	94
5.4 Moving forward	96
Chapter 3: Methodology	98
1. The research questions	98
2. The sample	100
2.1 FA1	103
2.2 SS2	104
2.3 EE3	104
2.4 JL4	105
2.5 TL5	105
2.6 CI6	106
2.7 HA7	107
2.8 MR8	107
2.9 LS14	108
2.10 TR9	108
2.11 CE10	109
2.12 HN11	110
2.13 IL12	110
2.14 WA13	111
3. Epistemological and interdisciplinary foundations	112
3.1 <i>Interdisciplinarity: Pandora's Box</i>	112
4. The methods	125
4.1 Overview	125
4.2 <i>Interaction 1: All About Me: a tool for investigating the self</i>	126
4.3 <i>Interaction 2: A day in the technological life of... : a tool for investigating extent of technology use</i>	130
4.4 <i>Interaction 3: Relationships with others: a tool for investigating attachment and relationships</i>	134
4.5 <i>Interaction 4: Strange Stories: a tool for investigating theory of mind/mentalizing</i>	138
4.6 <i>Interaction 5: Why do people do the things they do? A tool for exploring attribution</i> ..	142
4.7 <i>Interaction 6: My Possible Self? A tool for exploring self and identity</i>	145
4.8 Interviews	149
5. Analysis process and theory development	152
5.1 <i>Organising the data</i>	153
5.2 <i>Analysing the data</i>	154
6. Trustworthiness and ethics	158
6.1 <i>Sensitivity to context</i>	160
6.2 <i>Commitment and rigour</i>	160
6.3 <i>Weighting and aggregation</i>	162
6.4 <i>Coherence and transparency</i>	163
6.5 <i>Impact and importance</i>	165
6.6 <i>Ethics</i>	166
7. Reflection	169

Chapter 4: Findings and analysis by social cognitive aspect.....	172
1. Participants' use of technology	175
2. Relationships and attachment, adolescence and technology.....	178
2.1 <i>The process</i>	178
2.2 <i>The findings</i>	179
3. Self and identity.....	199
3.1 <i>The process</i>	199
3.2 <i>The findings</i>	200
4. Attribution	238
4.1 <i>The process</i>	238
4.2 <i>The findings</i>	240
5. Theory of Mind.....	259
5.1 <i>The process</i>	259
5.2 <i>The findings</i>	260
6. Final thoughts.....	270
Chapter 5: Understanding adolescent girls' technology use: composite analysis	271
1. How should we understand digital technologies in pre-adolescent and adolescent contexts?	271
2. How can we conceptualize the relationship between the aspects of social cognition explored in this study and adolescent girls' technology use in informal settings?.....	279
3. Stories of the system.....	287
3.1 <i>Technology and adolescent maturation</i>	288
3.2 <i>Technology and privacy</i>	294
3.3 <i>Technology as amplifier: safety and emotions</i>	299
4. Reflecting on the framework	307
5. Conclusion.....	310
Chapter 6: Conclusion	312
1. Implications for young women, their families, teachers and the media.....	314
2. Non, je ne regrette rien...almost.....	318
2.1 <i>Successes</i>	318
2.1 <i>Micro-reflections</i>	320
2.3 <i>Macro-reflections</i>	322
3. Future research.....	323
4. Ithakas: the personal significance of this research	325
References	327
Appendix 1: Technology diary instruction text and grid.....	348

Appendix 2: Adapted Adolescent Attachment Questionnaire and introductory text	349
Appendix 3: Attribution tool	352
Appendix 4: Interview schedule and images taken during interviews.....	354
Appendix 5: Codes and sub-codes from NVIVO coding	359
Appendix 6: Mindmaps: attribution, ToM, attachment and relationships, self.....	368
Appendix 7: Parent consent form, participant consent form, and ethical approval	372
Appendix 8: Scores for AAQ for all participants who completed the instrument	384

List of tables

Table 1	Summarising US Dept of Health and Human Sciences information (cited in Sawyer, et al., 2012) on the changes experienced by adolescents.	38
Table 2	Possible activational effects of hormone change in adolescents	39
Table 3	Characteristics of common attachment patterns	56
Table 4	Research sub-questions	99
Table 5	Resonances and dissonances with interpretivist paradigms	122
Table 6	Data collection overview	125
Table 7	Limitations of the Twenty Statements Test (TST) and mitigations	129
Table 8	Limitations of the solicited diary	133
Table 9	Limitations of using an established survey tool in a qualitative context	137
Table 10	Limitations of Strange Stories	142
Table 11	Limitations of using this tool to explore attribution.	145
Table 12	Weaknesses of semi-structured interview, and mitigations	150
Table 13	Ethical considerations	167
Table 14	Use of technology over the period of one weekend day	175
Table 15	Perspectives on technology and creativity. All quotes are drawn from responses to Interaction 4	203

Table 16	Proxy group measures for each closed question in Interaction 5, with an indication of the presence or absence of distinctive trends. In all cases ‘I don’t know’ or ‘None of these’ options were explored further in the open questions, and responses assigned to a proxy category accordingly. In cases where there were distinctive trends, these are explored further below.	238
Table 17	Attributions given by participants for their friend’s behaviour, indicating alignment with situational/dispositional causes and factors.	247
Table 18	Attributions given by participants for others’ behaviour, indicating alignment with situational/dispositional causes and factors.	248
Table 19	Characteristics of Valsiner’s Zones, and their relationship with life course perspectives.	280

List of Figures

Figure 1	Example .sif file. Note the main nodes in the left hand column, and related sub-nodes in the right. Sub-nodes can be designated main nodes in order to show multiple links between topics. For example, attribution -> bias -> self-serving	89
Figure 2	Circular representation of the network of ideas explored in this study showing the egalitarian, interlinked nature of the main points emerging from the literature.	91
Figure 3	Identity node in circular network diagram showing the significant number of nodes emerging from it.	91
Figure 4	Affective node in circular network diagram showing a dense clustering of nodes emerging. This suggests that although 'affect' is not a key over-arching concept in the study, it cuts across a number of key concepts and is of importance to the study.	92
Figure 5	Affective node in organic network diagram showing the cross-cutting nature of the topic area.	92
Figure 6	Inner circle of nodes on circular network diagram. There are more nodes emerging from this inner circle than there are cutting across it.	93
Figure 7	Identity and self hubs in organic network diagram	94
Figure 8	Outliers on organic network diagram showing the remote location of the node 'social cognition'.	95
Figure 9	Adolescence on organic network diagram, with 'social cognition' absent.	95
Figure 10	Total score on the adapted AAQ represented for both parents. The higher the score, the less likely the relationship is to be 'secure'. While the variation is not enormous, mothers are generally perceived as a more secure base than father. Of particular interest is HN11, who scored highly for both parents and appears as an outlier in a number of contexts.	180

Figure 11	Total score on the adapted AAQ represented for online and offline friends (for those participants indicating they had a close friend with whom they mainly interacted online. The higher the score, the less likely the relationship is to be 'secure', showing that HN11, FA1, WA13 and SS2 are less likely to have secure relationships with the friends than MR8 and EE3.	184
Figure 12	Attachment score for online and offline friends by age of participant.	191
Figure 13	Attachment score for online and offline friends by age of participant.	191
Figure 14	Acorn categorisation reflecting family socio-economic status and combined online/offline friends attachment scores. The distinctive curve suggests that participants in more challenging circumstances are less likely to have secure attachments with friends.	195
Figure 15	Acorn categorisation reflecting family socio-economic status and online friends attachment scores. There are no distinctive patterns to the data, other than three loose groupings of IL12/CE10, EE3/MR8 and the remainder of the sample.	197
Figure 16	Acorn categorisation reflecting family socio-economic status and offline friends attachment scores only. Note the distinctive curve from bottom left to top right of the graph.	197
Figure 17	Risk scores detailed in Table 16 in relation to estimated Acorn categories showing the possible correlation between socio-economic circumstance and perceived friend's risk propensity. IL12 and CE10 thus believe their friend is least likely to take risk, in contrast to SS2, FA1 and HN11, with the curve progressing upward from bottom left to top right.	241
Figure 18	Older participants, largely clustered in the top right hand corner of the graph, are more likely than younger participants to believe that a friend would share a creative product using technology.	246
Figure 19	Older participants were more likely to believe that their friend would seek resolution to conflict.	250

Figure 20	Participants in challenging socio-economic circumstances are more likely to believe that their friend will not choose to adopt conflict resolution strategies.	253
Figure 21	Participants with weaker attachments to their friends are also those least likely to believe their friend (or themselves) will adopt conflict resolution strategies. It should be recalled that the higher the attachment score, the less likely the attached is to be secure.	255
Figure 22	Most participants believed they are in control when they use technology.	258
Figure 23	Radial representation of themes emerging from Strange Story 3. Green nodes represent the participants. Red nodes represent emerging themes relating to social cognition. Blue node represents the theme in which participants made explicit reference to technology. Most participants believe that Florrie is motivated to lie to save Ruby's feelings for reasons based in friendship, and make connections between feelings and friendship. A number also spontaneously suggested that a constructive criticism approach might be a productive way forward for the friends in the Story.	262
Figure 24	Radial representation of themes emerging from Strange Story 1. Green nodes represent the participants. Red nodes represent emerging themes relating to social cognition. Blue nodes represent themes in which participants made explicit reference to technology. A number of participants suggested that there was a connection between technology use and ease of lying, and that technology sustained angry states.	265
Figure 25	Radial representation of themes emerging from Strange Story 2. Green nodes represent the participants. Red nodes represent emerging themes relating to social cognition. Blue nodes represent themes in which participants made explicit reference to technology. Technology use does not appear to be a key factor in participants' interpretation of Strange Story 2.	267

List of key findings

Participants said that families, and especially mothers, were important to them.	180
Friends were also important to the participants.	183
Technology acted as a gateway to new friendships, and a way of maintaining connections with older ones.	184
Technology also acted as an amplifying force for both positive and negative aspects of participants' relationships with others.	188
For some participants, digital artefacts were artefacts of self, and, as such, were mediating factors in friendships.	189
Age did not appear to be a mediating factor in participants' online or offline relationships.	190
Socio-economic circumstance appeared to be a mediating factor in friendships, although this requires more investigation.	193
Technological multiplicities: technology appeared to play a role in most aspects of the self-concept explored with the participants	200
Participants did not believe that technology use was associated with the self traits of agency, persistence, enthusiasm or determination.	218
Participants' technological competence did not appear to be linked to the strength of their technological self-efficacy.	220
Most of the participants believed that they exerted at least some level of control over the technology used in their day-to-day interactions.	221
Older participants were more likely to say that technology amplifies positive self-esteem.	222
Younger participants were more likely to evaluate themselves in clearly defined roles. Older participants were more likely to evaluate themselves in a nuanced way.	224

Participants felt that technology could help them realise their possible selves, but they did not see it as fundamental. Their ought self-guides were dominated by worries about academic performance and career paths.	225
There was diversity in the participants' social identities and characters.	232
Being an active user of technology did not inevitably mean a more limited adolescent social identity.	234
Some participants' identity statuses and social characters were observed in their use of technology. In particular, it was a medium through which some chose to explore and commit.	235
Technology was used to serve a malleable religious identity in practical ways, but it did not appear to be fundamental to the religious self.	236
Participants living in more comfortable socio-economic circumstances believed their friends were less likely to participate in risky behaviours.	241
Most participants said that they would not take the risks they believed their friends might take.	242
However, most participants believed that girls their age take more risks using technology than when they are face-to-face.	243
Older participants were more likely to believe that others would use technology to share something they had made.	245
Most participants said they would share their own photos using technology	248
Older participants believed their friends were more likely to seek resolution in technology-mediated conflict than younger participants.	250
Most participants believed that they would behave in the same way as their imagined friend.	252
Some participants from more challenging socio-economic circumstances believed that their friend would not choose to adopt conflict resolution strategies.	252
Participants with weaker attachments to their friends were more likely to wish to continue hostilities than those with stronger friend attachments.	254
That said, most participants believed that technology-mediated communication made a difference to people's interactions.	256

There were no distinctive patterns in participants' attributions relating to technology use and homework/self-discipline.	259
Most participants identified common key themes and ideas emerging from each of the Strange Stories. This suggests that for the most part, they were developing competent and compassionate ToM.	261
Most participants believed that using technology makes it easier to lie.	263
Participants believed that the ways in which technology enables 'remembering' intensified hot mental states.	265
Although technology may have a distinctive role to play in relation to developing ToM, we cannot say that it is a key factor in that development.	266

Abbreviations

AAI	Adult Attachment Interview
AAQ	Adolescent Attachment Questionnaire
AOE	Actor-observer effect
CHAT	Cultural-Historical Activity Theory
DC	Developmental contextualism
EF	Executive function
ESRC	Economic and Social Research Council
FAE	Fundamental attribution error
FFM	Five Factor Model
GER	Generic event representations
HPG	Hypothalamic-pituitary-gonadal axis
IWM	Inner working model
OAE	Over-attribution error
PFC	Prefrontal cortex
SCOT	Social construction of technology
SIT	Social identity theory
SRT	Social representations theory
TA	Thematic Analysis
ToM	Theory of Mind
TST	Twenty Statements Test
UKCCIS	UK Council for Child Internet Safety
UAE	Ultimate attribution error

ZFM	Zone of Free Movement/Freedom of Movement
ZPA	Zone of Promoted Action
ZPD	Zone of Proximal Development

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On the 24th of May 2010 the UK government announced that they would be closing Becta, the agency responsible for technology for learning, and where I worked as the Head of Educational Research and Analysis.

Not long after the announcement I spoke with the person who was to become my supervisor, Dr Michael Hammond. He suggested I put in an application for a PhD in the Education department at Warwick. It was as if the sun had broken through a grey mist; to do a PhD was dream of mine. I hardly dared believe I could get the place, but I put in an application (writing the proposal in lieu of our honeymoon) and to my shock, joined the programme a few short months later, thanks to the Economic and Social Research Council.

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Abstract

Technology is almost ubiquitous among adolescents in contemporary British society. Despite this, we do not have a meaningful understanding of the interplay between adolescent girls' developing social cognition and their use of digital devices. This study aims to address this gap in understanding. Four pre-pubescent and eleven pubescent young women based in the Midlands and from across the socio-economic spectrum participated between 2012-2013. Participants completed six research tools and eleven of them participated in a face-to-face interview. Three tools were adapted from the existing psychology literature, and the remainder were developed specifically for this study. The tools explored technology-mediated attachment and relationships, self and identity, attribution and Theory of Mind. The findings suggest that the moral panics surrounding technology use in adolescence are misplaced; rather, adolescent girls with a good range of personal and situational resources are likely to exert considerable choice in their uses of technology, and social media in particular. Valsiner's Zones and life course perspectives were used to conceptualise the emerging understanding of technology-mediated social cognition in adolescent girls. This theoretical framework made it possible to do four things. Firstly, to recognize adolescents' active choice and agency. Secondly, to articulate development opportunities within individuals, relationships and technological environments. Thirdly, to locate physiological and psychological development within the broader socio-technical realm. And finally, to see technology as neither positive nor negative, but as shaping, rather than defining adolescent perspectives, behaviours and relationships. These possibilities suggest that, rather than attempting to shoehorn adolescent experience into a single paradigm or model we need to ask ourselves key questions about the interplay between the individual adolescent and the technology they choose to use.

Chapter 1: Introduction

'Denver teens encouraged to join ISIS by online predator'
(The Guardian, 23.10.2014)

'ISIS and the lure of online violence for jihadi brides'
(Financial Times, 25.02.2015)

'British girls aged 15 and 17 run off to join ISIS after being radicalised online'
(The Mirror, 30.9.2014)

A brief scan of news headlines over the past twelve months is telling. What is surprising about these headlines is that whether red top or broadsheet, blame for the radicalisation of young women is often apportioned to technology-mediated lures. There is little nuanced reflection on the isolation or ostracism they might have experienced within their homes or communities – religious or otherwise – that might have tempted them towards ISIS. There is little reflection on many young people's need to feel like they are part of something bigger, some change, and that this need was addressed by the call to join ISIS.

The example of the ISIS girls is not isolated. Technology is deeply embedded in the lives of most adolescent girls in contemporary British society. Its apparent ubiquity and resultant implications have been the source of moral panic within the media, in homes, schools and public policy, as evidenced in the headlines above. This thesis is about bringing a rational framework to that debate in the context of technology use and the developing social cognition of 15 pre-adolescent and adolescent girls in the Midlands, UK. It aims to take a step forward our understanding of our relationship with technologies and with adolescents, and reflect on those in light of what we know about social cognition.

For the purposes of this study, social cognition is defined as ‘the way we understand ourselves and the world(s) around us’. Developing strong social-cognitive skills is an important part of becoming an adult. Adolescents without adequate social cognitive skills can struggle to:

- make friends and manage relationships
- make sense of their online and offline worlds
- develop adequate strategies for taking and managing risk online
- develop empathy and effective emotional self-regulation.

Without a robust understanding of the relationship between technology use and adolescent girls’ developing social cognition, we are ignoring a significant part of young people’s lives. This means that there is no nuanced discussion about associated behaviours and risks. As a result, the creative and advertising industries cannot develop hardware and applications that are conducive to safe and healthy development. Policy makers cannot adequately support and legislate for safe industry development. Parents, carers and schools lack confidence in knowing which behaviours carry inherent risk, and which behaviours are age-appropriate. And crucially, young women are not able to manage their own online experiences with confidence and competence.

1. Prevalence of technology and socio-technical change

Over the past fifty years we have become increasingly sophisticated in describing and understanding socio-technical change. Enormous increases in computing power, global technology networks and changes in global economic landscapes

have dominated socio-technical discourse. Amongst others, Facer (2011) has criticised existing perspectives on technology, claiming that they assumed that technology would define our collective futures without any exertion of free human will, and that the only important feature of technology (for education at least) is that it will define our individual futures as economic producers, rather than as messy, complicated, creative beings.

Facer is exemplifying a paradigmatic spectrum that I explore in more depth in Chapter 2. Suffice it to say that on one end of the spectrum is technological determinism, where technology is seen to drive progress. On the other end is the anti-essentialist movement in which everything is open to (no doubt postmodern) interpretation. There are a myriad of schools of thought in between these perspectives. This study attempts to go beyond polarisation by examining the contexts, attitudes, beliefs and behaviours of the participants in detail, and by applying existing frameworks to gain a deeper understanding of the interplay between technology, adolescence and social cognition. This forms the basis of the study's key question:

What is the interplay between pre-adolescent and adolescent girls' social cognition and their use of interactive digital technologies?

A number of sub-questions emerge. I have kept these broad in order to account for the speculative nature of the research.

- What do we understand about digital technologies?
- What is the nature and extent of technology use in the study?

- Is there a relationship between the different aspects of social cognition explored in this study and adolescent girls' technology use? If so, what does this relationship look like? How can it be conceptualised?
- What does the analysis mean for girls and young women, and the people living and working with them?

2. Why focus on adolescent girls?

The stereotype of the monosyllabic and aggressive adolescent is recurrent in media representations (boyd, 2014). This is not a new phenomenon; Aristotle wrote in 340 BCE in his Rhetoric:

They are changeable and fickle in their desires, which are violent while they last. (Aristotle, Internet Classics Archive, 1994)

My own revelation about the importance of adolescence and pubertal change to this study came during my Masters year, in which I was pregnant with our first child. As the birth came nearer, and in the post partum weeks, I found myself angry, emotional and out of control. It was not a good feeling, and it dominated my dealings with others and my attitude towards myself as a new mother, even though I knew what I was experiencing was due to hormonal change.

I realised that this was something similar to what adolescents experience. The strength of the change is such that it must influence informal and formal learning settings, relationships with parents/caregivers and friends, and the ways in which the adolescent develops a sense of self. The influence of pubertal change during adolescence, and its relationship to psychological, cognitive and social

development are rarely explored in the social research literature surrounding adolescent use of technology, and this was a gap I sought to address.

I then began to read more widely about pubertal change. I read endocrinological and neurological textbooks and papers, and attended seminars in medical schools that were like visiting new planets. It became clear that boys and girls experience puberty in distinctively different ways. This difference manifests well beyond the physical markers of pubescence into some aspects of structural brain development associated with social cognition (Blakemore, 2012) and into psychological and behavioural factors such as subjective well being (Froh, et al., 2009) and whether a young person is likely to keep secrets from their parents (Keijsers, et al., 2010).

In addition to this, methodological issues have made robust comparisons of technology use across the genders difficult. For example, until recently few studies on adolescents' use of computers or video games considered gender in a nuanced way (Richard, 2013). Those studies describing more subtle, gendered aspects of adolescent game use, such as differences in gaming patterns, social interactions or developmental change (Hayes, 2013) have thus far failed to capture public imagination. It was important that the focus of the study remained on the interplay between social cognition, technology use and adolescent development because this is where the gap in the literature lay. The inclusion of a gender dimension would be likely to shift the focus in a very different direction, and could be a goal for a future study.

3. Broad versus deep

At the same time as deliberating whether I should create a more gendered, comparative study, I was reviewing the literature on social cognition. It quickly became clear that it would be necessary to make a decision that would define the rest of the course of the study; namely whether to study one aspect of social cognition in significant depth, as I had done in my Masters level study, (Levine, 2011) or whether to try to gain a broader, more strategic perspective on several aspects of social cognition and technology use. The former might have been a more conventional study. Certainly establishing a firm footing on the landscape of existing literature would have been considerably more straightforward. It might have been possible to be more definitive in my responses to the key research questions, with a neater set of relatable – perhaps even causal – explanations for the interplay between adolescence, technology use and attribution, for example. There were many attractions to ‘going deep’ into one aspect of social cognition.

As it was, given my experience in national policy and the fact that the literature had not yet considered a more holistic perspective of social cognition in relation to adolescence and technology, I decided to ‘go broad’ and investigate five aspects of social cognition: self, identity, attachment and relationships, attribution and Theory of Mind (ToM). This has had implications for the study in that:

- I have drawn on a much wider range of existing tools in order to gather data, and developed new tools for social cognitive aspects that had not yet reflected on the relationship with adolescent technology use.

- I chose a small sample and a more interpretive paradigm in which to operate, as I needed the consistency of sample over several months to make the data robust. I wanted to understand the key concepts of the study in detail with each of my participants; a more quantitative approach would not have illuminated each of the social cognitive aspects I was seeking to explore in sufficient depth.
- The literatures surrounding self, identity and attachment had a small number of studies that considered the role of technology in adolescent contexts. In contrast, ToM and attribution had no previous research on which to draw. This has had an impact on this study; namely that the ToM and attribution findings are more tentative and exploratory than those relating to self, identity and attachment.

I chose to locate the data gathering beyond the school gates for similar reasons. Young people are under many forms of scrutiny while at school, and a number of the studies I commissioned while at Becta attempted to gain a deeper understanding of school-based technology use. Rather, for this study, I wanted to explore the behaviours and attitudes of young people outside formal school contexts, and in which social contexts could be explored without the added complications of school rules, processes and policies.

4. The purpose of this study

These two choices surrounding gender and scope were highly influential as the research questions were being developed. The purpose of the study became to

explore and describe the *interdisciplinary* relationships between technology, adolescence and social cognition, and to *generate theories* that would explain what had been observed (Coolican, 2009).

I knew that much of the study was likely to be descriptive, because there is no existing literature that brings together aspects of social cognition, adolescence and technology use in this way. Descriptive studies are sometimes considered the poor methodological relation of interpretive social research. They necessitate the researcher being explicit about whose perspective is being described and reported, and can lack intellectual rigour (Coolican, 2009). This is why interdisciplinarity is at the heart of this study; the account of ‘an adolescent girl’s use of technology’ might be interesting, but until the relevant epistemology, constructs or frameworks from equally relevant fields are applied with sophistication and within the social psychological paradigm, it can be nothing more than interesting journalism. Rather, I intended the description in this study to lead to theoretical perspectives about how we understand technology use in the adolescent context.

5. Novelty

The study shared in this thesis is novel in several ways:

- the research question on which the study is based is original, as will be shown in Chapters 2 and 3. A broad perspective of social cognition, technology and adolescence has not previously been brought together in the literature. This interdisciplinary perspective has added to our existing

knowledge in bringing together concepts and frameworks from a range of fields in order to gain new perspectives on the questions under review.

- Approaches to gathering data have used research tools in three novel ways. Firstly, fitting existing research instruments developed in experimental or more positivist studies into a new, more interpretive epistemological setting. Secondly, the adaptation of existing instruments to include an exploration of digital technology use in context. Finally, the development of new research tools to explore the interplay between some aspects of social cognition and technology use.
- I have drawn on a range of analytical frameworks in order to gain a deeper understanding of both the existing literature and the data. Some of the techniques and software I have used are more often applied in a scientific setting, for example the use of network diagrams developed in Cytoscape (open source software used for visualising and integrating data networks) in order to engage with the existing literature (see Chapter 2).

All of these choices have been pragmatic ones. Travelling the path through this study has felt a little like walking through a large orchard. I have carried some items with me: my experience, my prejudices, and my strategic awareness. The path has not been straightforward; at times I have had to search in discriminating ways for tools that would enable me to pick and carry forward the fruits of the research - a research tool here, a concept there, an analytical framework

somewhere else. On occasion I have had to make my own tools. The path has been defined, however, by the research questions and the emerging data.

6. Developing the research questions: a personal perspective

At the time that I wrote the initial proposal for this PhD I was at a transitional point in my career. Having started as a teacher, I had worked in public service for over ten years, culminating in the leadership of a research team for a government agency. In that role I saw many problems that a robust piece of research could address. However, because of the shifting yet stubborn nature of Ministerial interests, and the urgent needs of policy makers, I could never explore any issues in any depth. I had also become increasingly frustrated at the lack of sophisticated analysis needed to create a more nuanced dialogue about technology use in childhood and adolescence in the central government policy setting in the UK.

The PhD thus represented two wonderful opportunities to:

- investigate a single topic in the depth that can best be achieved over several years, and
- contribute to creating a more nuanced dialogue on the topic of technology use in childhood and adolescence.

I chose the focus area for this paper due to the work I had been doing. I sat on the Expert Advisory Group for the UK Council for Child Internet Safety (UKCCIS) since the Byron Review (2008), and in that forum had discussed a range of issues relating to child and adolescent safety, and the online lives of young people. There was a wide range of research being reported, from the large scale EU

Kids Online project, to a small grant exploring the ways in which young people can be encouraged to keep themselves safe by peers, rather than teachers or parents.

The gaps, however, seemed to proliferate; just as we understood one aspect of technology-enabled life, many more questions appeared. I noticed that many of the questions surrounded issues that were located within the field of social cognition – that is, the way young people understand themselves and the world around them. On exploring further, I realised that no one had yet brought together what we know about social cognition, adolescence and technology use in a robust form. This was important because many fields of research continued in isolation, and it seemed that one field might be used to illuminate lessons from the other. I also believed that it was unlikely that young people would be totally controlled by external structures and systems, and I was interested to know what kinds of perspectives they already had regarding the ways they understood themselves and the technology-mediated worlds in which they operated. It was my suspicion that, if given the linguistic tools to describe their perspectives, they might be in a better position to remain safe and sensible online.

I brought particular existing skills to the study. I had completed a Masters degree by research in 2001 during which I had implemented mainly qualitative techniques alongside a small survey. Then, as pragmatism became my epistemological watchword I became more adept at a range of both qualitative and quantitative techniques during my years of commissioning, managing and translating research into policy. I lost the emotional attachment to interpretivism,

and became comfortable with the idea that I could learn to implement any methods that would adequately respond to the kind of question posed. It is this flexibility and open-mindedness that I believe has been useful during both my more recent Masters study in 2011, in which I piloted the approach I chose to take for the remainder of the study, and in the study reported here.

Alongside my skills, I also brought prejudices and biases. Firstly, I had preconceptions surrounding the ways in which we perceive young people; I am often frustrated by sensationalist headlines that ignore the nuances of adolescent life. In terms of my own research (as opposed to commissioned research) this has manifested itself in emancipatory epistemologies and methods. For example, I have been interested in learner voice, and in encouraging young people to undertake action research to improve their own lives. Once my initial literature scan was complete I realised that this would not be the right first step for this study. I also wanted to be able to work with a wider range of young people from across the Midlands than I had in my Masters pilot study, and from across the socio-economic and age spectra. It was inevitable that this approach would have an impact on the methodology of this study.

Secondly, my previous teaching and personal research interests largely surrounded understanding young people in challenging or alternative circumstances. Working with young people who were not at risk of deviant behaviour, in alternative schools, or battling challenging socio-economic

circumstances was going to present a new and interesting research landscape in which to operate.

Thirdly, having spent so long in public service, I was used to presenting evidence in succinct, impersonal, strategic ways, accompanied by dry economic analysis and policy-salient advice. My audiences were very rarely interested in the detail. My writing no longer comfortably fitted into an autodiegetic mode. Understanding what needed to be included and what had to be excluded from a thesis of this sort, overcoming the feelings of frustration at my own limited thinking ('befriending the dragon', as my academic husband puts it), and writing from a personal perspective has been far more challenging than I had anticipated.

I had opportunity to explore these issues in depth during my second Masters degree in educational research methods in 2010-11. My main project for that qualification was a study that piloted the perspectives and approaches used in the study reported in this thesis (Levine, 2011; Levine and Edwards, 2014) using two participants and focusing on attachment theory. The dissertation, and its application in a youth work setting, was both challenging and exhilarating; I could see the ways in which the interdisciplinarity of the project could yield novel perspectives on the ways in which young women use technology.

7. Thesis organization

Following this introduction, the thesis begins by exploring the Key Concepts explored in the study in **Chapter 2**. It begins with an explanation of the review processes, and reflects on the terms 'adolescence' and 'puberty'. A brief summary

of the current state of knowledge surrounding adolescent girls' use of technology follows. The overarching concept of social cognition and the aspects of relevance to this study are then explored in greater detail, beginning with 'attachment', and progressing through 'self', 'identity', 'attribution' and 'Theory of Mind'. I conclude with a framework that underpins the conceptual thinking in the thesis.

Chapter 3 discusses the methodology used during the study. It begins by outlining the research questions, introducing the sample in order to provide a data gathering context, and exploring the study's epistemological and interdisciplinary foundations. Each of the data collection methods are discussed, followed by an explanation of the data organisation, processes for analysis and development of theory. The penultimate section of this chapter reviews the way in which the trustworthiness of the data has been assured, including a consideration of the study's ethics and the way the data have been aggregated. I conclude by reflecting on the relative successes and challenges of the methodological approach.

Chapter 4 shares the key findings relating to each of the socio-cognitive aspects explored in the study. It provides significant detail and reflects on the range of techniques used to gather and analyse the data.

Chapter 5 draws together the themes emerging from the analysis to propose a theoretical approach to understanding the interplay between social cognition, adolescence and technology. It responds to the research questions set in Chapter 2 framed by two existing conceptual structures, namely Valsiner's Zones and life course perspectives.

Chapter 6 concludes by discussing the implications of the research for young women and those who interact with them; their families, teachers, software developers and policy makers. I reflect on the strengths and weaknesses of the approach taken to explore the key research questions, and propose next steps for future research.

It should be noted that I refer to a range of software packages and social media tools in this thesis. I have not used ‘TM’ marks to denote copyright as it would disturb the flow of the text. It should be noted at this point, however, that the following software packages and sites are trademarked:

Facebook	Tumblr	Twitter	Mathletics
Skype	YouTube	Minecraft	HetaOni
DeviantArt	Teeter	Instagram	Maximum Ride
Snapchat	Ask.fm	Zondle	Howrse

The following software packages are open source:

Cytoscape	R	yEd
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Together, these chapters represent four years of work, demonstrating my efforts to gain a more meaningful understanding of the interplay between adolescence, technology use and developing social cognition. It is my intention that reading this thesis will be as interesting for the reader as carrying out the work has been.

Chapter 2: Key Concepts

This is an interdisciplinary study. The key concepts are drawn from a range of disciplinary sources: social psychology, sociology, endocrinology, sociology and social research.

This chapter introduces each of the concepts explored in this study, and aims to demonstrate a way in which they may be drawn together. In doing so, I will address the five points below:

1. Explain the review process by reflecting on key literature surrounding adolescent girls' use of technology.
2. Reflect on the terms 'adolescence' and 'puberty'. (I dwell more than might be expected on the physiological changes experienced by my participants because these are fundamental to the daily lives of these young women, but rarely acknowledged in social research.)
3. Share key evidence surrounding adolescent girls' technology use.
4. Explore the concept of social cognition and the aspects of this that are most relevant to this study.
5. Offer a conceptual framework of foundational concepts.

1. The review process

As this is an interdisciplinary study, I have studied and maintained notes from the following journals, reflected in the References:

Attachment and Human Development	Self and Identity
Computers in Human Behaviour	Social Cognition
Science and Technology Studies	Journal of Adolescence
Social Studies of Science	Journal of Youth and Adolescence
Journal of Personality and Social Psychology	
Social Cognitive and Affective Neuroscience	

Each of these journals has been scanned at least once a quarter between 2012 and 2015. In addition, I have done quarterly Google Scholar searches for appropriate combinations of the following key words:

attachment	self	identity
technology	adolescence	attribution
social cognition	relationships	social networking
social psychology	qualitative psychology	gender
digital technology	religion	puberty

I have also made extensive use of the references in frequently cited articles and books. All citations and articles of relevance have been referenced using Mendeley, a referencing management tool. I made notes by using the PDF highlighter function to draw out key passages. I then revisited each paper, turning main points into notes. For very complex sections, such as the section on self and identity, I printed off each of these main points and arranged them in a comprehensible way before beginning to write up.

2. Adolescence and puberty

As outlined in Chapter 1, this project focuses on pre-adolescent and adolescent young women. In this section, I will reflect on these two terms, and their implications for this study.

2.1 Puberty in the context of this study

Puberty and adolescence are terms used to describe the processes that transform an individual from child into adult. Researchers from the natural sciences traditionally focus on puberty from an endocrinological, and more recently, a neurological perspective. I will briefly touch on these, and then move on to consider the process from a sociological perspective. It is important for the purposes of this study to recognise that the strong relationship between the physical and the psychological – arguably forgotten or ignored in classrooms – is core to understanding the ways in which adolescents behave

2.2 What are puberty and adolescence?

The terms ‘puberty’ and ‘adolescence’ are sometimes used interchangeably. We might argue that this is because separating out the former (to describe physiological processes) and the latter (to describe psychological ones), defeats the goal of bringing the fields of research together in a mutually beneficial way. For the purposes of this interpretive study, however, there is a need to use language carefully, and in a way that does not make inappropriate claims.

For this reason, I will use ‘puberty’ to mean the hormonal change that happens during this time, namely the activation of the hypothalamic-pituitary-

gonadal axis that marks the onset of puberty, and the process of reaching gonadal maturation. For girls, this process is not just about reaching menarche; rather, it is about the physical changes that begin two to three years before, and includes breast development, the growth of pubic hair, height and facial structure change. Given that the median age of early breast development (self-report) in the UK is just over ten years, with 12 per cent of girls reporting this stage at age eight, and the median age of onset of menarche at just under age 13 (Rubin et al., 2009), the hormonal effects of puberty on the brain and behaviour are of relevance to girls before they reach the notorious 'teens'.

I will use 'adolescence' to mean the behavioural process changes that happen during this time. The question of whether the neurological changes belong in the category of puberty or adolescence is a tricky one, reflecting an old dichotomy between brain and mind. We know that gonadal maturation and behavioural maturation are both closely related to neurological change (Sisk and Zehr, 2005), partly due to the effect of elevated levels of steroid hormones on the brain during the period (Brown and Spencer, 2013; Peper and Dahl, 2013). My reading of the literature suggests that the directionality of these changes is still contested (Schulz, et al., 2009). However, gonadal maturation and behavioural maturation are relevant to this project because they have implications for adolescents' experiences of risk-taking and locus of power. The sense of lack of personal control, the lack of power over their own bodies and minds, the desire to

develop romantic relationships and take risks, can be traced back to the complex interplay between the physical and the psychological (Sisk and Foster, 2004).

2.3 What happens at pubertal onset?

Physiologically, puberty begins when the hypothalamus releases gonadotropin-releasing hormone (GnRH) while the child sleeps (Delemarre-van de Waal, 2002), leading to a reactivation of the hypothalamic-pituitary-gonadal (HPG) axis. We do not know what causes this process to begin. As well as the gonadal hormones (testosterone and estradiol), other hormones are known to change during adolescence (for example, oxytocin and vasopressin, which are associated with human bonding) (Peper and Dahl, 2013). However, the largest amount of data exists surrounding the gonadal hormones.

As a result of these hormonal changes, girls begin to develop breasts and the process of developing secondary sexual characteristics with accompanying metabolic change begins. Importantly for this study, hormonal change also acts on adolescent neural systems by changing the structure of the brain, known as 'organisational effects', and by changing neural system activity, known as 'activational effects' (McCarthy and Arnold, 2011). The neural model echoes social cognitive metaphors in that it suggests that healthy interplay between the brain and cognitive systems can lead to positive outcome trajectories, whereas negative interplay can lead to negative behavioural patterns and hence outcomes (Peper and Dahl, 2013). Mental models count.

2.4 Biology and behaviours

With these physiological changes in mind, I will now reflect on what the evidence from neuroscience and psychology have to say about interplay between puberty and behaviours. In their paper on adolescent health, Sawyer, et al. (2012) shared a table of correlated physiological and psychological development, which are summarized here in Table 1:

Timing	Physiological change in girls	Cognitive change	Psychological change
Early adolescence	Body hair, physical growth, breast and hip development, perspiration and oil production	Increase in abstract thought, and moral thinking, focus on the present	Body awkwardness and increased interest in sex, conflict with care givers, mood shifts, influence of peer group and identity struggle, desire for independence and privacy
Late adolescence	Growth and change slows	Increase in abstract thought, moral reasoning and goal setting. Interest in 'the meaning of life' (Sawyer, et al., 2012, pp.1632)	Adjusting to body change. Exploring what is normal, continuing to strive for independence and importance of peer relationships, developing increased ability for emotional regulation, with swings between high expectations and low sense of self, feelings of love and passion.'

Table 1: Summarising US Dept of Health and Human Sciences information (cited in Sawyer, et al., 2012) on the changes experienced by adolescents.

During this study I sought to identify any examples of activational effects in participants' contributions. These effects are summarized in Table 2.

Hormone	Possible activational effects known in girls	Also identified in boys
Testosterone	Sensation seeking (Forbes, et al., 2010) Sensitivity to rewards (Forbes, et al., 2010) Importance of the social environment (e.g. bullied girls produce less testosterone than nonbullied girls, (Vaillancourt, et al., 2009); exciting or stressful situations affecting decision-making, particularly around peers, Steinberg, (in Amsel and Smetana, 2008)	Proactive aggression (van Bokhoven, et al., 2006) Risk taking (cited in Peper and Dahl, 2013)
Estradiol	Risk taking, varying across the menstrual cycle (Vermeersch, et al., 2008) Lessened behavioural inhibition (Peper and Dahl, 2013) Social-emotional processing (Goddings, et al., 2012) Processing guilt and embarrassment (Zahn, et al., 2007)	

Table 2: Possible activational effects of hormone change in adolescents

Alongside these changes, researchers have suggested that young people entering puberty early are likely to experience more high risk or undesirable life changes. They may seek sexual activity earlier (Negriff, et al., 2010) in the context of friendships as the mediating variable, or be more likely to experience depression (Natsuaki, et al., 2009).

These studies collectively tell us that amongst the many changes experienced by adolescents, hormonal and neurological changes are highly influential for social affective processing. The processing of emotional stimuli and

rewards, social cognitive reasoning, and a heightened sensitization to the world around them are all demonstrated in the neurobehavioural literature (Crone and Dahl, 2012).

These insights give us a sense of what physical life is like for an adolescent, and mean that those young people navigating adolescence with relative calm and competence should be of significant interest to researchers.

The studies must be viewed with a wider sociological lens, however, as they do not – and cannot - always take account of the wider ecological context. For example, Lynne-Landsman, et al. (2010) found that associations between early onset of puberty and substance abuse were more likely to arise where there was already a high household risk of substance abuse exposure. Similarly, DeRose, et al. (2011) developed a model for analysing social skills as an outcome variable against menarcheal timing. Although some scepticism must be applied to the study, limited by an American sample and with data based on maternal report, it is interesting to note that *all* of the girls in the sample were said to have declining social skills at the onset of puberty; there were no obvious differences between early and normative pubertal onset. Internalizing problems were demonstrated by early onset white girls only, suggesting a complex relationship with ethnicity and socio-economic circumstances. These studies suggest that the variables explored in this body of research are more closely interlinked than is sometimes acknowledged.

2.5 A sociological description of adolescence

The preceding sections have attempted to bring to the forefront the challenges arising from the physiological changes experienced during adolescence. There is, however, a significant body of literature within the fields of sociology, cultural studies and educational and social research that addresses adolescents' daily lives, patterns and characteristics.

In *The Nature of Adolescence* (2011), Coleman proposes three models of adolescence that summarise models presented elsewhere. These are: sturm und drang/storm and stress, developmental contextualism, and the focal model.

2.5.1 *Sturm und drang/Storm and stress*

Cultural studies of adolescence have noted that artists, writers, poets and philosophers have commented on the problems of youth for centuries. As a subject for systematic study, however, it is a relatively new discipline, as famously noted by Compayre in 1906:

“La psychologie de l'adolescence est un beau sujet d'étude, mais il est aussi neuf que beau. Une page fameuse d'Aristote, il y a deux mille ans, et maintenant treize cent pages de M. Stanley Hall; et dans l'entre-deux rien ou presque rien.” (The psychology of adolescence is a fine subject for study, but a new one too. A few lines by Aristotle, then nothing for two thousand years until Mr. Stanley Hall's thirteen hundred pages.) (Compayre, 1906, cited in Koops and Zuckerman, 2003)

Hall's 1904 exhaustive tome is considered the beginning of the true study of adolescence. In it, he proposed that the 'storm and stress' expressed by the literary Romantics could be applied to young people, and that this was developmentally necessary for them to move through the transition from childhood to adulthood (Hall, 1904). What followed was fifty years of exploration, particularly from a psychoanalytical perspective, into the traumatic nature of adolescent development, although more contemporary writers in this tradition, such as Frankel (1998), have presented much more nuanced analyses.

Empirical studies of adolescence gained traction in the 1960s and 70s, and this impacted heavily on the storm and stress movement. The global evidence suggests that for around a third of cases, adolescents did not experience psychological distress, another third experienced mild distress, and the final third reported higher levels of distress (e.g. Siddique and D'Arcy, 1984). This meant that most young people navigated their way through adolescence without intense trauma and the storm and stress model began to fall out of favour in research circles. It has, however, had enduring power in the popular media and public. As a result, there is a significant gap between the relatively positive aspects of adolescent development to be found in the research, and the more negative leitmotifs that exist in wider society. This is relevant to this study in that ideas about adolescence may influence parent/caregiver responses to girls' use of technology, and the products created by the technology industries.

2.5.2 *Developmental contextualism*

Coleman (2011) goes on to describe a further school of thought as 'developmental contextualism' (DC). He describes a number of key facets (highlighted in bold):

- a) understanding adolescent development requires knowledge of the **context**.

Bronfenbrenner's work on human ecologies (1979) is influential here.

Perceiving the context as an 'ecology' suggests more than the adolescent's immediate surroundings, but encompasses the geo-political, social and historical contexts in which the adolescent operates. Related to this is the notion of **fit**, in which congruence of the individual's development within the context are examined.

- b) **Timing** is as important as the episodes themselves. I would argue that timing is not easily separated from the contextual issue above.

- c) Adolescents and their caregivers are not isolated beings. They exert a mutual **influence** on one other.

- d) 'Individuals are **agents** of their own development' (Coleman, 2011, p.16). A growing number of sociologists propose that adolescents in effect create their own adolescence and associated identities (Graham, 2004). This is a highly constructivist perspective, and has one particular flaw that I have not been able to resolve. That is, that power rarely lies with adolescents. While the theoretical adolescent might be the agent of their own development, the actual adolescent can only hope to be *an* agent in their own development.

This final point is particularly relevant to this study in that online spaces are considered by some researchers to be ‘owned’ by the adolescents who operate them (e.g. boyd, 2014). boyd’s perspective is that technology-enabled adolescence is a space in which significant agency lies with the young person. This point bears scrutiny as it could be considered somewhat utopian and celebratory; the adolescent in control of a space, exploring their growing identity in the manner of a pioneer. Equally, we could condemn the failure of some adolescents to exercise agency, which is an uncomfortable idea and does not sit well within epistemological contexts that aspire to emancipation and enlightened understanding of the human condition. As a result, I included a question to my participants as part of exploring their views on why people do the things they do.

2.5.3 *The focal model*

Coleman’s work in the 1970s gave rise to the focal model, building heavily on the principles of DC. The focal model indicates that as young people move through adolescent ages and phases, different relationships, ideas or issues come into focus. This means that adolescents can manage challenges consecutively or in overlapping curves, rather than in intensive parallels; they deal with one challenge at a time (Coleman, 1989). It also implies that problem attitudes and behaviours are more likely to occur for adolescents who are dealt more overlapping challenges than they can reasonably manage. Feldman and Elliott call these ‘concurrent major changes’ (1990, p.g. 485).

While the focal model initially implies a stage theory, Coleman does not configure development in this way, providing significant flexibility in interpretation (2011). For example, there are no sacrosanct sequences, no immovable boundaries between stages, and it is not considered fundamental for one issue to be resolved before the developmental focus moves to the next.

The focal model has two strengths. Firstly, it is strongly rooted in the available empirical evidence. Secondly, it aims to explain the difference between the amount of adaptation adolescents appear to need as they move through the phase, and the ways in which most young people accomplish this navigation with relative success (Coleman, 1989).

The model is important to this study in that it facilitates a perspective of adolescence that allows for the interesting study of young people who are not deviant (e.g. the Positive Youth Development movement, Yates and Masten, 2004; Lerner, et al., 2011a and b). This is in contrast to more deficit models of adolescence described above and perpetuated in the media.

It is also important because Coleman explicitly linked the model to life course perspectives, which places significant emphasis on the ways in which humans develop in context, and the nature of development as a result of environmental factors. The focal model, however, places the young person at the heart of the change, endowing them with agency in their development.

2.6 Life course perspectives

The life course tapestry paradigm (Crosnoe and Johnson, 2011), on which both DC and the focal model sit, is a crucial link between this study's conceptual framework and the composite analysis described in Chapter 5. Its importance to this study cannot be over-emphasized, although it only reveals itself late in the research process. In their review of the life course perspective, Crosnoe and Johnson focus on three 'strands': *developmental trajectories, social pathways and social convoys*.

Developmental trajectories encompass the body of research around adolescent development, including the biological, cognitive and psychological changes described above. It also largely includes the process-oriented developments we associate with identity (e.g. Kroger and Marcia, 2011) - although that is of course a social process in many ways too - particularly with regard to group identities such as race (e.g. Gonzales-Backen and Umana-Taylor, 2011) and mental health.

Social pathways research focuses on the institutions that influence adolescent life. School pathways feature heavily, particularly research surrounding subject competence and related factors such as gender (e.g. Riegle-Crumb, et al., 2006) and expectations (e.g. Bask, et al., 2014). Another pathway of interest to researchers is paid work (e.g. Shanahan, 2000). School and paid work are outside the scope of this study, but may be important contextual factors to the participants, so are not omitted from this brief review. More important, however, are the possible technological social pathways that could emerge from this study.

Social convoys are the relationships adolescents experience most closely to them; with parents, peers, romances, and influential adults. Arguably, much of the attachment literature (see below) falls within this thread, but an example of lifecourse-specific studies relevant to this thesis is Pearce and Haynie's work on parental and adolescent religiosity and problem behaviours (2004).

3. Technological concepts

This study focuses particularly on the ways in which adolescent girls use technology in their day-to-day lives, and more specifically outside the school context. In this section I will start by reflecting briefly on what we understand by 'technology' from the literature. I will then go on to report key evidence surrounding girls' volume of technology use, and what we know about the nature of that use. I will draw on recent Ofcom data, in addition to key studies by Davies and Eynon (2013), Mesch and Talmud (2010), theoretical perspectives by Crook and Lewthwaite (2010), Boyd's thought-provoking book, *It's Complicated* (2014), and the EU Kids Go Online team (2014).

One of the key questions to which this study attempts to respond surrounds the ways in which we understand technology. In his 2012 paper, Neil Selwyn approaches this issue from the perspective of sociological theory. In it, he challenges us to disconnect our experience of technology as researchers from our research contexts, and to begin to create a more sophisticated theoretical approach to considering both the social and the technological. He outlines two of the main paradigmatic approaches to socio-technical study.

On the one end of the paradigmatic spectrum is technological determinism, in which technology is understood to drive progress and change. An example of this might be the statement ‘technology too late in the evening *makes* children behave in undesirable ways at bedtime’. Selwyn claims that these ‘strong’ determinist approaches are attractive because they are relatively simple and enable us to go beyond the discussion of technological semantics into other realms of thinking. He acknowledges that there are also ‘soft’ or ‘diluted’ determinists who believe that technology impacts on adaptable social contexts with other complex influences at play. So while technology, *per se* cannot be said to make small children behave in undesirable ways, a soft determinist would say that technology *influences* behaviour in conjunction with other factors. What technological determinists – whether strong or soft – do not do is place broader social and environmental issues such as gender or class at the heart of theory.

At the other end of Selwyn’s paradigmatic spectrum lies anti-essentialism, in which technology determines nothing and everything is open to interpretation. For the anti-essentialist, technology is the product of interpretation, and some interpretations are more powerful than others (Woolgar and Cooper, 1999). From Grint and Woolgar’s work (1997) has emerged the idea of the interpretation of technology as textual, and the new literacies movement. This enables the researcher to perceive the layers surrounding socio-technical practice, and it is not uncommon to see research of this sort disregarding any designed characteristics of technology in revealing other social, cultural or psychological factors.

In between these two ends of the spectrum lie a large number of smaller schools of thought. These include affordances (e.g. Conole and Dyke, 2004) and its critics (Oliver, 2005); critical technology theory (e.g. Feenberg, 2002, 2010) and its critics (Thomson, 2000); the social construction of technology (SCOT) (e.g. Bijker et al, 2012) and its critics (e.g. the improving work of Klein and Kleinman, 2002). What these diverse perspectives tell us is that we do not have a very clear understanding of our relationship with technology.

On encountering this range and lack of clarity I quickly realized that to impose a socio-technological framework on a study already beset with frameworks and concepts would not be helpful at this early definitional stage. I decided to wait until the analysis stage to see which theories and ideas were best supported from within the data.

3.1 Adolescent girls and technology

Studies by Mesch and Talmud (2010) found that adolescents use technology for a range of reasons:

- an innate desire to communicate
- participate in wider range of activities, creativities or communications
- increase the number or range of social ties
- to increase homophilous networks
- in response to an emotional state
- to experiment or take risks that would be impossible offline
- to develop strategies for coping offline

Davies and Eynon drew similar, but more inclusive categories from their 2009 research into adolescents' use of technology, summarized as follows (pp.24-25):

- social communication and networking
- media consumption
- creative activities
- membership and participation
- academic work

These categories focus more on the question 'What do young people do?' rather than 'Why do they do it?'. However, these two sets of categories illustrate how difficult it is to meaningfully extract one question from another, and how difficult it is to construct a comprehensive list of both activities and motivations behind adolescent technology use. Certainly Mesch and Talmud's list is incomplete. For example, given what we know about the ways we seek and develop relationships and the attractions of those very different to ourselves (see below), it may be that adolescents seek to form networks with those outside their homophilous as well as those with common interests. Crook and Lewthwaite (2010) attempt to give a more nuanced perspective of technology use in adolescence, but their efforts are rather more focused on school-based use than would be relevant here.

There is research that provides a snapshot on the volume and nature of technology use amongst adolescents, and how they feel about technology. A rich source of this information is Ofcom's annual children's media literacy report. At the time of data gathering in my study (2012), Ofcom found that:

- children were using the internet on a wide range of digital devices. Around half of children aged 5–15 owned a mobile phone, with ownership increasing through the age range. By age 15, girls were more likely to own a smartphone than boys and have access to the internet in their bedroom, although boys were more likely to live in a home with a games console. Overall however, girls and boys appeared to spend similar amounts of time online, and both had almost doubled the amount of texts they sent using their phones since 2011, regardless of socio-economic circumstance.
- The data showed a decrease in girls gaming since the previous year. Compared to the previous year, however, children were less likely to have a games console in their bedroom, and boys and girls were equally likely to play games on their own. When playing with others boys were more likely to play against someone known to them. Girls aged 5–7 and 8–11 were more likely to use avatar sites than boys.
- Fifteen per cent of girls aged 12–15 were more likely to use the internet on their mobile phone than on any other device. This age range was also described as being ‘prolific social networkers’ (p.3), being more likely to have set up a profile on Twitter or uploaded photos online. They were also more likely to be one of the minority of children who reported negative experiences online.
- With regard to negative experiences, 13 per cent of girls were more likely to report having been cyberbullied than the 5 per cent of boys over the

preceding three-year period. This could indicate under-reporting by the boys.

- Girls were more likely than boys to report 'multi tasking' across media, with no differences across socio-economic settings. However, Davies and Eynon (2013) query whether this is a helpful description of what is occurring when young people go online; as what might actually be happening is a series of rapid consecutive activities, rather than multilayered, connected activities that we would describe as 'multi-tasking' in a research setting.

Of course, the world has changed since Ofcom's 2012 report. The 2014 report shows that tablet use is increasing in terms of access and popularity. Gender differences are more acute and appear in younger age groups, although there are risks in embedding unhelpful stereotypes between gendered uses of technology. Older children appear to be more discerning and critical about the nature and truthfulness of online content.

What these differences between the 2012 findings and the 2014 findings demonstrate, is the rapidity with which these technological landscapes change and the very widespread adoption of technology; perennial issues in the socio-technical research landscape.

The Ofcom work also demonstrates the continuation of some myths around technology use and adolescence across time; the digital native, the net-gen, the risk-takers. Many of these have acquired pejorative meanings (e.g. Nichols and

Good, 2004), and as a result, boyd's (2014) book on the topic of teenage technology use offers a refreshing take. In it, she takes a highly positive, almost utopian perspective, in which she argues that young people (in the United States) are more thoughtful and sensible about their technology use than is otherwise portrayed in the media. Her research reflects Ofcom's recent UK findings (2014), describing a sense of care adolescents take in their technology use and similarly their supposed high 'digital quotient' (a composite measure developed by Ofcom to show self-reported awareness and self-reported confidence with device use).

Boyd argues that although we need to continue to monitor and support digital practices among young people, we need to acknowledge the importance of technology in providing spaces apart from adult-controlled worlds in which adolescents can take ownership, take moderate risks and express their developing sense of self and identity. She is not arguing for a laissez-faire approach - and certainly some of the more concerning literature surrounding young people's use of technology in early dating violence and cyberbullying would strongly caution against such an approach, e.g. Hopkins, et al., 2013. However, she is suggesting that given that *most* young people operate their technological lives with care, we should try to approach the topic with more respect and nuance.

4. Social cognition

Social cognition is a branch of the field of social psychology, and its goal is to understand how we humans understand the social world and our place within it (Augustinos, Walker and Donaghue, 2006).

Unsurprisingly, there are multiple, complex definitions of social cognition in the literature, although most agree that it is ‘an approach or a perspective’ (Augustinos, Walker and Donaghue, 2006, p.16) rather than a theory. It is this flexibility that makes social cognition ripe for my study. Although social cognition arose from cognitive psychology, this study does not operate within the traditionally empirical parameters, which that school of research implies. Rather, the concepts, metaphors and approaches arising from social cognition research are applied in a more interpretive setting (see Chapter 3).

In this section, I will briefly reflect on what ‘social’ means in the social cognitive sense. There is, of course, much more to be said on the topic, but given the restrictions of space the key points can be summarised as follows, drawing on Augustinos, Walker and Donaghue (2006):

- we influence our environments
- two-way perception is negotiated
- the self is subject as well as object (e.g. we are creators and consumers of online artefacts)
- we are able to reflect on other people as social objects, and they may change as a result of that reflection. Social cognition is shared and involves ‘social explanation’ (Augustinos, Walker and Donaghue, 2006, p.17)

Social cognition, whether represented in social representations theory, social identity theory or discursive psychology, comprises metaphors, models and

mental representations that we are able to make explicit and describe. We use these as the basis for interpreting our future encounters with the world.

After developing a basic understanding of social cognition, I was able to begin to derive a list of aspects of social cognition that may be particularly pertinent to technology use in adolescence. I decided upon:

- attachment in order to reflect on relationships
- self and identity to reflect on participants' perspectives of their social selves as individuals and in group contexts
- attribution and theory of mind to reflect on participants' perceptions of why people behave the way they do.

These aspects of social cognition will be discussed in the following sections.

4.1 Attachment and relationships

For this study, attachment theory has provided a framework in which to analyse young people's interactions and relationships with those close to them, such as parents, siblings and friends. I draw in part on my Masters level study.

John Bowlby and Mary Ainsworth pioneered attachment research during the last century, providing the conceptual and methodological foundation upon which contemporary theorists link relationships and emotional development (Goldberg, 2000). Ainsworth's research into attachment theory focused on young children, and resulted in the classic 'strange situation' sequence, in which separations between mother-child dyads are explored. This enabled Ainsworth to identify the systematic patterns of behaviour (Ainsworth, 1969) of 'secure',

‘avoidant’ and ‘resistant/ambivalent’, and subsequently, ‘disorganized’. These are still conventionally used in contemporary research. In research with older children and young people, these patterns are also called ‘balanced’, ‘limiting’, ‘preoccupied’ and ‘disorganized’ respectively (Goldberg, 2000).

Table 3 (drawn from my Masters dissertation) summarizes the main attachment patterns (drawn from Main and Solomon, 1990; Goldberg, 2000; Cassidy and Shaver, 2008).

Pattern	Characteristics
Secure	Use the secure base (e.g. mother) as a place from which to safely explore environments After separation, positive with parent, returns to explore Easily comforted Feel more comfortable with parents than with strangers
Avoidant	Explore environments with little connection to the parent Little distress at absence of parent After separation, does not respond to parent Does not seek comfort Can be more comfortable with stranger than with parent
Resistant/ ambivalent	Engrossed with parent, and unwilling to explore Severe distress at separation Fury or apathetic emotional engagement Resists comforting
Disorganized	Small percentage of the population Does not demonstrate persistent strategy Comprises seven behavioural patterns: - ‘contradictory behaviour’ (Goldberg, 2000, p.25) - incomplete or unclear action or countenance - unexpected postures unrelated to how the child is feeling - freezing or slowing actions, disoriented - indications of concern or unhappiness about parent

Table 3: Characteristics of common attachment patterns.

Bowlby argued that healthy relationships with a small number of trusted individuals are key to an individual's mental health:

“For not only young children, it is now clear, but human beings of all ages are found to be at their happiest and to be able to deploy their talents to best advantage when they are confident that, standing behind them, there are one or more trusted persons who will come to their aid should difficulties arise. The person trusted provides *a secure base* from which his (or her companion can operate).” (Bowlby, 1973, p.359, my emphasis)

While initial research focused on mother-child relationships as the ‘secure base’, attachment researchers have since broadened into investigating other relationships, particularly in exploring attachment with older children. Some relationships can be described as ‘attachment bonds’ (Cassidy and Shaver, 2008). Attachment bonds occur when an individual has a relationship with another who is seen to be a source of security. These are not always the same as ‘affectional bonds’ although there may be overlaps between them within the attachment context. An affectional bond (Ainsworth, 1989):

- is continuous
- refers to a relationship with an individual in close proximity
- is important in emotional terms
- is demonstrated when the parties become distressed at separation.

An attachment bond includes all of the facets of an affectional bond, but also exists in relationships where an individual looks for safety and calm.

Attachment *behaviours* do not always imply an attachment *bond*; causal relationships are difficult to demonstrate (Sroufe and Waters, 1977). Attachment behaviours are 'situational' (Cassidy and Shaver, 2008, p.13), and attachment bonds are 'consistent over time' (ibid.), regardless of the situation or circumstance. This is important for this study because it means I need to demonstrate consistency in attachment behaviours within technology-enabled environments if I am to refer to a relationship as an attachment bond, rather than simply identifying attachment behaviours.

Attachment theory also provides a framework in which to identify and analyse the ways in which relationships are represented in other life contexts (Bretherton and Munholland, 2008). Bowlby called this representation our 'inner working models' (IWMs) of relationships (1969). IWMs can be thought of as the representational frameworks in which we can conceptualize our interactions with others, based on our previous interactions. Their key function is to 'anticipate', 'interpret' and 'guide' interactions with others (Bretherton and Munholland, 2008, p.103), whether parental or otherwise. Crucially, IWMs are located in the memory, which is a key concept in many aspects of social cognition.

4.1.1 Attachment and adolescence

Both Bowlby and Ainsworth emphasized that most of their descriptors were not to be considered pejoratively; a child with a disorganized attachment style was not to be thought of as 'wrong' or 'abnormal'. However, research carried out since their initial forays has indicated that there are some problematic trends that correlate

with a lack of secure attachment, particularly in the years between middle childhood and early adulthood. Fransson, et al. (2013) explored the relationships between attachment in this age range with the Five Factor Model (FFM) of personality, in which five dominant personality traits were correlated with attachment security. They found that attachment and the FFM are associated to a moderate degree, most particularly Extraversion and Openness. Their most interesting finding relates to Openness, as both attachment security in middle childhood and unresolved/disorganized attachment in adulthood were positively correlated with this trait. The researchers suggest two possible reasons; firstly, an equifinal reason in which childhood security and adult attachment status *both* require a degree of openness, and secondly, different aspects of attachment correspond to different aspects of openness (Fransson et al, 2013, p. 16).

Significantly more evidence exists on attachment in the adolescent years than in middle childhood, although the focus shifts away from categorizing or dichotomizing attachment organization types and relationships, and towards the *functions* of attachment (Allen, 2008) during adolescence. Of interest to this study is whether these characteristics are evidence in technology-facilitated relationships as well as offline ones. The functions have been described as (Ainsworth, 1989):

- proximity seeking
- unhappiness on separation
- exploration from the secure-base with reassurance
- trust/respect
- happiness on regaining contact

Allen characterizes a number of adolescent attachment 'developmental transformations'. The changing relationship with the parent features heavily in these, as the young person transitions from a concern with the proximity of the attachment figure, to availability (Booth-Laforce, et al., 2006), to growing independence and developing attachments outside the parent/carer relationship. Although we see an increase in peer attachment throughout the adolescent years, parental relationships continue to be important.

The importance of peer relationships for adolescents cannot be underestimated (although 2014 work by Herres and Kobak amongst others has found that attachments with parents continue to be important throughout adolescence) and are associated with a number of positive and negative societal outcomes (Boykin McElhaney, et al., 2006). Boykin McElhaney, et al. suggest that teenagers' attachment types - in particular, types of insecurity - are linked to the ability to externalize, and whether or not the young person is engaged in delinquent activity. For preoccupied young people for example, close friendships (arguably attachment relationships) protect them from delinquency by providing positive attention. This influence was reduced for dismissive adolescents who were less interested in relationships with others. Although there is a small amount of research exploring technology and attachment (for example Amichai-Hamburger, 2002; Lee, 2013; Otway, et al., 2014), technology could have a role to play in facilitating the kind of attention that characterizes the functions described above.

This freedom to explore outside parental relationships in more than logistical ways resonates particularly for young adolescents beginning to increase their levels of risk-taking in their online interactions (Livingstone, 2008), and is also correlated with attachment (Morsünbül, 2009). Richards and her colleagues (2010) explored screen time and attachment to parents and peers. They undertook the study in the context of research findings that strong parental attachment can *guard against* psychological health issues and participation in high risk health behaviours (Wilkinson, 2004). Peer attachment, while also correlated with good psychological health, is associated with more active participation in high risk behaviours (Carter, et al., 2007). Richards and her team found that high levels of television use were associated with weak attachment with parents and more time spent reading/doing homework were associated with strong attachment.

4.1.2 Critiques of attachment

The attachment construct has been criticized since Bowlby proposed it. Even considering the broad definition of attachment used in this project, these concerns must be taken into account. This section will review some of the predominant challenges faced by attachment theory, and their implications for the study.

Challenge 1: Is attachment a ‘real thing’?

Bowlby was eager for his audience to understand that attachment is not a ‘theory’, but a ‘conceptual framework’ (Bretherton and Munholland, 2008). Much of the research in this arena has been empirical in nature, assuming that attachment exists within the world, to be observed. A social constructivist, by contrast, would

say that attachment is constructed by individuals in order to help us explain our relationships with ourselves and others (Delanty, 2005), and although Ainsworth did make use of home observations in naturalistic settings to inform her work (Ainsworth, 1989), that trend has not been widely adopted.

While these perspectives inevitably affect the methods chosen to gather data, and the assumptions underlying any analysis of findings, I applied a pragmatic orientation (Baert, 2005; James, 1907) and by taking a pragmatic approach to attachment, the data gathering focus moved from testing tools within tightly defined boundaries of attached vs. non-attached relationships (Goldberg, 2000) to attempting to observe the functions of attachment within technological environments (Allen, 2008).

Neuroscience has more recently added additional, rich perspectives to attachment theory. While in its infancy, the neural constituents of attachment have been explored in relation to differences in attachment style, emotion and emotional regulation, family relationships and proximity seeking (Coan, 2008).

Challenge 2: Breadth vs. depth?

Definitions of attachment are very broad (Goldberg, 2000). The argument for a narrow definition of attachment revolves around whether the framework loses its singular character, and encourages the study of relationships to become muddy and diffused (Lewis, 1997). It has been argued that this makes attachment theory difficult to operationalize for research or clinical purposes. In contrast, we might argue a broader definition is more likely to take into account the complex and rich

life of a child or young person (Goldberg, 2000). For the purposes of this study, the goal was to use the attachment framework in a way that resonated for the participants. The idea was to investigate the boundaries between attached and other sorts of relationships (e.g. acquaintance or care-giver), rather than to impose an empirical approach in an interpretive context.

Challenge 3: Criticisms of methods leading to a failure to explore the construct in depth

The centrality of the Strange Situation (Lamb, et al., 1984) for measuring attachment in childhood and the importance of the Adult Attachment Interview in later life has led to criticisms of the methods used to gather data. The former comprises a procedure to observe mother-child dyads and classify their attachment. The latter is a substantial interview designed to assess adult attachment. In order to provide robust sample sizes, the small numbers of participants presenting in the insecure groups could lead to groups being combined or by removing outliers, leading to a failure to properly explore those groups in depth.

Challenge 4: Is attachment stable?

A recurrent theme in social-cognitive research is conceptual stability; i.e. whether the concept may be found throughout the life course and how much it changes (or does not change) over time. Attachment is considered to be dynamic. The prototypical IWMs can change as experience of relationships diversify and in response to biological and psychological change (Lewis, et al., 2000; Siegler, et al.,

2008). A recent meta-analysis (Pinquart, et al., 2013) found that the likelihood of stability drops in periods of more than five years - and falls more dramatically in intervals of more than 15 years - although toddlers with secure attachment are more likely to experience stability over time. The authors claim that this analysis supports the 'revisionist' perspective of attachment, which lies in contrast to the 'prototype' model in which IWMs are retained across development. This is hopeful for those working with children with attachment problems, as it suggests positive change is possible.

4.2 Self and identity

The concepts of 'the self' and 'identity' are crucial to this study. In his famous aphorism Gordon Allport claimed that:

“The existence of one’s own self is the one factor of which every mortal – every psychologist included – is perfectly convinced.” (Allport, 1943, p.451)

He might have said the same of identity. Confidence in the existence and identity of the personal self is embedded in our culture and language. Many studies do not define the 'self' at all, but assume that the self exists and that we have a common understanding of what a 'self' is, if not its precise location in the brain or the psyche (Klein, 2012b).

In this thesis, I aim to be more precise than this. In this section, I will briefly outline some of the descriptions and functions of self and identity described in the literature. In particular I will consider the question of the stability or malleability of the self over time, and how active self-development is related to self-evaluation

and self-esteem. I have chosen to review ‘self’ and ‘identity’ together because they are distinct but complementary concepts, possibly as part of a larger global self-system (Schwartz, et al., 2012).

4.3 Self: a brief theoretical overview

Most of the literature reviewed here considers meaning and function of the ‘self’ (Augostinos, Walker and Donaghue, 2006). In reviewing the literature I will consider conceptions and construction of the self, malleability and the relationships between self-evaluation, self-esteem and emotion. I will clarify the definition of ‘self’ used within this project and consider what is meant by ‘identity’ in light of this understanding of self. In particular, I will review social character and social identity models, and the identity politics that accompany these models day-to-day.

4.3.1 Singular self or multiple selves?

Klein (2012a), drawing on the philosophical Jamesian tradition, distinguishes between two broad types of self:

- *The epistemological self*: similar to James’ concept of the ‘self as known’ (1890), ‘self as experienced’ (Klein, 2012a) or ‘self as object’ (Damasio, 2012).
In Klein’s view, the epistemological self is observable and measurable.
- *The ontological self*: similar to James’ concept of the ‘self as knower’, McConnell’s explorations of the self-aspect (2012), ‘self as experiencer’ (Klein, 2012a) or ‘self as subject’ (Damasio, 2012).

I have used this dual definition of the self as a starting point for understanding the self as a multiplicity (Klein, 2010, 2012a, 2012b; McConnell, et al., 2012). This position is endorsed in the neurological literature, which finds that the two forms of self are not dichotomous, but rather a ‘continuity and a progression’ (Damasio, 2012, p. 10). In this study, we are not exploring a single self-aspect or process, but rather multiple selves, changing through times and perceptions of times, mood, neural and psychological health. Each aspect of our sense of self is subject to our wishes and goals, and adapts accordingly and in context (McConnell, et al., 2012).

Acknowledging the self as a multiplicity enables the researcher to consider social cognitive approaches to the self and identity, such as the idea of the self as a ‘knowledge structure’ or ‘self schema’ (Augostinos, Walker and Donaghue, 2006, p.189). It also permits more discursive, situated or socially constructed approaches that are concerned with understanding the various and subjective ways in which people experience their sense of self (Augostinos, Walker and Donaghue, 2006).

4.3.2 Conceptions of the self

The concept of the self has been described in many different ways, which are not necessarily mutually exclusive. The scope of this study limits the range of concepts under discussion. For example, life event memories (Dalla-Barba, 2002; Hurley, Maguire and Vargha-Khadem, 2011) and self-congruence/authenticity (Sheldon, et al., 2012) have not been included.

Rather, conceptions of the meaning of the 'self' which have been considered within this study, include:

- **Personality:** the self as a model of personality traits and characteristics (Klein, Cosmides and Costabile, 2003)
- **Personal agency:** (Frith, 1992, cited in Klein, 2012b) comprising traits such as competence, determination and confidence (Uchronski, et al., 2013).
- **The subjective experience of emotion:** emotions such as or 'warmth' (Uchronski, et al., 2013) intersect with what we do and how we reason (e.g. Damasio, 2000 in Lane and Nadel, 2000).
- **Self-reflection and self-evaluation:** self-evaluation for the purposes of this study is the ability to create metamodels of the self as agent. It is not necessarily an objective process, as it is influenced by the reasons an individual might self-evaluate in the first place (Taylor, Neter and Wayment, 1995). Some factors affecting self-evaluation are discussed below.
- **Self-regulation:** the process that governs the ability of the individual to initiate behaviours that will bring about particular consequences (Augostinos, Walker and Donaghue, 2006).
- **Self-concept:** everything that we know about ourselves, including our memories, beliefs, values, wishes, worries, traits and attributes (Augostinos, Walker and Donaghue, 2006). This study has conflated 'self-concept' with 'self-knowledge' and means more than knowledge about our traits. The literature suggests that motoric, kinaesthetic and interdependent social

representations are core to self-concept (McConnell, et al., 2012). For example, a professional athlete's self-concept will include a range of attributes. Some will be trait-based, such as 'determination' or 'ambitious'. Others may be embodied, such as shaking limbs before competing. Still others may be social representations, such as belonging to a club.

4.3.3 Memory and the construction of the self

In this study I have not used a model of the 'self' as purely a memory-construct: I wanted to explore the concept in a less restricted and pre-conceived way. I was interested in models of 'future selves', which meant going beyond a memory-based approach, and I was interested in participants' own conceptions of self in relation to their technology use. The idea of the self as a multiplicity is more useful in this context than adopting a single all-encompassing model, whether based on memory or any other overarching factor.

However, to explore our conceptions of our 'self' we must accept that the self has significant memorial properties. These 'multiple, context-dependent self-aspects in memory' (McConnell, et al., 2012, p.392) are what drive human beings to address the cognitive dissonances or mental goals described above in the discussion of self-regulation. Memory arises in an environmental context which also influences and directs our wider self-development (McConnell, et al., 2012). Perhaps it is the case that, as Klein would have it, a range of memory and non-memory (for example, the colour of our hair) traits contribute to the construction of the self and its change over time (Klein, 2012b).

Continuity through time links the constructed 'self as known', and the more ephemeral 'self as knower'. Both episodic and semantic memory contribute to the development of the life-course, the directed organisation of the self (e.g. Dalla Barba, 2002; Hurley, Maguire and Vargha-Khadem, 2011). As McConnell, et al. would have it, the multiple selves, which are 'organized and represented in long-term memory become activated in the context of pursuing one's goals.' (McConnell, et al., 2012, pp.383-384)

4.3.4 The stability or malleability of the self through time

Broadly, the literature agrees that the active or 'agentic' self is malleable (e.g. Uchronski, et al., 2013). The more intractable question is whether there are any self-constructs that define an individual across all contexts and times. McConnell, et al. would say that there are few to none, whereas personality theorists would say that there are definitional traits to all individuals (e.g. Kelley, 1972), and social psychologists would say that chronic attributes that reside in the memory are likely to guide an individual's behaviours across multiple contexts (McConnell, et al., 2012).

This has particular implications for this study, because if context activates variable thoughts, actions and emotional responses (McConnell, et al., 2012), then we may hypothesize that technology-mediated experiences in different digital environments will have different impacts upon self and identity.

I have not actively sought experimental data on the changing online adolescent self, but I have drawn on the work of Markus and Kunda (1986) to

provide a theoretical foundation for my explorations of the changing self, as relevant data have arisen. Markus and Kunda aimed to resolve the apparently unresolvable conflict of the self that is both stable and changeable – or malleable – by hypothesising the existence of the ‘global self-concept’ and the ‘working self-concept’ (1986). The self-concept is a multiplicity of interrelated self-schemas, arising from the memories, ideas, values and personal beliefs that comprise self-knowledge. Markus and Kunda suggest that the ‘global self-concept’ is generally stable, although it may adapt very slowly throughout a lifetime. The ‘working self-concept’ is that part of the self-concept structure that is accessed in a particular temporal, physical and social context. It is malleable, and drives our behaviour in particular circumstances. Although we may have an awareness of our global self-concept, our working self-concept, activated in context, suppresses opposes or silences other self-schemas (or ‘identities’ as McConnell, et al. term it, 2012).

Self-concept change is recognized to happen during life transitions, or in new contexts (McConnell, et al., 2012). Results in this area are important to this study because puberty and its social companion, adolescence, are periods of transition in which young people in contemporary industrialized cultures may experience a range of major role *entries* (e.g. into secondary school or youth clubs) and *exits* (e.g. exploring spaces away from family religion or leaving primary school). For this study, it is important to acknowledge that both entry into, and exit from, social roles can be a source of self-knowledge (Light and Visser, 2013, p.301). An individual choosing to exit from an online group may find that process

painful, or quite simple, depending on their personalities, the group itself, the nature of the group, their sense of self-worth, and their attitudes towards technology. Unfollowing an individual on Twitter does not carry the same resonance as leaving a closed friendship group on Facebook, for example.

4.3.5 Self-reflection

The development of the self through time and the accessibility of particular self-concepts need not be an entirely passive process. Self-reflection, self-evaluation and self-regulation are key aspects of the development and shaping of self-identity. In some studies 'self-reflection' and 'self-evaluation' are linked with motivational orientations such as self-assessment, self-enhancement, self-verification and self-improvement (Augostinos, Walker and Donaghue, 2006).

Self-regulation is considered in three broad ways in the literature:

- Cognitive dissonance theory, in which the individual holding conflicting ideas self-regulates in order to resolve the conflict (Festinger, 1957).
- Regulatory focus theory, which seeks to shine a light on the regulatory behaviours people exert in order to reach a mental goal or wished-for state (Augostinos, Walker and Donaghue, 2006; Higgins, 1997).
- The control-process model in which the individual tries to move towards a mental goal (or a 'principle') by reflecting on the gap between the goal and the status quo, and acting (or enacting a 'programme') to address the discrepancy (Carver and Scheier, 1982).

For the purposes of this study, it is sufficient to acknowledge that we regulate our behaviours in a range of ways, depending on our prior experience, our memories and our motivations.

4.3.6 Self-esteem and depression

Closely related to self-evaluation and reflection is self-esteem. If self-evaluation is the ability to create metamodels of the self, self-esteem is the level of positivity we infer from those metamodels (Augustinos, Walker and Donaghue, 2006).

There is a wide body of research exploring the notion of 'self-esteem' and self-worth, and links between the known self and positive and negative affect (e.g. Peetz, et al., 2014). The evidence indicates that our self-concept is linked to the ways in which we feel about ourselves, and this in turn impacts on our mood and emotion (McConnell, et al., 2009). For example, Sowislo and Orth's 2012 meta-analysis of the literature provides an insight into the relationship between self-esteem and depression. This suggests that self-esteem and positive/negative affect are distinct concepts, but that they are linked (Sowislo and Orth, 2012). This link is especially strong for young adolescents (Crocetti, et al., 2013).

4.4 Identity: a brief theoretical overview

The controversy in the literature surrounding identity has much in common with the discussion of the self. Is identity a global concept or are there multiple sub-concepts of identity? There is discussion around issues of temporality and malleability, and the role of others. In addition, some studies use the terms 'self' and 'identity' interchangeably. For example, Deaux, et al. (1995) argue that we need

to explore a holistic self-concept, in which identity is personalized and self is socialized, and in this way we can reduce an enormous number of possible working self-concepts to a smaller, more tractable number of identity-specific working self-concepts.

In this brief summary I will reflect on the dominant models of identity and identity development, the ways in which we categorize our identities, identity politics and finally the ways in which a projection of our self-concept and identity into the future can illuminate our understanding of the present.

4.4.1 Dominant models

Different research paradigms have given rise to different models of identity, the three dominant ones being social identity theory (SIT), social representation theory (SRT) and identity status modelling. While these competing models have influenced this study, I have not chosen one particular model within which my conception of identity comfortably sits. This is because I wished to be more data-driven than concept-driven during the analysis phase, and to draw on the widest range of research possible, rather than be constrained by one particular model.

Social Identity Theory (SIT) approaches identity as a ‘theory of intergroup behaviour’ that can be ascribed or acquired (Augostinos, Walker and Donaghue, 2006, p.204). Tajfel’s work has (1981) focused on the idea that people wish to think positively about themselves, and choose social groups and resultant social identities that differentiate from others in positive ways. Identification has been

found to be a relatively stable characteristic of group membership (Augostinos, Walker and Donaghue, 2006).

SIT also provides an important conceptual foundation for the ‘essentialism’ that occurs when group members believe that they (or another group) have inevitable or inherent characteristics that differentiate them from others. This is the basis for some theories of stereotyping and prejudice: in-group members discriminate against out-group members based on perceived ascribed characteristics (Augostinos, Walker and Donaghue, 2006).

In contrast to SIT, SRT takes a more discursive approach to the concept of identity. In this theory, social representations provide the context in which a self exists and interacts with others – these ‘social facts’ are fundamental to the ways we create our identities in the world (Augostinos, Walker and Donaghue, 2006).

Together with SIT and SRT, Marcia (and later Kroger’s) work on identity status modelling (Kroger and Marcia, 2011) has provided a foundation for my developing understanding of identity. Marcia’s work originally aimed to examine identity in late adolescence and into adulthood, but the principles have been adopted across research into identity in the life course. Marcia’s original conception discussed two key identity formation processes – exploration (and its associated concept of uncertainty) and commitment. It should be noted that these are *processes*, rather than *events* (Schwartz, et al., 2012; Meeus, 2010). Based on these processes, Marcia outlined four initial identity statuses: diffusion, foreclosure, moratorium and achievement (see Kroger and Marcia, 2011), and these have since

been adapted in a range of studies. For the purposes of this project I have found the two key formation processes (exploration and commitment) a more useful level of analysis.

Aligned to this interest is that of the malleability of the identity concept. The literature on the self, as discussed in the previous section, accounts for both stable and malleable aspects of the self-concept. The identity literature acknowledges the changing of identities through the life course and in response to external/ situational factors: most individuals demonstrate diverse behaviours and identities with different groups.

4.4.2 Identity politics

When we operate in social contexts, we experience our subjective ‘social character’ (Blasi, 2004). This character, like a character in a novel, proceeds along narrative structures and an evolving story arc (McAdams 1998, cited in Sheldon, et al., 2012). Although social characters are said to be temporally and situationally stable, that stability varies across individuals; it takes time and skill to operate our social characters in ways that are designed to increase others’ acceptance of or admiration for us (Sheldon, et al., 2012).

For the purposes of this study, the social character concept has been a helpful bridging point between different perspectives of the self and identity. Most particularly, it is a complex schema in which we can explore our subjective self, including when we are malfunctioning in social settings in damaging ways (Light and Visser, 2013).

Introducing, managing and rejecting social identities, whether conscious or unconscious, is not a neutral act (Augostinos, Walker and Donaghue, 2006).

Choosing to be part of a political movement, a social network or a knitting group, encourages both homogenization (as we understand what we have in common with others) and essentialism (as we exclude other groups or individuals).

Identity politics are particularly pertinent for marginalized groups, for whom the tension between social reality and preferred identity groupings can be problematic. For example, someone choosing to leave behind an orthodox religious upbringing may adopt an identity that does not fit comfortably with either themselves or the new identity groups they choose to enter. We can evaluate the degree of fit into the new group using relative *prototypicality* (e.g. Dong and Ding, 2012). The degree to which an individual can be said to be prototypical derives from the ratio between their perceived differences from the rest of the ingroup, and their perceived differences from the wider outgroup. The similarity between the self of the individual and an individual within the group may provide the 'cognitive overlap' needed to initiate a relationship, as we seek relationships with those that will provide us with novelty and growth within a reasonable cognitive range (Shedlosky-Shoemaker, et al., 2014). Popular individuals are usually more prototypical of the ingroup (Dong and Ding, 2012).

Social researchers have manifested identity politics in a different, but closely related way. For example, Davies (2014), in an ethnographic new literacy study of young hairdressers using Facebook, describes mechanisms by which her

participants accrue reputational points by demonstrating associations with others, and through a highly self-conscious representation of group identity. This is a form of politics akin to those identified in social psychology, with equally significant implications for an individual's place within social hierarchies and self-esteem.

4.4.3 Possible selves

During my reading of the literature surrounding self and identity, I identified a number of studies that used a projection of the self-concept or identity into the future to illuminate the present, namely an exploration of 'possible self'. The possible self has been actively invoked for a range of research purposes, from increasing optimism (Meevissen, et al., 2011) to motivating exercise (Gardner, 2012), and in a range of ways including life tasks, personal projects and personal strivings (Augostinos, Walker and Donaghue, 2006). These approaches all reflect a shared acknowledgement of the dynamism of the self and identity, and ascribe a level of control over the individual life to strive towards an aspirational future.

There are possible differences between the ideal and ought self-guides (Higgins, 1997; Markus and Nurius, 1986). The 'ideal self' is the aspirational possible self, while the 'ought self' represents duties and rules. Self-discrepancy theory, in contrast, states that discrepancies between actual, ought and ideal self produces a negative affect. Boldero and Frances (2002) have attempted to resolve this problem by suggesting that unrealized self-representations are contingent on how much we believe that we will actually become a future self.

Shedlosky-Shoemaker, et al. (2014) take the notion of possible selves one step further, and explore the implications of fictional selves. They found that fictional selves may be a source of safe self-expansion (i.e. we can 'try out' other identities and selves in a safe space), that their participants experienced cognitive overlap with fictional characters to the extent that those characters represented the participant's self, and that 'psychological transportation' can bring the individual closer to a fictional character, which in turn encourages a relationship with implications beyond the initial encounter. This was particularly prevalent for one of my participants who was an avid fan-fiction writer. As with this participant, Shedlosky-Shoemaker and colleagues found that individuals experience real distress if the relationship with the fictional character is eroded or broken – even though those relationships lack 'real life' reciprocity – and that parasocial relationships can serve as buffer for real life challenges.

4.4.4 A working definition

In exploring the literature on self and identity I was motivated by the need to find a definition of self that I could share with my participants. It had to be accessible and coherent enough to be understood by all participants. It had to be sufficiently broad to allow me to contextualize the findings as they emerged from the data.

Thus I settled on Augustinos, Walker and Donaghue's widely quoted definition:

"Self is more often used to refer to people's beliefs about themselves, about their own ideas of who they are, and their personal characteristics, abilities,

experiences, emotions and agendas. Our identity locates us in a world made up of different groups of people, and usually concerns the social groups and categories to which we do and do not belong.”

(Augostinos, Walker and Donaghue, 2006, p.186)

4.5 Attribution

Attribution was, to some degree, a secondary area of interest in this study. It is a topic more amenable to empirical methods than some of the other concepts explored here, and as those methods did not fit into the overall methodology of this study, I did not seek to make it a primary focus. However, I did want to create at least one opportunity to ask participants why they thought people behave the way they sometimes do online. Asking them to reflect on their own behaviours, and attribution provided a useful conceptual framework for this conversation. In the following section, I will give a brief introduction to the concept.

4.5.1 What is attribution and how does it relate to this study?

Human life is comprised of millions of events, experiences, interactions, activities, groupings and ideas. Some of these things we experience as random, but for the most part, we like to believe that things happen for a reason – we attribute explanations to the things that happen to us and around us, and these explanations are, in part, a way of trying to understand behaviour.

Attribution theory explores the reasons why and how people attribute (Augostinos, Walker and Donaghue, 2006).

The debate has been informed by a number of recurring points:

- We perceive the world as a causal system (Krech, et al., 1962). Causes can be dispositional or situational (Heider, 1958). Arguably, it is impossible to maintain this distinction (Edwards and Potter, 1992), particularly outside laboratory-based research settings.
- A range of biases have been identified that partly explain false attributions. Most relevant to this study are the fundamental attribution error (FAE) in which dispositional reasons are favoured over situational ones, ultimate attribution error (UAE) in which in-group members favour dispositional explanations relating to out-group members over situational ones, the Actor-Observer Effect (AOE) which is the tendency to favour situational explanations in attributing our own behaviours, and the self-serving bias in which we attribute our success to dispositional factors, and attribute our failures to situational factors (Augostinos, Walker and Donaghue, 2006).
- We tend to infer that our actions correspond to our motives and character (correspondent inference theory, Jones and Davis, 1965). Jones and Davis claimed that the individual's behavioural choice, motivation and social desirability all affect the attribution process, both on their own and in conjunction with one another.
- Before two experiences, events or behaviours can be causally linked, they must covary (covariation model, Kelley, 1967). Kelley claimed that in order to draw attributional conclusions we must consider three factors: consistency, distinctiveness and consensus, all in the context of the event.

Social representations theory takes this appreciation of the social context in attribution even further. Doise (1986) developed a four-level nomenclature to explain his model of attribution for example, comprising the intra-personal, inter-personal, positional and ideological (sometimes translated as ‘societal’). While this study would not claim to be exploring societal perspectives of attribution, this broader contextual perspective has been a mechanism for acknowledging wider factors in the attribution context.

Discursive approaches take this contextualisation even further. For the discursive researcher, description *is* attribution and can never be neutral. The events described in detail and from a range of discourses and perspectives are loaded with causal inferences and attributional perspectives (e.g. Edwards and Potter, 1992). For example, an adolescent discussing cyberbullying might attempt to do so neutrally, but will inevitably be influenced by particular events, experiences, barriers and empowering factors, family and school structures.

4.6 Mentalizing/theory of mind

We use the term ‘theory of mind’ (ToM) or ‘mentalizing’ to describe a) the ways we assign mental states to ourselves and to others, and b) use those assignments to predict and explain human behaviours (Bosco, et al., 2014). For some researchers, social cognition *is* mentalizing (e.g. Adolphs, 2006). For the purposes of this study, I have cast ToM as a subset of social cognition as this construction meant I could explore it in relation to other aspects under review, while still maintaining some clarity of definitions between them. It was important to include ToM as an aspect

of interest in the study because it is inextricably linked with other aspects of development, such as emotion-processing and executive function (e.g. Vetter, et al., 2013a and b), I was also interested to see whether any discernable effects of ToM might have an impact on participants' online behaviours.

Most research into ToM in the last ten years has happened in the field of neuroscience, although some teams (notably Blakemore's team at UCL) have been undertaking interdisciplinary work across neuroscience and psychology. What has resulted is a more clinical perspective on this topic than, there is, for example, on attachment. This is reflected in this brief review. A large body of research into ToM in childhood finds that children are already beginning to develop a relatively sophisticated ToM around the age of three (for a summary of the research surrounding ToM in childhood, see Doherty, 2008). By late childhood, there is already evidence of complex prediction of others' emotions based on a range of implicit and explicit cues (Rosenblum and Lewis, 2003). It is in adolescence, however, that young people begin to be able to truly imbue their understanding of others' emotions and thoughts with the information they have observed and absorbed over the preceding years (e.g. Blakemore, 2012).

In the next section, I will reflect on what key models of mentalizing in adolescence can tell us about the ways in which adolescents understand others' thoughts and emotions. This will not be a detailed review, but will provide the reader with sufficient information to understand the ways in which I have interpreted the limited data I collected on this topic in Chapter 5. It should be

remembered, however, that the study of *adolescent* ToM outside the spheres of empirical clinical psychology (in particular autism research) and neuroscience is rare, and even within those fields, it is in its infancy. This has undoubtedly had an impact on the high levels of caution I have used in choosing to absorb the topic into this study.

4.6.1 ToM and adolescence

Although the evidence is patchy and recent, we do know some things about ToM and adolescence, not least the fact that developmental change in ToM happens throughout adolescence (Bosco, et al., 2014). However, the development is not linear or steady – Bosco and colleagues found that while age effects were consistent between 11 and 13 years, they moved in anticipated directions between 13 and 15, and then appeared to stabilize. We cannot infer anything from this research about the general age at which we begin to master ToM.

There is still considerable debate about whether or not children and adolescents are better at reasoning about their own mental states than about others' (e.g. Goldman, 1993 vs. Gopnik, 1993). My reading of the literature would suggest that this is in part because we do not yet have adequate tools for exploring experimental contexts, and perhaps, because we do not yet have sufficient understanding of either adolescence or theory of mind. There are, however, hints as to productive directions in which to take research in the coming years; the efficiency of perspective-taking processes, working memory and inhibitory control (e.g. Dumontheil, et al., 2010). All we can say with any certainty is that capacity for

understanding our own and others' mental states grows, deepens and improves during adolescence, and that some of these changes are represented in the ways in which we behave and in our brains (e.g. Blakemore, 2012).

4.6.2 States of Theory of Mind

Some of the research into mentalizing divides our ability to make inferences about others' mental states (Frith and Frith, 2003) into:

- cognitive or 'cold' mental states (e.g. beliefs and knowledge)
- affective or 'hot' mental states, in other words 'emotions' (Shamay-Tsoory, et al., 2010), which can, in turn, be classified as social emotions (i.e. those that necessitate our understanding of mental states and basic emotions (e.g. fear) (Sebastian, et al., 2010).

Adolescents must learn to have both of these types of ToM functioning well and in harmony if they are to develop normatively (Vetter, et al., 2013b). Shamay-Tsoory, et al. (2010) found that affective ToM is dependent on both a competent cognitive ToM and empathy in order to operate (2010). These processes together comprise a functioning ToM, which indicates the tremendously challenging aspect of processing that ToM presents. Evidence emerging from behavioural psychology supports this, indicating that cognitive ToM develops earlier than affective (Ruffman and Keenan, 1996), suggesting that the developmental trajectory is longer for affective than cognitive ToM. However, given the paucity of evidence surrounding adolescent ToM (Vetter, et al., 2013a) this can only be speculative.

In addition to empathy, we know that another driver of change in cognitive ToM at least is executive function (EF). EF is the cognitive processes used to organize and regulate in order to achieve goals (Vetter, et al., 2013a), for example managing time, focusing, planning, remembering important facts and, importantly for ToM, inhibition (Vetter, et al., 2013a). EF plays a proven role in cognitive ToM performance (Carlson and Moses, 2001; Vetter, et al., 2013a). However, it does not stretch credibility to see that in the event of EF operating poorly, affective ToM might be influenced (Vetter, et al., 2013a). For example, being disorganized might lead to missing important content in a lesson at school, thereby affecting performance and self-esteem.

Other researchers make different distinctions in tackling ToM. Some claim that understanding ourselves (first person) and understanding others (third person) requires different processes and types of understanding (Nichols and Stich, 2003; Bosco, et al., 2014). This is important because the latter type requires 'nested representations' (Bosco, et al., 2014), and the evidence suggests that we develop first person ToM well before third person ToM (e.g. Perner and Wimmer, 1985). Other distinctions include the difference between the 'egocentric' and 'allocentric' perspectives (Frith and de Vignemont, 2005). Egocentric representations are the way we compare the mental states of others to our own, and allocentric representations are independent of our self reflections.

We thus have a number of dualistic perspectives of ToM to take forward into this study. They are not mutually exclusive and in some cases interrelate; I have thought of them as facets of a single jewel, summarized in the coding as:

- cognitive (including examples of EF)
- affective (including examples of empathy)
- egocentric
- allocentric

While the Strange Stories tool adapted for use in this study was a starting point for these explorations, examples of ToM being made explicit to me were evident in other tools and during the interviews. This is discussed further in Chapter 3.

4.6.3 ToM and the brain

In this section I will briefly touch on some of the evidence emerging from neuroscience relating to ToM. This is in order to provide helpful context for interpreting the perspectives shared by my participants; I am not intending to share diagrams of the brain, or profess to an understanding of neuroscience that I do not have.

Neuroscientists term the network of brain regions that facilitate social cognition the 'social brain'. The social brain is thought to enable us to understand ourselves and others, including the ability to recognize different mental states (Sebastian, et al., 2010). The social brain undergoes considerable change during adolescence, which is of interest because of the corresponding changes happening in young people's social behaviour, their new risk-taking, concern with others'

perspectives and exploratory independence (Sebastian, et al., 2010). Studies exploring neuroimaging of ToM during this period have found that medial prefrontal cortex (mPFC) decreases as a young person progresses through adolescence (Sebastian, et al., 2010).

While the reasons behind these changes remain unclear, neuroscientists using functional Magnetic Resonance Imaging (fMRI) have observed prefrontal cortex (PFC) activity during ToM tasks (often using face-processing techniques) decreases as a young person progresses through adolescence and increase during emotion regulation tasks (Sebastian, et al., 2010). In terms of distinctions between cognitive and affective ToM, research has shown that those parts of the brain tasked with recombining complicated information work hard during adolescence to integrate cognitive and affective information (Shamay-Tsoory, et al., 2010; Vetter, et al., 2013b).

ToM studies rooted in behavioural psychology and neuroscience have several common problems summarized by Vetter, et al. (2013a):

1. They tend to focus on cognitive, rather than affective, ToM. Where they do investigate affective ToM, they are rarely investigating the *same* aspect of affective ToM.
2. A number of studies utilize tasks aimed at children, and are either poorly adapted for adolescents, or not adapted at all (Blakemore, 2008).
3. Different age spans are investigated.

My study is one that reflects on the broader sweep of social cognition in light of adolescent use of technology; neuroscience in its current form is better at creating robust answers to very detailed questions, all of which grow incrementally to add to our broader state of, as yet, incomplete knowledge.

5. The conceptual framework: a network of ideas

Once I had completed an initial scan of the literature, I began to map out the key themes explored earlier in this chapter. I have drawn out key points that appeared repeatedly in the literature, and use these as initial coding points that could be expanded once the emerging themes in the data became apparent.

I am including details about the process I used here rather than in Chapter 3 (Methodology) because the outcomes of the network analysis are closely linked to the process. To separate them would make the remainder of this chapter confusing, and Chapter 3 disjointed.

I began by setting out these key points on large paper, with many linking lines. Unfortunately, I found myself more confused than ever, and the networks I was creating did not seem to have any strong themes emerging. I therefore decided to create a network using Cytoscape, an open source program for visualizing networks¹. I did this by creating a simple .sif file² in TextEdit outlining all of the links I had identified in the literature in a hierarchy.

¹ Many thanks to Dr Dov J Stekel for the suggestion.

² Input file format

Conceptual_frameworkv.2.sif		
Find		
attribution	pp	causal_systems
attribution	pp	bias
attribution	pp	behavioural_choice
attribution	pp	motivation
attribution	pp	social_desirability
attribution	pp	consistency
attribution	pp	distinctiveness
attribution	pp	consensus
attribution	pp	levels
causal_systems	pp	similarity
causal_systems	pp	proximity
causal_systems	pp	situational
causal_systems	pp	dispositional
bias	pp	FAE
bias	pp	UAE
bias	pp	AOE
bias	pp	self-serving
levels	pp	intra-personal
levels	pp	inter-personal
levels	pp	positional
levels	pp	ideological
ToM	pp	others'_mental_state
ToM	pp	own_mental_state
ToM	pp	malleable
ToM	pp	cognitive_cold
ToM	pp	affective_hot
cognitive_cold	pp	EF
affective_hot	pp	empathy

Figure 1: Example .sif file. Note the main nodes in the left hand column, and related sub-nodes in the right. Sub-nodes can be designated main nodes in order to show multiple links between topics. For example, attribution -> bias -> self-serving

I then exported this into Cytoscape, and began by applying a network drawing algorithm that would show an ‘organic’ network. This first step was extremely helpful as it immediately showed that, despite my attempts to ensure that an acknowledgement of the importance of physiological change on the behaviours and perspectives of adolescent girls was a foundational element of this study, this had not been acknowledged by my initial networking. All nodes relating to physical change were outliers on the diagram.

I therefore returned to the text file, inserted node points where the literature clearly demonstrated links between behaviours, development, attitudes

and perspectives, and physiological change. I then recreated the network diagram as both an organic and circular network in order to provide a comparison point. Both the organic and circular diagrams were much more instructive. In this chapter I have provided reproductions of the nodal points and points of interest. Due to their large size, it would not be appropriate to replicate the diagrams in full here, but they are available for download and viewing on Figshare at http://figshare.com/articles/Network_diagram_conceptual_framework/1427425.

5.1 More cross-fertilization and connection than anticipated

Before beginning this process, I had anticipated that the main concept areas (self, identity, attachment, attribution, technology, ToM) would be hubs from which other aspects of knowledge would be distributed, with some connections between them. I had intended to make these a different node colour to highlight this. What the circular representation shows is a much more egalitarian, interlinked message emerging from the literature.

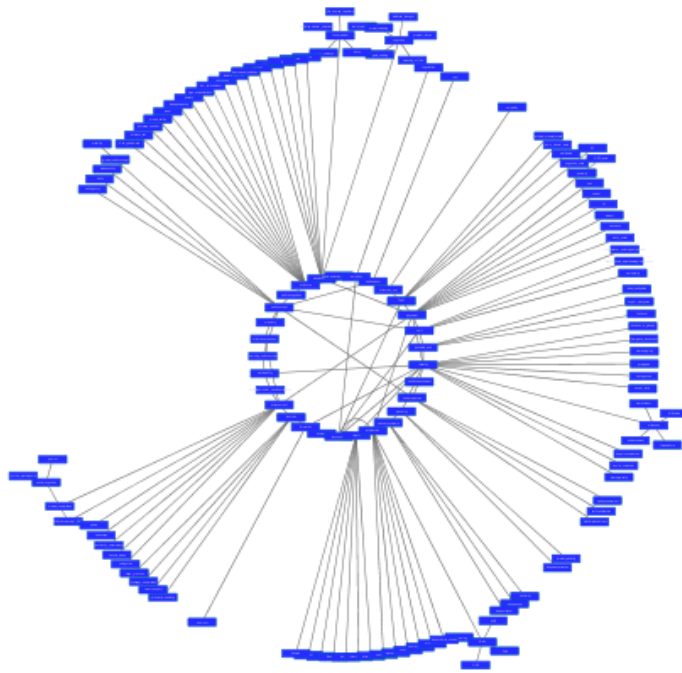


Figure 2: Circular representation of the network of ideas explored in this study showing the egalitarian, interlinked nature of the main points emerging from the literature.

In the smaller, inner circle are not solely the key overarching concepts, but other ideas linked in equally interesting ways. For example, while identity has a significant number of nodes emerging from it...

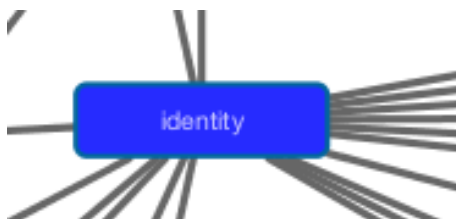


Figure 3: Identity node in circular network diagram showing the significant number of nodes emerging from it.

...so, too, does the affective node (albeit predominantly in one dominant direction).

It may be that emotions/affect are as important to the study as identity.



Figure 4: Affective node in circular network diagram showing a dense clustering of nodes emerging. This suggests that although 'affect' is not a key over-arching concept in the study, it cuts across a number of key concepts and is of importance to the study.

The organic network diagram gives further insight into these surprising relationships, demonstrating how increased body-awkwardness and risk-taking (seemingly only weakly connected), may find common conceptual ground in the affect and emotions of an adolescent.



Figure 5: Affective node in organic network diagram showing the cross-cutting nature of the topic area.

As a result, I decided not to impose a pre-decided hierarchy on the diagrams through colour, but to use colour and size of node as a way of remaining open-minded about the relative importance of different concepts and topics with the data gathering and analysis stages.

The intensely linked nature of the conceptual framework is further highlighted by the interrelationships in the inner circle of nodes.

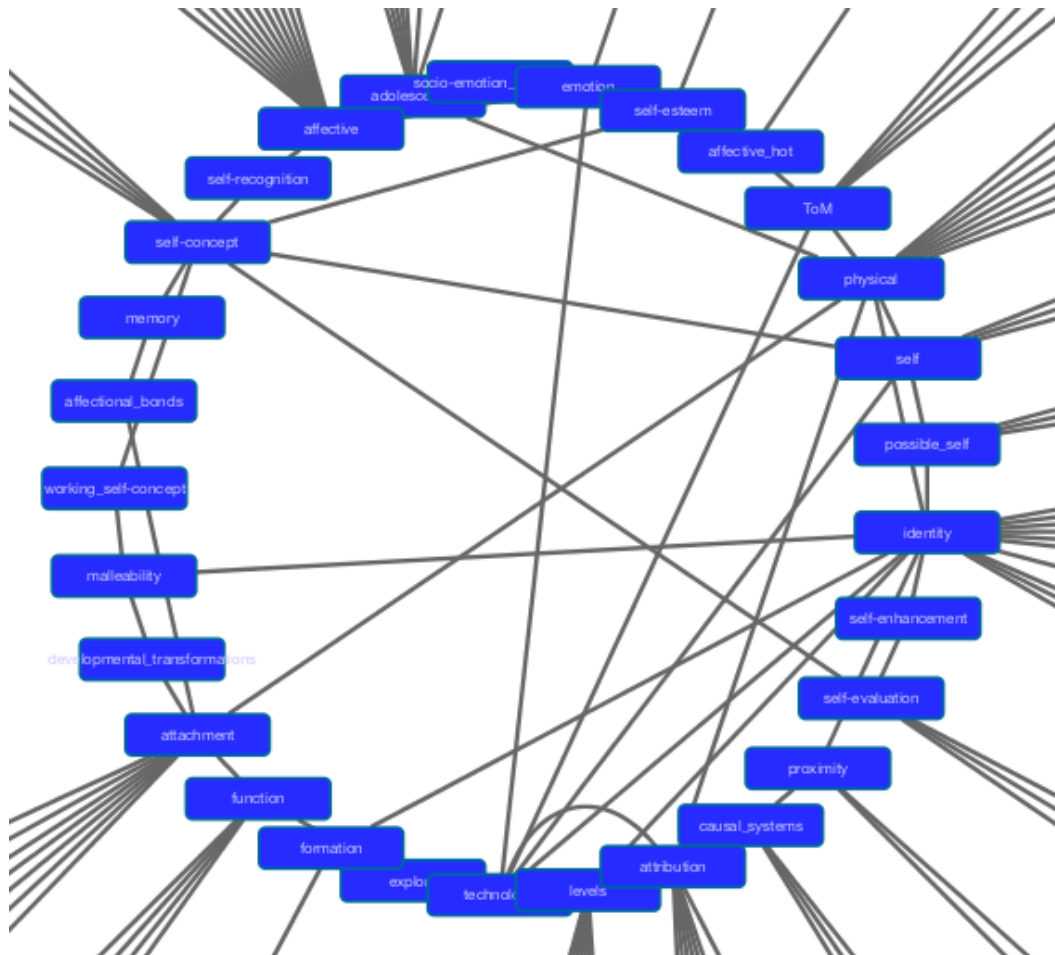


Figure 6: Inner circle of nodes on circular network diagram. There are more nodes emerging from this inner circle than there are cutting across it.

5.2 Hubs

There are, however, some obvious hubs made explicit in the network diagrams. By 'hubs' I mean a focal point emerging from within the literature, and of importance to the study. Identity and self (as reflected in the literature and in the way I have

chosen to approach them in this chapter) are closely located, share many characteristics and descriptions, but are separate.

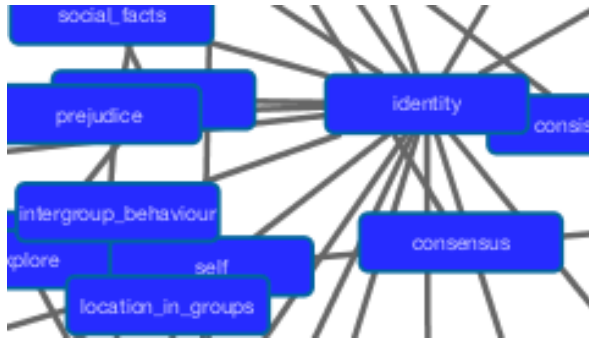


Figure 7: Identity and self hubs in organic network diagram

5.3 Outliers

Outlying concepts in the organic network diagram provided me with significant pause for thought. For example,



Figure 8: Outliers on organic network diagram showing the remote location of the node 'social cognition'



Figure 9: Adolescence on organic network diagram, with 'social cognition' absent.

Arguably, social cognition should be the core of both diagrams, with mental templates as a key construct within that core. The organic diagram, however, suggests something different. In its place at the top left of the diagram (see Figure 8), it may cast a shadow over every other construct and idea present, but it does not look like the foundational concept. Rather, the concept at the foundations of the diagram is adolescence (see Figure 9), linking out to every other node on the diagram in range, if not in density. This highlighted to me an important point. Social cognition as a concept was not likely to be the study's foundation; rather adolescence, and by association my participants, were to be the heart of the process and the findings.

5.4 Moving forward

This chapter has ranged widely across disciplines and fields. Together, these create the landscape upon which this study is founded. These literatures tell us that adolescence is a time of significant physiological, neurological and psychological change, and suggest that those young people managing to navigate such extreme changes with relative equanimity must necessarily be a source of some interest. They do not navigate the period in a vacuum, however, and sociological commentaries enable us to perceive adolescence in more holistic and environmental ways.

The chapter also discussed some of the key findings emerging from the literature on adolescents girls' use of technology. What is striking about this literature is how much of it is descriptive or commentary; very little of it appears to

draw on theoretical advances in Science and Technology Studies or from biosciences about the factors influencing young women's use of technology, or the ways in which they might actively change the technologies they use. This is reinforced by a lack of clarity on what we understand by technology in the STS and technology for learning literatures.

The chapter also delved into the aspects of social cognition I explored during this study. Some of these aspects have more cross-fertilization than might have been expected as I found in my network analysis of the topics, suggesting that the interconnected and interwoven nature of the concepts might be important at the composite analysis stage of the study, even if the data gathering processes were looking relatively discretely at each social cognitive aspect.

This broad overview of the literature has helped me to begin to problematize the key questions to which this thesis aims to respond. We can begin to ask ourselves why it is that, given we know that most adolescents draw on a range of social cognitive skills and environmental factors to navigate the turbulence of adolescence with relative calm, we continue to see a negative rhetoric surrounding the age range. In addition, given that we have relatively little consensus surrounding our relationships with technology, why is it that we continue to see technology blamed for undesirable outcomes in adolescence? But most importantly, we can begin to make explicit the ways that young people themselves understand their own technology use, and the use of those around them.

Chapter 3: Methodology

This chapter discusses the methodology used during the study. It begins by outlining the research questions, introducing the sample in order to provide a data gathering context, and exploring the study's epistemological and interdisciplinary foundations. Next, I discuss each of the data collection methods used, the data organisation and processes for analysis and development of theory. The penultimate section reviews the way in which the trustworthiness of the data has been assured, including a consideration of the study's ethics and the way the data have been aggregated. In the final section I reflect on the effectiveness of the approach taken.

1. The research questions

Chapter 2 outlines the key concepts that frame this study. It demonstrates that we know a great deal about young women's use of technology (boyd, 2014) and a correspondingly significant amount about technological development (e.g. Feenberg, 2010), puberty and adolescence (e.g. Coleman, 2011) and social cognition (e.g. Augustinos, Walker and Donaghue, 2006).

What Chapter 2 also demonstrates, however, is that we have a very limited understanding of what it means to be a pubescent or pre-pubescent girl, interacting with a range of worlds online. We do not know how young women understand online environments and the people they encounter there; how they form, maintain or end friendships and relationships; or the way they develop their own self-concept

in the context of these experiences. This is the gap that this study seeks to address: the *interplay* between adolescence, technology use and developing social cognition.

The overarching research question is therefore:

What is the interplay between pre-adolescent and adolescent girls’ social cognition and their use of interactive digital technologies outside school?

From this flows the sub-questions in Table 4. These are addressed in the thesis, but primarily in Chapters 4 and 5 which discusses the composite analysis and resultant theoretical framework:

Sub-question	Thesis chapter
How should we understand digital technologies in pre-adolescent and adolescent informal contexts?	2, 5
What is the nature and extent of technology use beyond school in the study?	4
Is there a relationship between adolescent girls’ use of technology and their sense of self? If so, what can we understand about that relationship?	4
Is there a relationship between adolescent girls’ use of technology and their identity? If so, what can we understand about that relationship?	4
Is there a relationship between adolescent girls’ use of technology and their relationships with others? If so, what can we understand about that relationship?	4
Is there a relationship between adolescent girls’ use of technology and the way they attribute activity and motivations to others? If so, what can we understand about that relationship?	4
Is there a relationship between adolescent girls’ use of	4

technology and the ways they understand others' minds? If so, what can we understand about that relationship?	
How can we conceptualize the relationship between the aspects of social cognition explored in this study and adolescent girls' technology use in informal settings?	5
What does the analysis mean for girls and young women?	5, 6

Table 4: Research sub-questions.

I used 'adolescent' as shorthand to describe both pre-adolescent and adolescent aspects of the study, except where there were distinctive findings relating to age. The research sub-questions were reviewed quarterly throughout the project to assess their relevance.

2. The sample

This study was not about providing findings that could be generalized to a parent population. It was about learning from the participants' unique, individual experiences (Coolican, 2009). As a result, I used a purposive sampling technique to gather the research participants (Cohen, Manion and Morrison, 2007). The sample was influenced in part by my upgrade, in which it was suggested that I may wish to increase the sample at either end of the age range in order to get a better sense of the contrast from pre- to late adolescence and to improve heterogeneity (Cohen, Manion and Morrison, 2007).

Purposive sampling requires the researcher to identify participants that are typical (or atypical) of the characteristics being explored within the study. I specified the following criteria for participants in the sample. They had to be:

- female

- willing to speak freely with me
- Midlands-based (to facilitate manageable face-to-face data gathering and because the Midlands, as well as being located in the centre of the country geographically, also reflects the centre of the country in socio-political terms)
- aged between 8 and 18, but with most participants at either the lower or upper age range
- from a range of socio-economic backgrounds, ideally from Groups B, G, H, L, M, P and Q according to the Acorn classification tool, which categorises the UK's population into demographic types (CACI, 2014).
- from a range of ethnic backgrounds
- high users of technology, meaning they used digital technologies for approximately more than one hour a day at the youngest age range, and more than three at the oldest age range.

This last criterion was important. I could have sought out exceptionally high users of technology (5+ hours a day outside school), or a contrasting group of young people who were highly technology-averse. However, although I wasn't expecting the findings to be generalisable across the population, it was important to root them in the everyday lives of a larger group of young women than at the extremes of use/not use.

Two sibling groups were included in the sample to enable comparison within and between families. The sample also contained participants with a range of religious orientations, although this had not been within the original criteria. The Midlands (East and West) is an area of the country that is more than geographically central.

I was keen to use informal networks (rather than school-based routes) in order to achieve the sample, as I did not want the participants to associate the study with school-based technology use (see Chapter 1). As a result, I contacted two youth groups (one based in Leicester and one in Birmingham), and put a call out for participants on social media (parent groups on Facebook and Twitter). The initial group of participants was expanded via my own social network after my upgrade, during which the examiners suggested I may want to increase the sample at either end of the age range. Four participants joined the study after this call (CE10, IL12, JL4 and CI6). I had only met MR8 prior to this study (she was one of two young people who participated in the pilot study, and was included for comparison as well as to gain a more longitudinal insight).

It is possible that all of these criteria and the choices I made have skewed the data in one direction or another. Young people who are religious may have particularly distinctive relationships with their parents, for example, and the sister dyad and triad may have weighted the findings towards one direction because of a common home environment. The benefits of insight afforded by these factors,

however, outweigh the risks, on the condition that no inappropriate claims are made for the generalisability of the data.

In hindsight, it would have been interesting to also seek out a smaller number of negative cases; that is, participants who were technology-averse or who did not use technology to any great extent. This would have provided a contrast with the group included here, although it would not have been wholly in the spirit of purposive sampling.

Below is a summary of each participant and the extent to which they took part in the study. Before beginning the data gathering I attempted to assign each participant a pseudonym; I found it impossible to be impartial about ethnic or class-oriented name sources, or to avoid cultural appropriation. As a result, I assigned each participant a code based on two random letters and a random number generated online.

2.1 FA1

Participant FA1 was 17 years old at the time of the study. Based in a city in the West Midlands, she lived with her sister, SS2, and parents. The family falls within the Acorn category M. They are White British and devout Christadelphians.

Data gathering exercise	Participated
Interaction 1: All about me	Y
Interaction 2: A day in the technological life of...	Y
Interaction 3: Relationships with others	Y
Interaction 4: Strange Stories	Y

Interaction 5: Why do people do the things they do?	Y
Interaction 6: My possible self	Y
Sister dyad interview with SS2	Y

2.2 SS2

Participant SS2 was 15 years old at the time of the study. Based in a city in the West Midlands, she lived with her sister, FA1, and parents. The family falls within the Acorn category M. They are White British and devout Christadelphians.

Data gathering exercise	Participated
Interaction 1: All about me	Y
Interaction 2: A day in the technological life of...	Y
Interaction 3: Relationships with others	Y
Interaction 4: Strange Stories	Y
Interaction 5: Why do people do the things they do?	Y
Interaction 6: My possible self	Y
Sister dyad interview with FA1	Y

2.3 EE3

Participant EE3 was 17 years old at the time of the study. Based in the East Midlands, she is an only child, living with her parents in a small town. The family falls within the Acorn category G. They are White British and Jewish.

Data gathering exercise	Participated
Interaction 1: All about me	Y
Interaction 2: A day in the technological life of...	Y

Interaction 3: Relationships with others	Y
Interaction 4: Strange Stories	Y
Interaction 5: Why do people do the things they do?	Y
Interaction 6: My possible self	Y
Interview	Y

2.4 JL4

Participant JL4 was 9 years old at the time of the study. Based in the East Midlands, she is youngest of three children, who all live with their parents in a small village. Both her siblings participated in this study (CE10 and IL12). The family falls within the Acorn category B. They are White British and do not consider themselves to be religious.

Data gathering exercise	Participated
Interaction 1: All about me	Y
Interaction 2: A day in the technological life of...	Y
Interaction 3: Relationships with others	Y
Interaction 4: Strange Stories	Y
Interaction 5: Why do people do the things they do?	Y
Interaction 6: My possible self	Y
Sister triad interview with CE10 and IL12	Y

2.5 TL5

Participant TL5 was 10 years old at the time of the study. Based in a suburb in the East Midlands, she is the eldest of four children, who live together with their parents. The family falls within the Acorn category E. They are White British and

Church of England. As the study progressed TL5 said she believed herself to be an atheist.

Data gathering exercise	Participated
Interaction 1: All about me	Y
Interaction 2: A day in the technological life of...	Y
Interaction 3: Relationships with others	Y
Interaction 4: Strange Stories	Y
Interaction 5: Why do people do the things they do?	Y
Interaction 6: My possible self	Y
Interview	Y

2.6 CI6

Participant CI6 was 17 years old at the time of the study. Based in a city in the East Midlands, she is the eldest of two children, living predominantly with her mother. The family falls within the Acorn category L. They are of mixed race and do not consider themselves to be religious.

Data gathering exercise	Participated
Interaction 1: All about me	Y
Interaction 2: A day in the technological life of...	Y
Interaction 3: Relationships with others	Y
Interaction 4: Strange Stories	Y
Interaction 5: Why do people do the things they do?	Y
Interaction 6: My possible self	Y
Interview	N

2.7 HA7

Participant HA7 was 9 years old at the time of the study. Based in the east of England, she is the eldest of three children, living with her parents and an au pair in a small city. The family falls within the Acorn category B. They are White British and Jewish.

Data gathering exercise	Participated
Interaction 1: All about me	Y
Interaction 2: A day in the technological life of...	Y
Interaction 3: Relationships with others	N
Interaction 4: Strange Stories	N
Interaction 5: Why do people do the things they do?	Y
Interaction 6: My possible self	Y
Interview	Y

2.8 MR8

Participant MR8 was 17 years old at the time of the study. Based in the West Midlands, she is the eldest of two children, then living with her parents in the suburbs of a city. The family falls within the Acorn category H. They are White British and do not consider themselves to be religious.

Data gathering exercise	Participated
Interaction 1: All about me	Y
Interaction 2: A day in the technological life of...	Y
Interaction 3: Relationships with others	Y
Interaction 4: Strange Stories	Y

Interaction 5: Why do people do the things they do?	Y
Interaction 6: My possible self	N
Interview	Y

2.9 LS14

Participant LS14 was 15 years old at the time of the study. Based in the West Midlands, she is the eldest of two children, living with her parents in a small city. The family falls within the Acorn category G. They are of mixed race and do not consider themselves to be religious.

Data gathering exercise	Participated
Interaction 1: All about me	Y
Interaction 2: A day in the technological life of...	Y
Interaction 3: Relationships with others	Y
Interaction 4: Strange Stories	Y
Interaction 5: Why do people do the things they do?	Y
Interaction 6: My possible self	Y
Interview	Y

2.10 TR9

Participant TR9 was 16 years old at the time of the study. Based in the East Midlands, she is the eldest of two children, living with her parents in the suburbs of a small city. The family falls within the Acorn category H. They are White British and Jewish.

Data gathering exercise	Participated
Interaction 1: All about me	Y
Interaction 2: A day in the technological life of...	Y
Interaction 3: Relationships with others	Y
Interaction 4: Strange Stories	Y
Interaction 5: Why do people do the things they do?	Y
Interaction 6: My possible self	Y
Interview	Y

2.11 CE10

Participant CE10 was 11 years old at the time of the study. Based in the East Midlands, she is the middle of three children, living with their parents in a small village. Both of her siblings (JL4 and IL12) participated in this study. The family falls within the Acorn category B. They are White British and do not consider themselves to be religious.

Data gathering exercise	Participated
Interaction 1: All about me	Y
Interaction 2: A day in the technological life of...	N
Interaction 3: Relationships with others	Y
Interaction 4: Strange Stories	Y
Interaction 5: Why do people do the things they do?	Y
Interaction 6: My possible self	N
Sister triad interview with JL4 and IL12	Y

2.12 HN11

Participant HN11 was 10 years old at the time of the study. Based in the East Midlands, she is the middle of three children, living with their mother and stepfather in a small city. The family falls within the Acorn category Q. They are mixed race and do not consider themselves to be religious.

Data gathering exercise	Participated
Interaction 1: All about me	Y
Interaction 2: A day in the technological life of...	Y
Interaction 3: Relationships with others	Y
Interaction 4: Strange Stories	Y
Interaction 5: Why do people do the things they do?	Y
Interaction 6: My possible self	N
Interview	N

2.13 IL12

Participant IL12 was 15 years old at the time of the study. Based in the East Midlands, she is the eldest of three children, living with their parents in a small village. Both of her siblings (CE10 and JL4) participated in this study. The family falls within the Acorn category B. They are White British and do not consider themselves to be religious.

Data gathering exercise	Participated
Interaction 1: All about me	Y
Interaction 2: A day in the technological life of...	Y
Interaction 3: Relationships with others	Y

Interaction 4: Strange Stories	Y
Interaction 5: Why do people do the things they do?	Y
Interaction 6: My possible self	Y
Sister triad interview with CE10 and JL4	Y

2.14 WA13

Participant WA13 was 10 years old at the time of the study. Based in the East Midlands, she is the middle of three children, living with her mother in a small city. The family falls within the Acorn category Q. They are White British and do not consider themselves religious. WA3's contribution to the study was intermittent due to economic and relationship challenges within her home life.

Data gathering exercise	Participated
Interaction 1: All about me	Y
Interaction 2: A day in the technological life of...	Y
Interaction 3: Relationships with others	N
Interaction 4: Strange Stories	N
Interaction 5: Why do people do the things they do?	Y
Interaction 6: My possible self	N
Interview	N

The majority of the participants, therefore, took part in most of the data collection. Despite a small number failing to participate in the interview or individual Interactions, I was pleased at the levels of commitment and interest displayed over the twelve-month data-gathering period. I believe this reflected the positive and trusting relationship I developed with the participants, achieved

through honest initial encounters (see informed consent below), developing a sense of shared endeavour (creating more nuanced reflections of adolescence in society) and sensitive ongoing email exchanges.

3. Epistemological and interdisciplinary foundations

A number of perspectives have informed this study. They come together like pieces of a puzzle, each contributing an idea, image or metaphor that are the epistemological foundation of this work. They are all, to some degree, choices that relate to the interdisciplinarity that lies at the heart of the study; because I have been working at the intersection of several disciplines, there was a need to be pragmatic about the approach and outcomes possible. Because this interdisciplinarity called for intimate, deep work with a small number of participants, an interpretivist approach was appropriate. In this section, I will explore these ideas in detail.

3.1 Interdisciplinarity: Pandora's Box

This study lies at the intersection of several disciplines. The conceptual framework is rooted in social psychology, but it also draws on endocrinology, neuroscience, and sociology. Data gathering techniques and analysis techniques are drawn from psychology and social research.

This is not an unusual circumstance in contemporary social research; there are many questions that cannot be answered within a single discipline. However, while interdisciplinary research techniques and practices offer exciting

opportunities for addressing wider social questions, they also reveal a range of challenges for the researcher. I will look at the challenges that are especially pertinent in this section, outlining some of the responses I devised and used during the study.

3.1.1 The limitations of a discipline-focused approach

Instead of thinking about the nature of a discipline, it became more helpful to think about the nature of the data being considered. This applied to both the literature scanning phases and in reflecting on the data collected. How was the data derived? What was the epistemological position of the researcher? What does this mean for what can be said about the data? For example, developmental psychology contains some common assumptions:

- Human beings change as we age. Those changes are as a result of the interaction between nature and nurture influences.
- Development happens in stages.
- The most interesting time to study these changes is during childhood.

All of these assumptions would benefit from perspectives from other disciplines and methodological perspectives. The field of neuroscience has revealed how much neurological change happens after entry into adulthood, suggesting capacity for impressive growth throughout the life course. Social psychologists have revealed the importance of the individual-in-social-context when considering development. Sociologists have enabled us to see that the ecologies surrounding an

individual cannot easily be encapsulated into identified nature or nurture categories.

Taking a data-focused approach meant that it became possible to use tools developed in one discipline to gather data in a format evolved in another discipline. The most significant challenge emerging from a data-focused approach was finding ways of bringing data together to develop the conceptual framework for the study, and also to analyse data. To do this I drew on Repko's work on interdisciplinary research processes (2008).

Repko expresses the principles of interdisciplinary research as a series of four metaphors (2008, pp.22-24). 'Bilingualism' and 'boundary crossing' were not applicable to this study. However, I did draw more heavily from the final two metaphors:

- bridge building, in which resources are shared between disciplines, using explicit structures much like a large-scale bridge between two shores. This approach was particularly attractive because I acknowledged in myself a need to 'only connect' (Forster, 1910) – to create connections between people, actions and ideas - and the bridge building metaphor was very satisfactory from that perspective.

- mapping, in which the researcher maps data in a systematic and integrated way by breaking a research question down into constituent parts and looking at the relationship between those parts. This is what I attempted to do by having a conceptual framework conceived prior to the data gathering. Repko

claims that a weakness of this metaphor is that geographical land that is mapped through cartography is relatively immovable, whereas in social research we are often mapping changing 'landscapes'. On the contrary, I have found the idea of mapping a changing landscape to be helpful in this study, as it has encouraged regular reflection on both the established research on 'static' versus 'dynamic' human characteristics, and the implications of my own data for analysing change over time.

Repko advocates an integrated approach. He provides a clearly structured sequence for achieving this:

1. Define the problem or state the focus question.
2. Justify using an interdisciplinary approach.
3. Identify relevant disciplines.
4. Conduct a literature search.
5. Develop adequacy in each relevant discipline.
6. Analyze the problem and evaluate each insight into it.
7. Identify conflicts between insight and their sources.
8. Create or discover common ground.
9. Integrate insights.
10. Produce an interdisciplinary understanding of the problem and test it. (Repko, 2008, p.142)

This apparent simplicity was very attractive at the start of the research process. However, unsurprisingly, the reality of this process has been messier and more cyclical than this simple sequence initially suggested. I revisited the literature repeatedly throughout the study, evaluating insights into the problem as I progressed, rather than as an explicit stage. I sought common ground since the first literature search.

3.1.2 Conflict in interdisciplinary research

Identifying and examining conflicts has been a recurring theme in developing an understanding of the existing literature, in examining my own and the secondary data, and in contextualising my emerging findings in the real life experiences of my participants.

At the conceptual framework development stage, conflicts largely arose because of paradigmatic differences both within disciplines and between them. For example, referring back to developmental psychology, with its focus on the stages of individual experience, can be very different from the sociology of adolescence, with its focus on social roles and cultural and gender variation. These are not necessarily alternating perspectives. Rather, the role of the interdisciplinarian is to make explicit these conflicts, find resolution in language, construct or data where possible, but also to maintain parallel perspectives until an evidence-based resolution occurs.

I began this stage by drawing up complex tables of findings from parallel fields with similar thematic elements, but quickly realized that all this was doing was further embedding the disciplinary divides I was attempting to work beyond. I was not identifying existing conflicts; I was embedding them. For example, in reviewing the sociological and psychological literature on adolescence, I found that the psychology literature indicated a more linear, developmental lens as opposed to the more individualistic perspectives of the sociology literature. Placing these in opposing columns in a table was not a helpful way to reflect upon them, or to ensure that I explored this as a theme if it arose in the data, because it was highly unlikely that a small study of this sort would resolve such a conflict. Instead, I chose to draw all findings relating to a theme (for example, 'self' or 'adolescence') from across the literature and give them equal weighting. I also explicitly reflected on the limitations of each study, taking into account the data collection method and context. This approach continued to be productive at the analysis stage, where I drew thematic links between emerging themes.

What became apparent as the study progressed, was that using tools derived in a positivist setting in a predominantly qualitative study, using an interdisciplinary conceptual framework, was going to present both opportunities and risks. There were, however, precedents for this (although not within this particular topic or anything similar) from the field of qualitative psychology. Qualitative psychology has evolved out of a meeting between a desire to understand the world, and a desire to understand individuals. This makes it a

helpful bedfellow for interdisciplinary studies, and provides another piece of the epistemological puzzle comprising this. Ashworth (in Smith, 2008) outlines the possible epistemological positions qualitative psychologists may take and the implications for their practice:

- an acknowledgement that we *may* derive objective variables that enable us to understand our world, and that the physical world is largely comprised of cause and effect. This would seem to be an alignment to purely empirical or rationalist epistemologies. However, qualitative psychologists have not been averse to accepting interpretivist stances. For example, Kelly's influential personal construct theory (1955), with its valuable Repertory Grid tool, focuses on construction rather than perception. Mead's symbolic interactionism (Blumer, 1969) is similarly constructionist in orientation, and also places language and symbols at the heart of the research process.
- Qualitative psychologists seek the unique experiences and behaviours expressed by individuals. Allport's work on idiography is core to this position, although Allport himself took a pragmatic approach to data gathering, using any means he deemed appropriate to investigate the individual (Allport, 1965).
- Our understanding of the world may be conceptualised phenomenologically through our perceptions, and the meaning we ascribe to those perceptions. In the phenomenological paradigm, the participant's experience, self-perspectives and reports are the heart of the research

(Coolican, 2009). I would not claim to have taken a wholly phenomenological stance throughout this study. This is because phenomenology operates within a pre-established conceptual framework that also draws on cognitive and developmental schools of thought (although this approach has been used by phenomenological psychologists who seek to establish the universal elements of all lifeworlds (e.g. selfhood, Ashworth and Chung, 2006). However, this principle of eliciting and prioritising participants' experience has permeated this study, particularly during the interview phase.

Qualitative psychology seemed to provide an appropriate meeting place for the disciplines involved in this study. Having progressed along this path for most of the study, it was during the analysis phase that it became evident that this had been the correct choice; it has facilitated common ground and integration.

3.1.3 Common ground and integration

Repko discusses a range of techniques that enable the researcher to find common ground between disciplines. The one most relevant to this study is the technique of *extension*, in which a concept or idea is extended beyond its originating discipline into another, or even across other boundaries such as time, culture, gender or ideology (Repko, 2008, pp.286-287). In this study I have extended the concept of social cognition into the social research sphere and between individuals, although I have maintained gender boundaries for the reasons discussed elsewhere.

The value of extension, like other integrative techniques, is that extensions encourage both researcher and participants to work within an inclusive mindset. No conceptual perspective is rejected. Rather, we aim to see the links between our interdisciplinary conceptual understandings, while making explicit our conflicts and differences so they can be explored in a rational and systematic way. Playfulness and flexibility are important (Klein and Newell, 1997).

Repko agrees that creativity and intuition play a role in finding integrative models and metaphors that adequately respond to a research question. They also correspond well to the ‘uncertainty and orderliness’ of the pragmatic research process. However, in this study, I have found that without disciplinary insight and systematic process, creativity and intuition risked becoming aimless and unfocused. This means that integration must be an explicit process, that examines concepts, ideas and data in a way that acknowledges common ground and, where possible, resolves conflict and enables the researcher to think in nonlinear ways (Klein and Newell, 1997; Nikitina, 2005). Integration happens when the new idea, concept, theory or metaphor is more than the sum of its disciplinary parts (Repko, 2008). The integrated understanding can be represented as a metaphor, model, narrative, application or product. This can then be tested.

3.2 Interpretivism and pragmatism

At the start of this section, I explained that because of the interdisciplinary nature of this study, interpretivist and pragmatic perspectives became part of the

epistemological puzzle that is the foundation of this work.

I would not consider myself an ‘interpretivist’. Rather, the nature of this study is such that interpretivism has provided routes into ensuring the data, although largely subjective, are robust and used appropriately. Interpretivism enables the researcher to identify and acknowledge the important role of power in the data gathering process and the ways in which researcher and participant move together towards ‘negotiated meanings’. For example, in researching with adolescents we enter into a position of trust; we are asking a participant to reveal something of themselves to us, as adults and as perceived representatives of authority. Trust and power do not always make comfortable companions for adolescents. Once we know this, we can create structures that move towards negotiated meanings. We do this by creating research instruments and data gathering contexts that do not maximize our adult power, by approaching interviews with respect and acknowledgement of time given, and by analyzing data with the concept of power in mind.

“What is overlooked about such negotiated meanings, observes Bernstein, is that the very process whereby one interprets and defines a situation is itself a product of the circumstances in which one is placed...power...”

(Cohen, Manion and Morrison, 2007, p.25)

Some aspects of interpretivist research resonate more deeply with this study than others. Table 5 summarizes these differences.

Aspects of interpretivism	Resonance	Divergence
<p>'Concern for the individual' and 'understanding from within' (Cohen, Manion and Morrison, p.21, 2007)</p>	<p>The majority of the data collection methods in this study are intended to explore individuals' perspectives. This is not unique to interpretivism; qualitative psychology is ripe for interpretivist approaches; tools developed are robustly tested, and then used to illuminate individual lives.</p>	
<p>Exploring intentional behaviours and a focus on establishing the intentional or unintentional meaning behind action (Blumer, 1969)</p>	<p>The focus on young women's developing online lives and social cognition is the ideal context for exploring the meaning behind action. Online activity provides a tangible manifestation of the participants' attitudes, growth and emotions.</p>	
<p>Context is fluid and fundamental to understanding individuals. People are ever-changing. There are many possible interpretations for both context and people. 'Thick descriptions' are therefore crucial. By thick descriptions, I mean ways of gathering and interpreting data that explore not just the individual, but also the</p>	<p>Much of this study aims to provide a thick description of the participants' lives and experiences, and acknowledges alternative interpretations of the data.</p>	<p>However, we know from the psychology literature that there are static as well as malleable aspects to social cognitive development. In taking an interdisciplinary approach, it is important to account for existing knowledge in the analytical stage in particular.</p>

wider context (Geertz, 1973).		
Emergent, rather than revealed, theory (Cohen, Manion and Morrison 2007)		Primary data collection in this study is focused on a range of pre-established areas. Secondary data analysis also seeks data in pre-specified areas. Arguably this means data has been found because it has been sought, rather than because it exists in a meaningful way for participants. In this study, theory serves to frame, indicate and signpost.
Theory as a diverse set of meanings, rather than a single collective reflection of a single reality (Cohen, Manion and Morrison, 2008)	Interdisciplinary social research yields diverse sets of meanings, and this study has been no exception. It is not, however, case study research.	

Table 5: Resonances and dissonances with interpretivist paradigms.

Thus the challenge of operating in this paradigm is to find ways of using language that are precise and trustworthy, without claiming beyond the boundaries of the study (Cohen, Manion and Morrison, 2007). I use the term ‘claiming beyond’ rather than ‘over-claiming’ advisedly; a pragmatic approach does not place methods in a hierarchy, and I am not stating that a normative paradigm would enable a more impressive claim than an interpretive paradigm might. Rather, I am interested in the *kind* of claim that might be made on the basis of an interpretive paradigm as opposed to a normative one, and the pragmatic change those claims might effect.

In 2010, at the start of this research process, I wrote an assignment in which

I reflected on two epistemological schools of thought in relation to my developing research: pragmatism and social constructivism. In the assignment, I drew the conclusion that my work was more closely aligned to pragmatism than to social constructivism.

Pragmatism as a theoretical construct emerged with the work of Dewey, Pierce and James in the late 19th century. After an initial acceptance, it diminished in importance for nearly one hundred years when Rorty once again brought it to prominence (see Delanty, 2005 for a helpful historical overview). Pragmatism is not a monolithic construct. Rather, it comprises several similar schools of thought that overlap and are concurrent, but are not identical. Five strands of common thought can be identified (identified by Baert, 2005) that have influenced this study: active knowledge (Baert, 2005), the importance of conceptual context (Preyer and Peter, 2005), making a difference (James, 1890), 'commitment to uncertainty' (Feilzer, 2010, p.14) and methodological diversity (Tashakkori and Teddlie, 2003). Thus, the study has given considerable weighting to the stories and experiences of individual participants. Acknowledging the importance of physiological change for adolescents has been the most important contextual aspect of the study. As will be seen as this thesis unfolds, I have raised as many questions as I may have answered. For now, however, with these epistemological issues in mind, I will introduce the diverse range of methods used in the study to explore each aspect of social cognition, and its interplay with technology use.

4. The methods

Having considered the epistemological and interdisciplinary foundations of this study, I will now provide a brief overview of the methods used, before defining each in more detail. For each, I will review the opportunities and limitations afforded by the method, demonstrate why the method was effective in this context and how it addressed the research question.

4.1 Overview

This study comprised six exploratory instruments delivered online and via email to each participant. I was also able to interview most of the participants during the final two months of the data-gathering period.

Table 6 provides an overview of the data collected.

Interaction	Aspect	Source	Time
I1: All about me	Self	Adapted from the Twenty Statements Test (Kuhn and McPartland, 1954)	Sept 2012
I2: A day in the technological life of...	Usage levels	Diary (original tool)	Oct – Nov 2012
I3: Relationships with others	Attachment	Adapted from Adolescent Attachment Questionnaire (West et al., 1998)	Dec 2012 – Jan 2013
I4: Strange Stories	ToM	Mental state stories adapted from Strange Stories (White et al., 2009)	Jan – Feb 2013
I5: Why do people do the things they	Attribution	Scenario-based original tool	Mar – Apr

do?			2013
I6: My possible self	Self and identity	Original question based on possible selves evidence base	May – June 2013
Interview	All	Semi-structured interview schedule	Aug – Oct 2013

Table 6: Data collection overview.

I will first review each of the methods used for primary data collection. The first six research tools were implemented via email. This modality offers specific opportunities and challenges (Markham, 2004), but primarily using email facilitated ease of data collection across a geographical area, and enabled participants to complete the instruments in their own time. Arguably gathering data in this technologically-mediated way could have an impact on the data. Technology-mediated data gathering can provide a context that enables participants to be more open (e.g. Gibbs et al., 2002) with the unseen researcher, but can also lead to participants being more likely to embellish or omit pertinent information (e.g. Gibbs *et al*, 2002), which could otherwise be elicited by the researcher in a face-to-face context. I mitigated against these risks by using the post-Interaction emails to explore issues in depth and by repeating questions across the Interaction process.

4.2 Interaction 1: All About Me: a tool for investigating the self

This method was based on a well-established tool in psychology called the Twenty Statements Test (Kuhn and McPartland, 1954). It has been used in a large number of studies to investigate self-concept in relation to diverse topics such as gender (e.g.

Grace and Cramer, 2002), teacher motivation (e.g. Klassen and Chiu, 2011) and power (Kraus, Chen and Keltner, 2011). However, there have been relatively few studies that examine the mechanisms behind the self-descriptors generated by the participants. I aimed to address this in a small way in this study.

Participants in this study were asked to complete the adapted version of the Twenty Statements Test (TST) in the following way.

1. In the space below, please write twenty answers to the question 'Who are you?' Don't worry if you can't think of twenty.

You can write anything you like, but here are some examples:

I am tall.

I am in the football team.

I like listening to music.

I don't like broccoli.

I am a happy person.

I am an unhappy person.

I am a girl/woman.

2. Once you've finished your twenty statements, if you would like to, try to put your statements into the following categories:

- My physical body (e.g. I am tall).
- What I do with other people (e.g. I am in the football team).
- The kind of person I am (e.g. I am a happy person).
- Big ideas (e.g. I am a human being)

If you don't understand this part of the activity, or don't want to do it, then ignore this instruction.

The Interaction was sent to the parents of the two youngest participants with the instruction to only read the instruction to the child if they struggled with some of the text. All participants were asked to return their responses by email.

Adaptations made were:

- simplifying the language significantly for a child/young person audience
- adding age appropriate but ungendered examples
- eliminating the stage asking participants to subcategorise into the oceanic, reflexive, social and physical (Zurcher, 1977), again because of the participant age range.

I piloted the adapted tool with one young woman I had worked with previously during the pilot study (Levine and Edwards, 2014). It was returned with no significant issues raised, bar some minor changes to language to address the age range of the participant group.

I chose the TST to be the opening Interaction because it:

- is simple to deliver and complete, particularly across the age range
- opens the data gathering with the focus firmly on the individual participant, for example from MR8.

I have brown, wavy hair that reaches just past my shoulders.

I roleplay online with multiple people.

I like to talk about anything and everything with my friends.

I try to be optimistic as much as possible.

I don't believe in God, but I believe in something. I just don't know what it is.

As with most tools, there are limitations to the TST, listed in Table 7.

Limitation	Mitigation
<p>A participant can complete the Test differently each time they do it (Augustinos, Walker and Donaghue, 2006).</p>	<p>Without running the Test repeatedly over a period of time (something I did not feel able to do given the time commitment already being asked of my participants), it provides only a snapshot in time, rather than any kind of stable view of a participant's self-concept. These descriptions are therefore said to have a variable 'probability value' (Carpenter and Meade-Pruitt, 2008). When the probability value is high, the traits described by the participants may be more extreme than may be typical for any reference group (ibid). As a result, it is considered important to analyse 'descriptiveness' and 'importance' independently when using the TST (Kihlstrom and Cantor, 1984). This was particularly apparent for me when analysing the data generated by the youngest participants in the sample. Their responses across many Interactions could be considered more extreme, suggesting a wider range across a normative group.</p> <p>I addressed this issue by introducing a different tool later on in the Interaction list that would touch on self-concept as well as exploring identity, thereby providing a little more of a view over time.</p>
<p>The TST is challenging to code because it is so open.</p>	<p>If there were a larger data set from which I was seeking comparative or generalisable messages, this criticism would have been more relevant. However, this tool was intended to help me gain an initial insight into the participants' perceptions of their self/selves, and as a result the variation and 'openness' of the participants' responses presented an opportunity rather than a risk.</p>
<p>Making comparisons between participants' responses is challenging (Augustinos, Walker</p>	<p>This was less of an issue for this study as I was not aiming to draw a large number of comparisons given the small, intensive sample I was using and the exploratory nature of the first Interaction.</p>

and Donaghue, 2006).	
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Table 7: Limitations of the Twenty Statements Test (TST) and mitigations.

In summary, despite its limitations, the TST offered a sensible first tool to use with participants, beginning to encourage their thinking about their own self-concept. It provided me with an early indication of participants' self-concept and in some cases, their developing identity. It also indicated the degree to which technology was an explicit or implicit part of their conscious self-concept.

4.3 Interaction 2: A day in the technological life of... : a tool for investigating extent of technology use

I wanted to explore participants' degree of breadth of technology use as early as possible, once they understood the reality of participating in the research process. As a result, the second Interaction asked the participants to provide a 24-hour diary of their technology use over a weekend. Participants were asked to make a record of every occasion in which they used any kind of technology in the following way:

What technologies do you use over 24 hours?

Choose a Saturday or Sunday to do this activity. Make a record every time you use technology. This includes mobile phones, video cameras or cameras, computers, gaming consoles or anything else that you think of as technology.

You can record this any way you like. You could use the notebook and pen that was provided in your starter pack. You could use a camera or video camera (if you would like to use one of these but don't have one, let me know and I can lend one to you). You could draw a set of pictures or sketches, or you could do all three.

For each record, please make a note of:

- the time you started using the technology
- how long you spent using the technology

- what sort of activity you did
- how you felt when you finished using the technology. You can record this in words or smiley faces or any other way you want. If you didn't feel anything, then don't worry about recording an emotion.

Don't worry if you forget to record an exact time or emotion – just do your best. 😊

At the end of the record please say whether this was an ordinary Saturday or Sunday for you, or whether it was unusual.

(See Appendix 1 for the full tool). The option to draw or record the technology was provided given the young age of some of the sample, although this option was not taken up by any participant. I chose to use a weekend for two reasons. Firstly, I did not want to disrupt their school day, and secondly, the focus of this study was on technology use outside of the school context.

An alternative approach would have been to create a more detailed, formally structured diary. For example, the diary might have contained information about where the participant was when they were using the technology, their level of confidence in that use, and whether a friend or family member was with them at the time. While this information would have been interesting, I felt it was important to minimize the amount of 'work' the participants had to do in order to quickly retrieve the most important information. I knew I could explore the relevant details via emails or during the interview process later in the study. Key to the task at hand was establishing whether these participants were, in fact, using technology as frequently as their parents and I thought they were. This

would confirm early on in the research process that the chosen participants were appropriate for the sample.

Another alternative would have been to use a free text diary, in which participants were asked to write as much or as little about their technological lives, perhaps over a longer period of time. This would have been more in keeping with Allport's idiographic perspective and the qualitative psychology approach overall. I decided against this because I did not want the data gathering to become burdensome, and because I suspected it would result in pockets of rich data from participants who enjoyed writing, but could produce large gaps from younger or more writing-averse participants.

The outcome of these deliberations was the creation of a light-touch, researcher-driven diary. The diary did not seek to explore much beyond a snapshot of the extent and nature of participants' technology use, with a rough indication of their feelings during that use. Although it gathered quantitative data in the forms of length of time used, I did not use the data in conventionally quantitative ways. For example, I did not use it to compare within the sample. Rather, this information was used to assess whether the participant was, as suspected, someone who used technology more than most of their peers might be expected to, based on the research done by Livingstone and her colleagues in the EU Kids Online team.

Table 8 details the approach limitations, and the mitigations I introduced.

Limitation	Mitigation
Diaries capture an 'ever changing present' (Plummer, 2000, p.43). Without ongoing commitment or repetition, they cannot give a sense of change over time.	This Interaction was not intended to provide any data on participants' use of technology and its changes over time. Rather, I intended to use this to confirm the participants' suitability for the project, and to give an initial indication of their technological interests and uses. I used subsequent email exchanges and the interview as opportunities to assess whether their use changed during the data gathering period. For example, TL5 started out the research process deeply interested in Zondle. During the data gathering period she moved away from this software, through a short period of playing Howrse frequently, to her high volume interest in watching gameplay on YouTube and a growing interest in coding games by her final interview.
This form of diary did not capture the detail of participants' lives or introduce a space for participants to reflect on their technology use.	Email exchanges and subsequent data gathering exercises reflected on these issues.
The need to limit the time commitment and maximize willingness from the participant.	I kept the length and burden of this tool to a minimum, as described above.
The need to account for the capability of the participant to complete the diary (e.g. levels of literacy).	I acknowledged that participants may not be able to contribute to a written diary, and as such offered an alternative to draw their diary, or make recordings of it on a loaned camera or video camera. None of the participants took up this offer, choosing to use the form provided instead.

Table 8: Limitations of the solicited diary

The diary was a tool with a specific purpose within clearly defined limitations, used to ascertain the participants' levels and nature of technology use.

To that extent it was successful. Were I to do the study again, I might be tempted to re-run this survey at several intervals (with participants' consent), to gain a deeper picture following key life changes, such as the start of menarche.

4.4 Interaction 3: Relationships with others: a tool for investigating attachment and relationships

The third Interaction comprised the completion of an online questionnaire that had been adapted and piloted during my previous Masters-level project (Levine and Edwards, 2014).

The questionnaire was based on the Adolescent Attachment Questionnaire (AAQ) (West et al., 1998) (see Appendix 2 for the adapted tool and introductory text). I chose this tool because:

- It has been tested within the field of psychology and is relatively robust (although there are inevitably issues with this that manifest more seriously in a conventional survey setting than in the study reported here).
- It is relatively brief, and given the time commitment asked from participants over the data gathering period, I wanted to keep each tool to a focused, core minimum of questions.

The AAQ gathers data against three attachment-related parameters: 'Angry Distress', 'Availability' and 'Goal-Corrected Partnership'. The Angry Distress scale measures levels of anger towards the parent. For example:

My parent only seems to notice me when I am angry.
I often feel angry with my parent without knowing why.
I get annoyed at my parent because it seems I have to demand his/her caring support.

The Availability scale measures the extent to which the respondent believes that the attachment figure is available to them, and vice versa. For example:

I'm confident that my parent will listen to me.
I'm confident that my parent will try to understand my feelings.
I talk things over with my parent.

The Goal-Corrected Partnership scale measures the extent to which the respondent reflects on others' perspectives, differentiates those perspectives from their own, and works with others to construct the relationship. For example:

I enjoy helping my parent whenever I can.
I feel for my parent when he/she is upset.
It makes me feel good to be able to do things for my parent.

My adaptation was to include parameters for online and offline friendships, thereby providing a technological and non-technological comparator for each participant, as well as an insight into their relationships with each parent. For example, the opening Angry Distress question became four options:

My mother only seems to notice me when I am angry.
My father only seems to notice me when I am angry.
My closest offline friend only seems to notice me when I am angry.
My closest online friend only seems to notice me when I am angry.

Each dimension contained three paired sets of questions. Each question was rated on a five-point Likert-type scale. Goal-Corrected Partnership and Availability were reverse scored. Scores are combined to provide a sub-score for each dimension. The higher the score, the more likely it is that there is a non-secure

attachment for the dimension (West et al., 1998, Levine and Edwards, 2014).

I used Kwiksveys to deliver the questionnaire. Kwiksveys was chosen for its ease of use and clean layout options. As with my Masters-level work, the questions were grouped in pairs, with linked questions sharing a page.

Although the AAQ is a questionnaire that can be run in large samples, and produces a quantifiable result, I used it in a new way in this study. Given that these sorts of tools can be used in clinical psychology to evaluate clients, it did not seem too outlandish to use a survey research tool in a more intimate way. Thus, instead of using a survey to gather data across a large sample, the survey became the beginning of an exchange about relationships with each participant, a source of discussion during the interview, and a way of looking at relationships in the analysis stage. I piloted this approach during my Masters study and found it to be both conducive to a pragmatic epistemology (i.e. outside the qualitative/quantitative paradigm), and was also a rich source of ensuing email exchange (Levine and Edwards, 2014). As a result, I used the same tool in the same way in this study. Limitations to using surveys in this way are outlined in Table 9 below.

Limitation	Mitigation
Although I could use the tool to explore participants' attachment types, I could say almost nothing about <i>why</i> those types resonated for them, whether the types were stable or in flux, or <i>how</i> they came about.	I used the survey as the beginning of an email exchange to explore participants' perspectives of these contextual matters, and for discussion during the interview.

<p>Surveys cannot easily demonstrate trends over time.</p>	<p>As with all of the Interactions described in this study, if I could have found a way of gathering continuous, or at least periodic data on <i>all</i> of the socio-cognitive parameters throughout the entire data gathering period, without being too intrusive on participants and their families, that would have been a wonderful opportunity to explore the stability of these parameters over time. It was, however, outside the scope of this initial study to do so.</p>
<p>Participants may not have felt ready to provide open or accurate responses to the survey. In addition, because the survey was delivered online for all bar the youngest of the participants, there was no way of knowing whether a friend or parent had been present during the Interaction completion, with implications for the replicability of the data.</p>	<p>Asking participants to respond on sensitive matters such as their relationships with parents and friends raises issues around gatekeepers, access and accuracy of response (Cohen, Manion and Morrison, 2007). This is compounded when responses are completed online, outside of the immediate control of the researcher.</p> <p>I addressed this issue in two ways. Firstly, I made it clear at the consent stage that we would be covering some potentially problematic areas, and communicated the process for dealing with disclosure issues clearly (see Appendix 8). I also explained to participants that I would protect their anonymity outside of the disclosure sphere. I repeated this at the start of the Interaction.</p> <p>Secondly, at the coding stage, I introduced an ‘accuracy’ code that would flag up any possible discrepancies, that might suggest social, environmental or parental pressure across the initial survey, email exchanges and during the interview. No issues were raised.</p> <p>However, if I were to run the survey again in any context, I would include a question that asks whether the respondent is completing the survey in private, with someone else in the room, or sitting together with someone else.</p>

Table 9: Limitations of using an established survey tool in a qualitative context

The AAQ served a useful purpose in opening a discussion about relationships with participants, and stimulating in some of them a more abstract

consideration of those relationships. However, it could not stand alone – it needed the additional email exchanges and discussion during the interview to become a whole greater than the sum of its parts.

4.5 Interaction 4: Strange Stories: a tool for investigating theory of mind/mentalizing

Once I had resolved to include Theory of Mind (ToM) or ‘mentalizing’ in this study, I explored the range of tools available for assessing ToM that could potentially be adapted. I settled on Strange Stories, a tool originally developed by Happé in 1994. Happé’s original set of 24 Strange Stories (1994) was designed to test people with brain lesions and those with advanced ToM ability. The first iteration had significant failings, predominantly around ‘weak central coherence’ (that is, the ability of the participant to bring disparate pieces of information together) (Happé et al., 1999). Two further iterations of the test were also found to have weaknesses in detecting subtle effects (Brent et al., 2004) and between different elements of the tests (Happé et al., 1994).

White et al. (2006) revisited the original Strange Stories set to investigate what the possibilities were for using the set robustly, and to establish its limitations. They were specifically looking to explore previous mismatches between findings relating to mental and physical states. This was not of relevance to the study reported here, but the format of the *mental state* stories (White et al., 2006, pp.1109-1111) provided a template for some new Strange Stories that were relevant to this study.

My adapted version comprised three one-paragraph 'stories'. Each Story comprises a realistic, simple account of an event that explores the non-literal choices and behaviours we experience in everyday life. The Stories I created for this study also explored issues such as lying, seeking sympathy and sensitive friendships, but each had a technology-mediated angle. I did not explicitly ask the participants to comment on the technology angle as part of the original instrument, as I was interested to see whether they would raise this as an issue spontaneously. The Strange Stories created for this study were not intended to serve the diagnostic or neuroscientific purpose of the original set or more recent adaptations. Rather, it was the principle of the approach for exploring ToM that was crossing into this social disciplinary domain.

Much of the research in this area is focused either on the early years and the acquisition of ToM (Doherty, 2008), or on autism and other neuro-atypical circumstances in which ToM is absent, delayed or impaired (e.g. Baron-Cohen et al., 1985). I excluded tools from the former set because:

- many require a face-to-face test
- young children and adolescents are very different. These tests required significant adaptation to be applicable to this study, and without the time or resources to test such adaptations widely (i.e. beyond the small scale piloting I was undertaking for the other tools) they became out of the scope of this study.

The main goal of piloting was to establish whether the Stories were subtle enough to engage the oldest participants in the sample, and sufficiently comprehensible for the youngest. Thus, the Stories devised for this study were piloted with two neurotypical young women, one at the lower end of the participant age range, and one at the upper. Each of the Stories were improved following the piloting process; the majority of these improvements were focused on clarity and syntax. For example, Question 2 originally read:

Dayani is feeling sad. She does not know why. She sends a text message to all her friends saying that her pet has died.

The revised version included more detail, without leading towards any particular response from the participant:

Dayani is feeling sad. She doesn't know why – she just feels sad today. She sends a text message to all her friends saying that her pet has died, even though it hasn't.

The final instrument read as follows:

1. Maria is a liar! Ruth, Maria's online friend, knows this. She knows that Maria hardly ever tells the truth, although she's a good person in many other ways. Yesterday, Maria used Facebook to tell all her online friends that she was getting a horse for her birthday present, and was looking for somewhere to stable it. All of her online friends were very excited for Maria, and wrote lots of excited messages to her. Ruth loves horses, and has always wanted to ride. Maria knows that Ruth loves horses. Ruth feels very angry with Maria.

Question: Why does Ruth feel angry with Maria?

2. Dayani is feeling sad. She doesn't know why – she just feels sad today. She sends a text message to all her friends saying that her pet has died, even though it hasn't.

Question: Why does Dayani say this?

3. Ruby has made a new website. She is very proud of it, and shows it to her friend Florrie. Florrie cares a lot about Ruby, but she thinks that Ruby's new website

looks very ugly indeed. But when Ruby asks Florrie ‘What do you think of my new website?’ Florrie answers ‘Oh, it looks really good.’

Q: Why does she say that?

Each of the three Strange Stories used in this study were designed to assess a different aspect of ToM. A common theme across the Stories is deception, partly because this is a theme explored in the ToM in adolescence literature (e.g. White et al., 2014), and partly because the pilot stage identified that participants had a more thoughtful, careful response across the set if they were considering variations on a theme, rather than three very different Stories.

Story 1 explored whether participants could identify lying, the motivations behind deception, whether technology could play a unique role in deception, and the impact of deception on others. Story 2 explored whether participants could identify sympathy elicitation and/or deception, and the role technology can potentially play in these things. Story 3 explored whether participants could identify creative pride and deception in the context of kindness and friendship. All of the three Stories included a technology-mediation element in order to respond to the research questions.

As with all of the other tools used in this study, there were limitations in using the Strange Stories, and these are outlined in Table 10.

Limitation	Mitigation
Although Strange Stories are well-tested in the neuroscientific community, using them in qualitative ways is a new, untried approach.	On the whole, this tool did yield some interesting responses from participants. The data, however, come across as incomplete; there is a sense that this is the start of a new tool, rather than one that provides deep insight. Developing the tool further could yield more meaningful responses. For example, developing a larger set of scenario videos that participants could respond to (this could also be used in a neuroscientific context).
Strange Stories rely on literacy competence.	All of the participants in this project were comfortable readers and writers. However, the two youngest participants had assistance in reading the Strange Stories (from myself in one case, and a parent in the other). The support was in reading only.

Table 10: Limitations of Strange Stories.

Strange Stories provides an interesting, potentially fruitful line of research in exploring the interplay between adolescent technology use and developing mentalizing. This study provided an initial foray into this field, but demonstrated that significant further tool development is needed to create an instrument that could be used across a larger sample or in a more specifically disciplinary context.

4.6 Interaction 5: Why do people do the things they do? A tool for exploring attribution

There are no existing research tools that explore attributions specifically in relation to adolescent girls and their use of technology. As a result, I developed a short questionnaire that would initiate an email exchange and provide stimulus for recall and discussion during the interviews (see Appendix 3 for the full tool). I chose to use a scenario-based approach because it would enable me to distinguish between participants' perspectives of attribution, their own attributions, and also

provide a reflexive tool to ensure my own attributions were not biasing my interpretation of the data. For example:

Think about a close female friend, about the same age as you. Imagine your friend has taken a lovely photo with her phone camera. She edited it on the computer, and thinks it looks even better. What do you think she does next? You can tick more than one answer.

- Calls her parents to the computer to see what she has done.
- Texts or emails the photo to her friends and family.
- Prints off the photo and puts it on the wall.
- Puts the photo up on a photo-sharing site, e.g. flickr™.
- None of these.
- I don't know.

Why do you think she would do these things? (open response)

What would you do in a similar situation? (open response)

What do you think makes people want to share, or not want to share, things they've made through using technology? (open response)

As with other questionnaire-style tools in this study, the tool cannot be effectively used in quantitative ways with such a small sample. That said, it could be used for statistical analysis with a wider sample after appropriate piloting and testing. This would enable an analysis of the parameters explored here against variables such as gender, age, ethnicity and socio-economic background.

Following Elig and Frieze (1979) and Falaleeva and Johnson (2002), I explored four dimensions of attribution: ability and resilience (and stable/unstable effort as a subset), risk-taking, mood, task and confidence. Elig and Frieze also explore luck, but this is not relevant to the scope of this study. Maruyama (1982) conducted secondary analysis of Elig and Frieze's data to explore the most

appropriate ways of measuring attributions. He found that findings from structured versus open questions were not interchangeable. As a result, the tool I deployed contains both structured and open questions, with the intention of analysing each question separately, and then bringing the data together thematically to reduce the risk of bias.

The tool was piloted with two volunteers (aged 11 and 18). A range of questions arose that I opted to use during the interview or during email exchange.

A range of risks presented themselves using this approach:

- Is the tool subtle enough to ensure the participants were not going to provide what they perceived to be 'correct' answers?
- Is it possible to distinguish between perspectives of attribution and attribution *per se* in the tool?
- Did the tool strike an appropriate balance between a focus on technology as a medium and technological determinism?

Some of these risks fell under the category of 'attributional bias'. An attributional bias is a cognitive bias that influences the way we explain an action or behaviour. These should not be thought of as errors – this would imply that the researcher is able to determine a 'true' reason for an action, which is unlikely to be the case (see Section 4.5.1 in Key Concepts for further discussion). I mitigated against these risks by focusing on them during the development and piloting stage, and using the interview and email exchanges stages to explore any potential biases

more fully.

As

well as the risks presented above, there are inherent limitations in using this tool to explore attribution. These are explored in Table 11.

Limitation	Mitigation
Are the findings a function of adolescence, or of the individual participant?	Given the small sample, this risk applies to all data gathered during the project. As such, it is explored further in the discussion surrounding trustworthiness below.
By providing pre-established scenarios data may be incomplete as they may not resonate for the participants, or explore a sufficiently wide range of possibilities.	I have no doubt the data for this section are incomplete. However, this tool, like the others in this study, is not intended to provide a complete picture of participants' perspectives on attribution and technology use, but to begin to make explicit the interplay between attribution and technology use in this sample.

Table 11: Limitations of using this tool to explore attribution.

Exploring attribution and technology use outside the context of a focused interview or experimental setting was always going to be a challenge. The tool described here provides a perspective of participants' views at a moment in time, and provides a starting point for using scenario-based Strange Stories in social research. For the findings to become scalable, the set would need to be significantly extended and tested in a wider disciplinary context.

4.7 Interaction 6: My Possible Self? A tool for exploring self and identity

The final Interaction, before the interview phase began, needed to explore identity. As has been explained in Section 4.2 of the Key Concepts chapter, identity and self are linked. As a result, the tool I chose to develop for exploring these sub-concepts

was one that acknowledged their close relationship. I also took this opportunity to re-visit the concept of self during the data gathering, thereby offering a limited opportunity for triangulation, and examining it several months into the project. I asked the participants to do the following exercise:

Jump forward into the future, and imagine yourself as being 30 years old. Write a paragraph about, or draw a picture of, your future self – the person you would LIKE to become.

What does your future self do during the day?
What does your future self do during the evenings?
What characteristics of your future self do you really like?
What characteristics of your future self do you not like?
Who are the important people in your future self's life?

Then, please give me your views on the following questions. As always, there are no right or wrong answers, just your views.

What do you think are the most important things you need to do now to become that person?

What role, if any, do you think technology could play in enabling you to become your future self? Or do you feel technology is a barrier to you becoming that person?

What, if anything, worries you about your path to becoming your future self?

What other paths could you imagine yourself taking over the coming years?

Markus and Nurius' seminal 1986 paper on possible selves introduced the idea that representations of a future self or selves are the:

“...cognitive components of hopes, fears, goals and threats, and they give the specific self-relevant form meaning, organization and direction to these dynamics. Possible selves are important, first, because they function as incentives for future behaviour (i.e. they are selves to be approached or

avoided) and second, because they provide an evaluative and interpretive context for the current view of the self.” (Markus and Nurius, 1986, p.954)

These are not abstract wishes. They are rooted in a participant’s current perspective of their ‘self’. There is evidence that they can also provide some illumination into identity (e.g. Dunkel and Kerpelman, 2006) although this will be the first time a possible selves-style research tool will have been used in the context of adolescent girls’ use of technology.

There are a number of related methodological constructions that I could have used to explore identity. All of these have in common the idea that the self and identity are dynamic and capable of change (Augostinos, Walker and Donaghue, 2006). This is particularly relevant to a study focusing on adolescence, a period in which agency and power are contested. I excluded these related constructions for the reasons outlined below.

- Personal strivings (Emmons, 1986) as these have historically focused mainly on goals and subjective well being. Both are valid for this study, but insufficiently broad for the purposes described here, and likely to yield data focusing on self rather than identity.
- Life tasks (Cantor *et al*, 1987) as these are focused more on the pivotal moments, contexts, groups, individuals and issues for participants throughout their lives. There is an interplay between life tasks and possible selves in that the former influence which possible self might be enacted in a given context, and the latter provides goals for life tasks. This would be a

rich seam of exploration on self in future research, but it did not enable a focus on identity.

- Personal Project Analysis (PPA) (Little, 2000) as this would have required significantly more data collection than was appropriate for the size and length of the project and the established commitment of the participants.

By using a possible selves approach, I wanted to explore the categories and groups that my participants anticipated as being important in their future, and the role technology may or may not play in bringing these into being. I wanted to capture their 'social identity' (Tajfel, 1981). That is, I wanted to explore in an intensely theoretical way *why* my participants, both now and in the future, perceived these group memberships as important – their emotional and psychological value.

As a result, I was concerned that the tool I used for this aspect of the project should not lead participants, and should also not overburden them (for fear of attrition at such a late stage in the project). Instead, it should provide opportunity for each participant to be creative and open about their hopes and fears for the future. The goal of using this tool was to establish the ways in which the participants saw technology as a barrier to, or enabler of, achieving their desirable or undesirable future possible social self, in the context of their broader identity.

4.8 Interviews

Following successful semi-structured interviews during the pilot project (Levine and Edwards, 2014), I chose to carry out face-to-face interviews during the main body of the project. Interviews facilitate *direct* data gathering. They are a:

“...two-person conversation initiated by the interviewer for the specific purpose of obtaining research-relevant information, and focused by him on content specified by research objectives of systematic description, prediction or explanation.” (Cannell and Kahn, cited in Cohen, Manion and Morrison, 2007, p.351)

I chose a semi-structured interview approach as the final primary method because it would:

- enable structure to allow comparison, but also offer flexibility to explore individual participants' perspectives and responses to Interactions
- provide external organisation to keep the interviews focused, and to reduce the risks of researcher bias
- enable the exploration of some potentially sensitive topics in a robust and ethical way, focusing on the needs of the project.

The schedule I devised is available in Appendix 4.

However, a semi-structured interview approach also carries some inherent risks (Cohen, Manion and Morrison, 2007). These are explored in Table 12 below.

Risk	Mitigation
Topics of importance might be omitted because of the need to balance generality with specificity.	Using the conceptual framework as the basis for creating the schedule meant that I would be touching on each of the key concepts during the interview. This ‘top down’ approach was balanced by ensuring a greater number of open questions.
The range and style of questions during interviews could jeopardize comparability of findings.	Using a schedule ensured some commonality across all participants. In addition, during the coding process I reserved a code to flag any systematic concerns. In a larger project, of course, this would be increased in scale across multiple researchers.

Table 12: Weaknesses of semi-structured interview, and mitigations.

During the pilot (Levine and Edwards, 2014), I used a recall strategy designed to explore participants’ generic event representations (GERs) (Bretherton and Munholland, 2008) in order to gain insight into their perspectives on attachment. As data gathering for the main project progressed, it became clear that basing the interview around a single ‘event’ would be limited, and would preclude exploring the range of aspects of social cognition that had been touched on during the previous months.

As a result, I developed an interview schedule (see Appendix 4) that could be used with each participant, and still facilitate exploring the potentially interesting points that arose during individual participants’ Interactions with me.

The schedule covered:

- exploring participants’ sense of self and role attributes
- personal priorities
- affective responses

- exploring conflict

I wanted to be able to explore questions specific to the individuals within the sample, although some questions would be applicable generically across the sample. The schedule comprised an activity that could be used to structure the conversation. I was not expecting the participants to comply rigidly with the structure; by this stage we knew each other well enough to use this as a starting point, and not as a conversational straightjacket. In the activity, participants were asked to:

- use post-it notes to document any thoughts or feelings they had about technology use and their parents, friends, school, wider family, future self and present self.
- prioritize the post-it notes in three encased circles. Most important post-it notes were to go in the centre, with decreasing importance moving to the outer perimeter of the circle.

We explored the emotional responses and points of conflict arising from the post-it notes.

Overall, the interviews provided an opportunity to explore participants' perspectives of their technology use in relation to social cognition in more depth. I was able to follow up on issues that had arisen during the Interactions, and gain a better understanding of participants' views on the topics we had been exploring. This is discussed further in the analysis in Chapters 4 and 5.

5. Analysis process and theory development

In devising the analysis strategy for this study I returned to its original purposes as described in Chapter 1, namely to *explore and describe* the interdisciplinary relationships between technology, adolescence and social cognition, and to *generate theory (ies)* that would explain what had been observed.

In order to respond to these requirements, the analysis strategy had to have the following two characteristics. It had to:

- be more than journalism (Reason and Rowan, 1981). The analysis needed to do more than just report what was observed from my perspective, or even the participants' perspectives. Rather, it had to respond to the research questions within the conceptual framework of existing theory.
- be more than the sum of its parts. New theory had to emerge from the drawing together of data from across participants and existing theoretical disciplines. As Coolican puts it, to:

'...give participants the greatest opportunity to 'tell it like it is', to gather a broad and initially untreated set of information...get immersed in it, to organise it in a way that will produce higher order concepts (themes) that explain, make sense of or 'fit' as much of the whole collection as possible.'

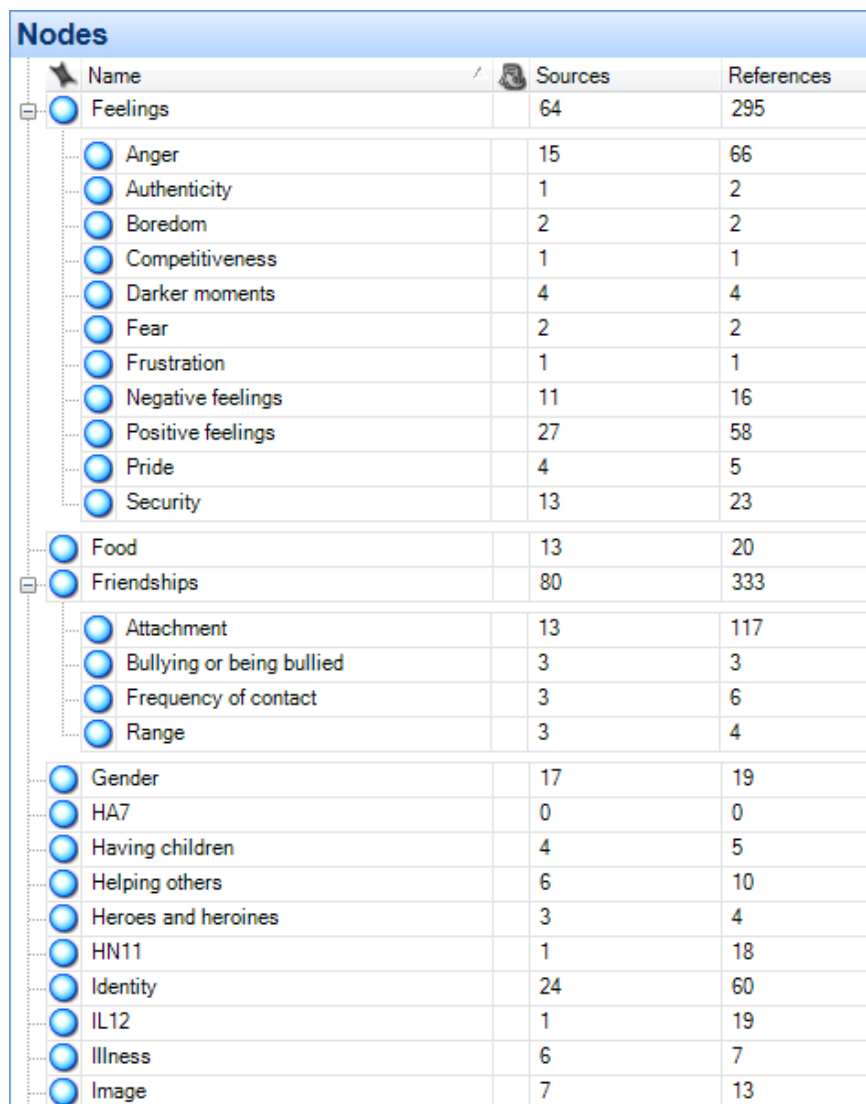
(Coolican, 2009, p.561)

Given these requirements, a particular set of methods for organising the data and analysis tools were available to me.

5.1 Organising the data

Data was initially stored and coded in NVIVO, a software programme designed for qualitative analysis. I began with nodes comprising the social cognitive areas explored as part of the project, a node for ‘adolescence’ and a node for ‘technology’.

As the coding progressed a number of sub-nodes arose. For example:



Name	Sources	References
Feelings	64	295
Anger	15	66
Authenticity	1	2
Boredom	2	2
Competitiveness	1	1
Darker moments	4	4
Fear	2	2
Frustration	1	1
Negative feelings	11	16
Positive feelings	27	58
Pride	4	5
Security	13	23
Food	13	20
Friendships	80	333
Attachment	13	117
Bullying or being bullied	3	3
Frequency of contact	3	6
Range	3	4
Gender	17	19
HA7	0	0
Having children	4	5
Helping others	6	10
Heroes and heroines	3	4
HN11	1	18
Identity	24	60
IL12	1	19
Illness	6	7
Image	7	13

I then revisited each data source away from NVIVO, coding themes using the mindmapping software, 'Mindnode', and where relevant, yEd to represent the data graphically. An example of a mindmap can be seen in Appendix 6.

5.2 Analysing the data

In this section, I will explain the steps taken to analyse the data, beginning with thematic analysis, deeper exploration using line-by-line coding, improving trustworthiness by approaching the data a third time using a mindmapping technique and additional graphical software, and finally, using a theoretical framework to create a composite analysis.

There are obviously a large number of ways of analysing qualitative data, and no single 'correct' way. Rather, the goal of a qualitative analysis strategy should be to impose systematic order on the data, immerse oneself in it, and align the analysis with the overall research questions and epistemology underlying the project. This comprised a number of steps that were a combination of pre-defined process and evolution as the needs of the project were made increasingly apparent.

Step 1: Generating initial codes in thematic analysis

Thematic analysis (TA) is a:

'poorly demarcated, rarely acknowledged, yet widely used qualitative analytic method...' (Braun and Clarke, 2006, p.77)

In it, the researcher seeks the themes in the data. As such, this method is not bound to philosophical perspective (in contrast to, say, Interpretive

Phenomenological Analysis, which is aligned with phenomenology). This lack of demarcation means that the conscientious researcher must be scrupulously detailed in outlining the method used to generate the themes.

This project used ‘theory-led’ TA (Coolican, 2009) as it drew on existing theories surrounding social cognition and adolescence. It did, however, also include an element of ‘inductive’ TA, as the technological element was explored without a preconceived conceptual framework. As a result of this tension, I began the coding process by completing an initial axial coding of each tool in NVIVO. I used pre-determined themes as codes as well as themes emerging from the data. The pre-determined codes were high level, related directly to the research questions and without granularity:

Attachment	Mentalizing/ToM
Attribution	Self
Identity	Risk
Technology	Adolescence

Axial coding has been criticized for distracting researchers from the themes emerging from the analysis (e.g. Glaser, 1992). Given the conceptual framework within which this project was operating, I did not see that an open coding approach would be a productive first step.

Step 2: Deeper exploration

Once the data set had been reviewed and broadly coded, I revisited each data source in NVIVO, and carried out 'line-by-line' coding, during which a significant number of codes and sub-codes emerged alongside the initial axial codes. A full list of codes and sub-codes may be found in Appendix 5.

In parallel, during this step I explored the data emerging from the surveys. These findings had to be handled carefully to ensure they were used to illuminate the research questions in tandem with more traditionally qualitative data, rather than to over-claim or claim generalizability for the population.

Step 3: Increasing trustworthiness

It became clear at this point that despite the repeated revisiting of the data, and the attempts to be reflexive in that process (described in more detail in Section 6 of this chapter below), I needed to introduce an additional layer of analysis to provide another 'way into' the data, away from NVIVO. This would have the important added benefit of providing an additional layer of robustness; if the themes and findings emerging from this new coding correlated with those from the work in NVIVO, I could be increasingly confident that the findings were reflective of the reality. This explanatory framework resulting from these additional reflections should, insofar as possible, be 'saturated', as a grounded theorist might put it – that is, additional data should not alter the themes and findings emerging. In order to do this, I used two techniques.

Firstly, I once again revisited each data source, and focused this time on emerging findings that responded to each *research question* rather than the axial codes I had used in the previous step. I used the Mindnode mindmapping software package to represent my thinking, an example of which may be found in Appendix 6. To use Mindnode I chose a main node from the NVIVO analysis and placed it as the core node on the mindmap map. As important quotes from the data emerged I added them to relevant edges (linking nodes) of the map. Sub-nodes in NVIVO correlated well with radial edges in Mindnode.

Secondly, when the analysis called for it, I used yEd to create diagrammatic representations of the data using nodes to represent key points, with edges linking the nodes. yEd is graphical software, intended to enable the user to create and recreate a range of representations of a single data set. In yEd the graphical user interface (GUI) allows the user to choose nodal points and designs, and then to link them using edges by clicking from one node to another. Edges can be bi-directional, uni-directional, or not indicate direction. As before, nodes correlated with main nodes in NVIVO. I used yEd because it offers a range of layout algorithms enabling creative representation of the data, and highlighting relational aspects of the data that I might otherwise have missed. Once the data have been inputted, the user can easily apply a layout algorithm from the list of hierarchical, organic, orthogonal, circular, tree, radial and series parallel. For each of the concept areas I implemented in yEd I tried all of these algorithms before choosing the representations that were most illuminating and honest.

Step 4: Composite analysis, or bringing it all together

The next stage was to bring the analyses together in a way that responded to the research questions. The goal was to extend the thematic analysis by placing the data within a theoretical framework. The framework needed to (Damasio, 2012):

- define and organize the resolved themes in such a way that produced a strong, complete theoretical response to the research questions
- propose explanations for the findings at the level(s) at which these explanations could apply and make explicit the interconnectedness between levels
- identify the findings amenable to analytical methods available to social research, and resolve discrepancies arising from the previous analytical stages
- result in messages for young women and the adults in their lives (see Chapters 5 and 6).

6. Trustworthiness and ethics

Most qualitative researchers adopt a constructionist or relativist perspective on knowledge; that is, there is more than one version of a 'truth'. This does not, however, mean that all qualitative research is true, equally valid and useful (Yardley, in Smith, 2008). Rather, it means that, as researchers, we need to find common criteria for evaluating and judging findings that have been derived through qualitative methods. No simple or agreed set of criteria has been

established amongst the plethora of epistemological schools and sub-schools. In fact, it has been argued that words such as 'reliability' and 'validity' should not be used in reference to qualitative research at all (Yardley, 2008). Terms such as trustworthiness, resonance, and coherence are seen as more appropriate.

For the purposes of this study, I have taken what might be termed a semi-contextualist approach to trustworthiness (Coolican, 2009). By this, I mean that research of the sort described here is dependent on context, and that some versions of a truth may be more trustworthy or justifiable than others. This study is therefore structured in such a way as to make it possible to generate identical or very similar findings using a similar context (i.e. sample, data gathering processes using multiple data gathering techniques and analysis strategy).

More specifically, I have adopted the core principles for evaluating the validity of qualitative psychology outlined by Yardley (in Smith, 2008, pp. 243-244), although I am choosing to use the term trustworthiness to describe a set of overarching principles: sensitivity to context, commitment and rigour, weighting and aggregation, coherence and transparency, impact and importance, and ethics. These are useful because they apply to the quantitative nature of the secondary survey analysis element of the study, as well as the more qualitative elements. Each principle is outlined in more detail below.

6.1 Sensitivity to context

Two forms of context were applied during this study. Firstly, as has been said above, I chose these methods to enable patterns, themes and meanings to emerge from the data. The conceptual framework outlined in Chapter 2 above informed the analysis.

Secondly, I wanted to be able to identify and study in depth the subtle interplays between the participants, their growth and change, and their use of technology in well-defined socio-cultural settings (including technology settings). At each stage of the Interactions and during the interviews, I was able to gain participants' perspectives on the emerging findings and their views on the topics under study (sometimes called respondent validation, Coolican, 2008). I did this both by introducing structured questions via email after each Interaction, and also by ensuring that the semi-structured interview schedule would encourage participants to discuss the matters of importance to them, within the research context (Yardley, in Smith, 2008).

6.2 Commitment and rigour

Rigour in the study derives from:

- robust data collection that explores each aspect of social cognition in light of technology use in a discrete and systematic way
- the 'theoretical sophistication' made possible by depth, breadth and iteration in the analysis strategy (Yardley, in Smith, 2008).

This last requirement was particularly important given the small sample. As the literature search, data gathering and analysis progressed, I began to see that it was in the interaction between each stage in the research process that this distinction became more discernible, particularly with regard to the endocrinological and neuroscientific literature (which is so rarely embedded within social research). Theoretical sophistication and a comprehensive understanding of the literatures surrounding adolescence provided signposts to findings that were more likely to be attributed to adolescence. Conversely, given the importance of the individual within qualitative psychology research settings, findings likely to be about individual participants' characteristics were not to be treated as inferior or unimportant.

This study collected an extensive corpus of data. In total, it comprises 75 completed tools and 8 interviews:

- 14 completed Twenty Statements Tests
- 13 completed technology use diaries over a 24 hour weekend period
- 12 adapted Adolescent Attachment Questionnaires
- 12 responses to three mental state stories
- 14 completed scenario-based questionnaires
- 10 prose responses to the possible selves question
- 8 interviews lasting between 30 minutes and 1 hour

All large figures are already available via the website Figshare, and all data will be made available via the UK Data Service once the PhD is achieved. This

means that anyone wishing to follow my procedures to interrogate the archive or match the findings to the data is free to do so.

6.3 Weighting and aggregation

Rigour is also provided by appropriate weighting and aggregation across the sample and across the methods deployed in the project. In this project, equal weighting was given to each of the participants during primary data collection and analysis. More data, however, emerged relating to self and identity, suggesting increased weighting and trustworthiness in relation to those findings as opposed to those relating to ToM or attribution, for example.

Closely related to sensitivity to context, this study also aspired to provide findings that were comparable with other contexts. Researchers using qualitative methods avoid referring to 'generalisability', with its statistical overtones. Henwood and Pidgeon (1992) use the term 'transferability' to mean studies whose findings can be applied elsewhere when the context provided is rich and dense. The broad range of this study has made this sort of rich context difficult to describe, as so many areas of social cognition and technology have been explored. In reality, however, this breadth of exploration *is* rich context. This study does not exclude one aspect of social cognition in favour of another, or one technology in favour of another; it attempts to gain an understanding of the interplay between these things at a challenging and exhilarating stage of human development.

To my advantage, I had a rich and broad data set across my participants. The challenge, then, was to aggregate findings across different methods and across

different disciplines. My approach to achieving aggregation was the composite analysis method described in Step 4 above, although arguably I did not 'triangulate' my findings in the traditional sense (Yardley and Bishop, 2007).

6.4 Coherence and transparency

A study demonstrates coherence when it shows that each element works together in a rational way to make an integrated whole, while ensuring that the characteristics of the data are not compromised (Yardley in Smith, 2008). In order to achieve coherence, and by association transparency, I have tried to ensure:

- *a good fit* between the epistemological background, the conceptual framework, the research questions and the data analysis. One mechanism for achieving this is a variation on disconfirming instances (Yardley, in Smith, 2008). This means searching through the data in a systematic way for any findings that do not fit the themes emerging. To some extent this process was happening continuously as I moved through the analysis strategy, but it only happened systematically during Stage 4 (see Step 4: Composite analysis above).
- *Transparency* by explaining something of each of the several methods used during the study, and presenting data on these clearly and appropriately given their purpose. I also used the interviews as an opportunity to explore some of the emerging themes with the participants to check whether these resonated with their experiences and perspectives, and I used conference

posters and presentations as an additional opportunity to gain the perspectives of critical peers on the findings emerging.

- Mechanisms for introducing *reflexivity* into the study. A study of this interpretive kind must build in ways to identify the role, power and influence of the researcher in the entire research process. This study does not claim to be objective – rather, I attempt to make my presence as the researcher explicit in the process. I dealt with reflexivity in two ways. Firstly, I maintained a private research blog throughout the process. Throughout the data gathering, I needed to maintain a balance between developing a sufficiently trusting relationship with the girls so that they would be comfortable to respond honestly to my questions, but also not becoming their ‘friend’. This was, in part, why I chose to run the majority of the data gathering via email for all bar the youngest participant (HA7); it was an attempt to reduce my direct influence on the tool completion process. The issue was relevant to the analytical process too, however. Some of the responses made by participants were humorous, while others excited sympathy or concern. I tried to acknowledge these feelings explicitly to myself in the blog as I was doing the early stages of coding, in an effort to then maintain emotional distance in the coding and analysis itself. Secondly, I used a critical friend, Alison Page, to run a similar analysis process to my own, using my anonymised data at three intervals

during the analysis stage. No significant issues arose during these review periods.

6.5 Impact and importance

True to its pragmatic foundation, this study is intended to make a difference. This is important within the qualitative psychology tradition too, and has been a driver throughout the project. In addition to presenting at three conferences and at one poster session, I have completed the following activities during the study to try to ensure it has a positive impact:

- worked with a youth worker in the East Midlands to embed the language of attachment with young people in order to equip them with the language to describe and manage their relationships (Levine and Edwards, 2014)
- created a MESH (Mapping Educational Specialist knowHow) guide on attachment aimed at teachers. MESH guides offer a way of sharing evidence on a particular topic with teachers by creating flow charts available online.
- exemplified a model of cyberbullying resilience using data from this study (Papatraianou, Levine and West, 2014), shared the key ideas on a panel at the Cheltenham Science Festival panel in 2015.
- reflected the data back to the participants after each Interaction to provide them with language that may empower them in their technology use.

6.6. Ethics

I also aimed to embed ethical research practices across the study, and in my personal practice. I wanted to be able to demonstrate my academic integrity, and that the research had been conducted in an honest and responsible manner.

I began by obtaining ethical approval using the University's normal mechanisms (see Appendix 7 for ethical approval). I kept rigorous references during the literature review stages, using the software Mendeley to ensure I would not inadvertently plagiarize existing material. Once the prospective sample had expressed an interest, I met face-to-face with each participant and a parent. We discussed the project, I explained in detail what time commitment would be involved, and ensured each participant and their parent understood what would happen in the event of a disclosure. We completed these conversations with the participants and their parent signing a consent form (see Appendix 7).

Once the signed consent forms had been received, I sent each participant a starter pack with any resources they might need during the study (it was important to me that the parents should not be expected to purchase anything for the project). Each pack contained a summary of the project including my contact details, a glossary, some colouring pencils and paper, addressed and stamped envelopes and a USB stick.

At the outset of the pilot study during my MA, I created a table of considerations, drawn from the notes provided during a lecture on ethics. I

continued using this table as a reference point during the main study, and found it a helpful, regular reminder of my commitment to the highest ethical standards.

Consideration	Action/Mitigation
Design and sampling	
Is the study appropriate to the participants' circumstances, including age and ethnicity?	Yes, as evidenced by ethical approval from the University.
Does the study offer any particular risks?	Yes, predominantly in the potential for disclosure. As mitigation I ensured that all participants and their parents understood the procedure for disclosure (as per the University guidelines).
Is there a risk that the study could be offensive?	Low risk, mitigated by respondent validation and having multiple readers of the thesis.
Is the study practical and useful, and not intrusive?	The pragmatic nature of the study, and a clear sense of who the beneficiaries are, ensured that the study makes a difference. Ensuring participants were aware that they could withdraw means that the study remained unintrusive.
Privacy and consent	
Are the participants and their families competent to provide consent?	Yes, as evidenced by the participants' and their parents' intellectual and emotional abilities.

Do I have consent from everyone necessary?	Yes: participants and their parents. All website data referred to in this study is publicly available.
Is the consent process robust, but not a burden on participants?	Yes. A consent form was provided and guidance offered if any questions arose during completion.
Do participants know they can withdraw at any time?	Yes, as evidenced by the consent form. I reiterated this to parents at the start of the project via email.
Do participants know that their anonymity and confidentiality are assured, and how will that happen?	Yes, as evidenced by the consent form.
Data	
Am I competent to handle data? How will ensure my accuracy?	I am competent to handle data as evidenced by my completion of a Masters in Educational Research Methods (with distinction) and prior experience as head of research for a government agency. I ensured accuracy by introducing a checking protocol that included three systematic visits to the complete data set, using different analytical methods, software and paper-and-pencil methods.
How will data be stored, including location, security, and levels of access, automatic destruction?	Electronic only given the small-scale nature of the study. Located on a secure, password-protected server, to which only I have access (a potential risk).
Reporting and authorship	
How will I report on the	Thesis reported as per University guidelines. All

<p>data, including in my dissertation? Future thesis? Presentations from my dissertation? In any future publication?</p>	<p>participants have been anonymised. Presentations: anonymised, with thanks in the acknowledgements where this will not lead to exposure and where agreed with participant and parent. Future publications: anonymised, with thanks in the acknowledgments where this will not lead to exposure and where agreed.</p>
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Table 13: Ethical Considerations.

7. Reflection

At the outset of this study I had intended the main interdisciplinary challenge to be one that spanned psychology, technology and neuroscience. As the initial literature scoping progressed, it seemed that there would be an insurmountable incongruence between the broad conceptual context of this work and the detailed, incremental questions that neuroscience could respond to. If I wanted to explore several areas of social cognition, the neuroscience literature could be used to inform the instrument development, data gathering and analysis, but it was unlikely that any element of new research in this area could be included. On realising that, I began to explore the sociology of adolescence and Science and Technology Studies (STS). It was clear that these disciplines had much to offer the study, and that this should be reflected in the process. The interdisciplinary challenge became one in which tools developed in one field crossed over into another, and concepts developed in one field were applied to the research questions. New challenges arose and were overcome.

This chapter has provided an insight into the methodology and methods employed in this study. I opened by outlining the research questions, and in particular the main question:

What is the interplay between pre-adolescent and adolescent girls' social cognition and their use of interactive digital technologies?

I went on to introduce the sample of thirteen young girls and women who graciously gave of their time, energy and interest to be a part of this project over the 9-12 month period.

The interdisciplinary approach to the work drew heavily on Repko explained here in brief, and linked to the secondary influences of interpretivism and pragmatism.

I reflected on each of the research instruments used to explore the concepts of self, identity, technology use, attachment and relationships, attribution and ToM, demonstrating the importance of placing the individual participant at the heart of each process, and reflecting on their applicability and necessary mitigations. This ethos continued into the four-step analysis plan, ranging from Thematic Analysis, through deeper exploration and increasing trustworthiness to the composite analysis stage using an unusual software source. Finally, I have explored the trustworthiness and ethics of the study, concluding with some reflections on the process.

What Chapters 2 and 3 together do is to create a backdrop for the analysis

to follow. Given what we know already about the topics explored in this thesis, what follows is a broad-ranging overview of the key findings and themes that emerge from the data gathering and analysis processes I have described here.

Chapter 4: Findings and analysis by social cognitive aspect

Chapter 3 detailed the analysis plan developed for this study. The plan was intended to provide a trustworthy process for exploring and interpreting data on my participants' use of technology in the context of important aspects of their developing social cognition. The process comprised four steps:

1. Thematic analysis – axial coding of all data using the main conceptual themes of the study using NVIVO.
2. Deeper exploration – line-by-line coding of all data, allowing codes and sub-codes to arise from the axial codes in Step 1.
3. Increasing trustworthiness – revisiting all data using mindmapping and diagrammatic techniques to establish whether similar codes and themes emerged.
4. Composite analysis – drawing together themes from across the previous steps to explore conflicts, similarities, resolutions and interrelationships, and finally applying the theoretical framework discussed in Chapter 5.

In this chapter I will share the findings emerging from this study, covering the first three analysis steps. This chapter responds directly to the following research questions introduced in Chapter 3:

- What is the nature and extent of technology use in the study?
- Is there a relationship between adolescent girls' use of technology and their sense of self? If so, how can we understand that relationship?

- Is there a relationship between adolescent girls' use of technology and their identity? If so, how can we understand that relationship?
- Is there a relationship between adolescent girls' use of technology and their relationships with others? If so, how can we understand that relationship?
- Is there a relationship between adolescent girls' use of technology and the way they attribute activity and behaviour to others? If so, how can we understand that relationship?
- Is there a relationship between adolescent girls' use of technology and the way they understand others' minds? If so, how can we understand that relationship?

It may be helpful to the reader to recall the aspects of social cognition covered during each interaction, and the tools used to explore each aspect.

Interaction	Social cognitive aspect	Source	Time period
I1: All about me	Self	Adapted from the Twenty Statements Test (Kuhn and McPartland, 1954)	Sept 2012
I2: A day in the technological life of...	Usage levels	Diary (original tool)	Oct – Nov 2012
I3: Relationships with others	Attachment	Adapted from Adolescent Attachment Questionnaire (West et al., 1998)	Dec 2012 – Jan 2013
I4: Strange Stories	ToM	Mental state stories adapted from Strange Stories (White et al., 2009)	Jan – Feb 2013

I5: Why do people do the things they do?	Attribution	Scenario-based original tool	Mar – Apr 2013
I6: My possible self	Self and identity	Original question based on possible selves evidence base	May – June 2013
Interview	All	Semi-structured interview schedule	Aug – Oct 2013

Two important matters should be noted here. Firstly, all quotes from participants are reproduced here exactly as they were given during the data gathering process, including grammatical and lexical errors.

Secondly, in this chapter I report on findings first sharing the data on participants' use of technology, and then considering each aspect of social cognition in turn. This is in contrast to Chapter 5, which offers a more overarching theoretical perspective. In this chapter, I begin with attachment and relationships, then self and identity, attribution and finally ToM. Each of these aspects may draw on one or more of the tools described above. For example, although findings emerging from Interaction 4 are at the heart of the discussion surrounding attachment and relationships, relevant findings also arose in Interactions 1 and 3, and the interviews. Findings are shared as a set of unfolding themes that draw on a range of Interactions as relevant. Using findings from all instruments was an important part of the interdisciplinary process of developing this thesis; one tool was used to illuminate findings relating to another tool.

1. Participants' use of technology

I will first share the key findings emerging from the technology use diaries they provided in Interaction 2. The purpose of this exercise was to confirm the participants' relatively high levels of technology use, foreground that use in the participants' thinking early in the data gathering process, and gain an insight into the range of technology used and under which circumstances.

Table 14 below shares a summary of the data gathered, in the form of the total amount of technology used on a single weekend day for each participant, from least use to most. The types of technologies used and the types of usage participants described are also included. No diary was received from CE10.

Participant	Length of time (minutes)	Device	Use
JL14	42	CD (and toaster)	Listening to music and story tapes
FA1	123	Phone, computer	Facebook, Twitter, Tumblr, speaking with close friends, uploading photos from youth weekend, checking in with family
IL12	214	Phone, camera, laptop, TV	Email, photos, homework, listening to music, texting, calling, reading, browsing apps, homework, Facebook
HA7	240	PC, tablet	Mathletics, Skype with family, chess, art, YouTube, DVDs
MR8	260	PC, tablet	Writing with E, Skype with E, Tumblr, homework
EE3	278	Radio, TV, laptop, CD, phone	Homework, music practice, email
TL5	330	Computer/laptop, phone	Minecraft, playing phone games
TR9	346	Phone, laptop, TV	Facebook, Twitter, homework,

			making arrangements with friends, texting, browsing clothing sites
HN11	348	Laptop, webcam	Playing HetaOni, watching videos, DeviantArt, Zerochan, recording voice
SS2	360	Phone, laptop, TV	Twitter, Facebook, blog, music channels, games, Tumblr, email, reality TV
WA13	385	Phone, computer, mother's phone, CD, DVD	Phoning relatives, YouTube music videos, Teeter, listening to Paul Simon CDs in relation to schoolwork, Enchanted
CI6	450	Phone, computer, TV	Social networking, homework, funny videos, films and X-Factor
LS14	450	Phone, TV, laptop	Checking email, texting, phoning mother and friends, Twitter, Facebook,

Table 14: Use of technology over the period of one weekend day.

Most participants used over four hours of technology on a normal weekend day, suggesting that they were above average users of technology (EU Kids Online, 2014; Ofcom, 2014). Only JL14, FA1 and IL12 reported using under four hours. We cannot assume that volume of usage is related to age; of the three, only JL14 was one of the younger participants, whereas FA1 and IL12 (relatively low volume technology users) fell in the upper age range for the study. JL14 remained in this study as a useful marker of pre-adolescent girlhood, as part of a sister triad, and as a reminder that I was exploring multiple, complex journeys.

What is notable is how much time was spent reaching out and connecting with others. This is not a novel finding; the literature has emphasized the extent to which social networking facilitated by technology has been relatively extensive (e.g. Davies and Eynon, 2014; boyd, 2014). Participants' frequent mention of software

tools such as Facebook, Twitter, texting and email illustrates this. Tumblr appeared to be increasingly popular amongst older participants, perhaps because as MR8 stated:

Tumblr is opening a new more visual community. (MR8, Interview)

Both TL5 and HN11's uses verified their claims to be gamers, albeit in different gaming media and with different motivations. For TL5, gaming appeared to be a general interest linked to a growing interest in coding (she later expressed a wish to participate in game beta-testing). For HN11, gaming appeared to be a manifestation of a sense of herself as someone outside the mainstream and a wish to be *different* (HN11, Interaction 1) or *alternative*.

Many participants also described using technology to do homework. As I was not focusing on schools and technology for this study, I did not delve further into this use. There were no indications from participants that other technology use (e.g. photography) featured in both homework and leisure activities. Older participants showed some parallel uses of technologies while completing their homework. For example, they might be emailing, chatting online or texting alongside completing homework, and it is possible that some of that chat might relate to homework activities. As has been suggested by Davies and Eynon (2014), this could not reasonably be defined as multi-tasking, but rather as parallel or consecutive activities.

The data suggest that the participants used their technologies in a range of settings, from their homes, to friends' homes, to public transport. Some activities,

such as watching videos or gaming, appear to be mainly located in homes. Other activities such as texting, photography or social networking are highly portable.

In summary, the technology diaries indicated that most participants were, indeed, relatively high-volume users of technology. While some participants were using less common software to enjoy themselves or to complete homework, the majority were either using media or using a range of popular social networking technologies to connect with others. But what kinds of relationships were being made, sustained, being re-made or ending in technology-mediated ways?

2. Relationships and attachment, adolescence and technology

2.1 The process

The first three steps of the analysis process yielded data relating to technology-mediated relationships and attachment from a range of data sources, specifically:

- Interaction 1: All about me (Twenty Statements Test focusing on self)
- Interaction 3: Relationships with others (adapted questionnaire focusing on attachment)
- Interaction 4: Strange Stories (adapted mental state stories)
- Interviews

Interaction 3 was an extremely rich source of data. The instrument, developed from the Adolescent Attachment Questionnaire (AAQ) to include questions on online and offline friendships, yielded total scores for each participant in the areas of Angry Distress, Availability and Goal-Corrected Partnership. The higher the

total score, the less likely it was that the relationship was 'secure' in the attachment sense. It is important to remember that if a relationship is not secure, it does not mean it is a bad relationship. Bowlby and attachment researchers since, have striven to point out that all relationships are different. Not all relationships can be expected to form attachments or even bonds, and we can derive support as well as sustenance from relationships outside the secure base. Nevertheless, this score gives us an indicator to the relative security of relationships in my participants' lives. Details for all scores are available in Appendix 8. It should be noted that HA7 did not complete this interaction; I deemed her too young to be able to complete the task meaningfully and instead explored these relationships during her interview.

Alongside exploring the adapted AAQ data, I also found relationships and attachment-related findings emerging during the Thematic Analysis and Deeper Exploration steps of the analysis process. These are discussed below. Examples of NVIVO codes and Mindnodes maps may be found in Appendices 5 and 6.

2.2 The findings

Participants said that families, and especially mothers, were important to them.

A considerable amount of data indicated that, for the majority of the participants, relationships with their families were very important. Figure 10 demonstrates that mothers were particularly important for the factors explored in the adapted AAQ.

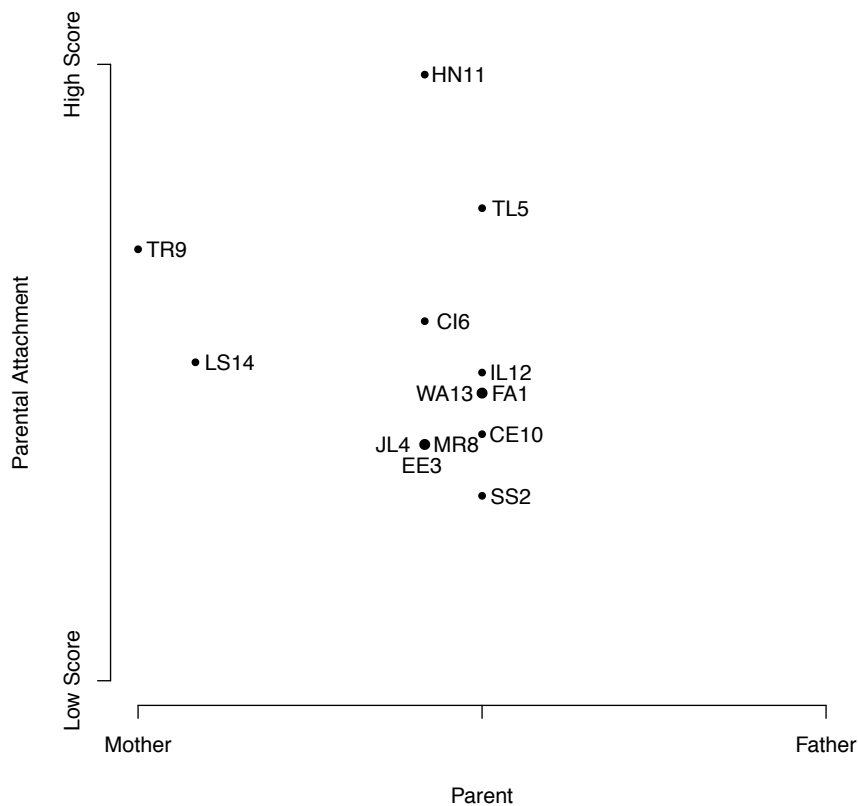


Figure 10: Total score on the adapted AAQ represented for both parents. The higher the score, the less likely the relationship is to be 'secure'. While the variation is not enormous, mothers are generally perceived as a more secure base than father. Of particular interest is HN11, who scored highly for both parents and appears as an outlier in a number of contexts.³

The importance of family was echoed in other data sources too, even for older participants who, according to the literature, were likely to be exploring meaningful peer relationships more than younger girls.

My best friend is my sister. (SS2, I1)

³ Figures 10 - 21 were produced by Dr Dov Stekel using R. The nature, content and interpretation of the figures are of my devising.

Participants' use of technology plays a role in parental relationships. For some it is a manifestation of the support and safety they experience in their daily lives:

IL12: [Mum] only goes on every so often just to check what I'm doing. I'm OK with that.

CE10: Because it'll help. Because, like, if she saw what I was doing, so if someone gave me a bit of trouble she could say things...so she would see what you were posting and that would be helpful.

JL4: Yeah, it would sort of be like she's keeping me safe. And if Dad was on there I'd probably have him too.

IL12: I think we all trust Mum and Dad. And I think it is a bit of a deterrent - puts people off if they see your parents on there. (Sister triad interview, IL12, CE10 and JL4)

For others it can be a source of mutual pleasure and connection.

I like watching my mum over her shoulder when she plays her game [Candy Crush]...Sometimes I do say stuff while she's playing, but lots of the time stuff is asking like 'What's that thing?' In new levels more things get added in and I'm not used to them. I like watching rather than playing. (HA7, interview)

For some, it is a way of reaching out to more distant family. For example HA7 uses Skype to speak with her grandparents abroad every week, and for TR9:

with wider family its like...like with photographs of special occasions. I like to look back at those...[family live in Scotland] I feel...quite connected again. It's nice to have something that evokes those kind of memories. (TR9, interview)

For others it is a source of minor confrontation.

SS2: If we're on the computer for ages, and Mum wants us to do something productive, because the kinds of things we go on aren't very beneficial on the whole.

FA1: I always use the argument that they do strengthen our relationships with friends, but it doesn't seem to wash with Mum. Yes, it is more of a source of conflict.

SS2:...not usually big rows or anything. It's more like, if we're on there for a certain amount of it, it's like 'You're coming off there'. But they're only usually casual little comments. (Sister dyad interview, SS2, FA1)

There were some examples of securely attached participants drawing on parental support to resolve emotional conflicts and challenges. MR8 described a stage in which she was struggling to maintain distinctions between the online role play/fanfiction she was creating and her day-to-day experiences. She turned to her mother:

And that's when I talked to Mum. I can't remember what she did. She kind of talked to me and helped me decipher what was real, what wasn't real. I think it was mainly the talking that did help. (MR8, interview)

However, none of the participants reported the serious conflicts arising from technology use that are sometimes reported in the media, or that form some popular preconceptions about adolescence. Even those participants who consider themselves gamers (e.g. TL5 or CE10) demonstrated an acceptance that their parents would intervene for positive reasons, rather than restrictive ones as reflected in this interview conversation with TL5;

TL5: Um...well me and my Mum kind of like just 'Can I buy this?' 'Can I go into town?' She's kind of like supportive but its mainly 'No'.

DTL: And if something happened online, what would you do?

TL5: It depends. Tell my Mum. Tell my friends. Tell my Dad. Depends on the situations. If I had a proper row with my friends in the classroom I'd text or call Mum 'Please come and pick me up.'

DTL: And then she'd come?

TL5: No. But it's worth a try [laughs]

Friends were also important to the participants.

Most of the participants claimed to have at least one friend with whom they communicated mainly online. The level of secure attachment they felt for those friends, as well as offline friends, is reflected in Figure 11 below. As with all of the figures, offered here, findings should not be considered scalable due to the sample size, the exceptionality of outliers such as HN11 and the additional factors of the sister groups.

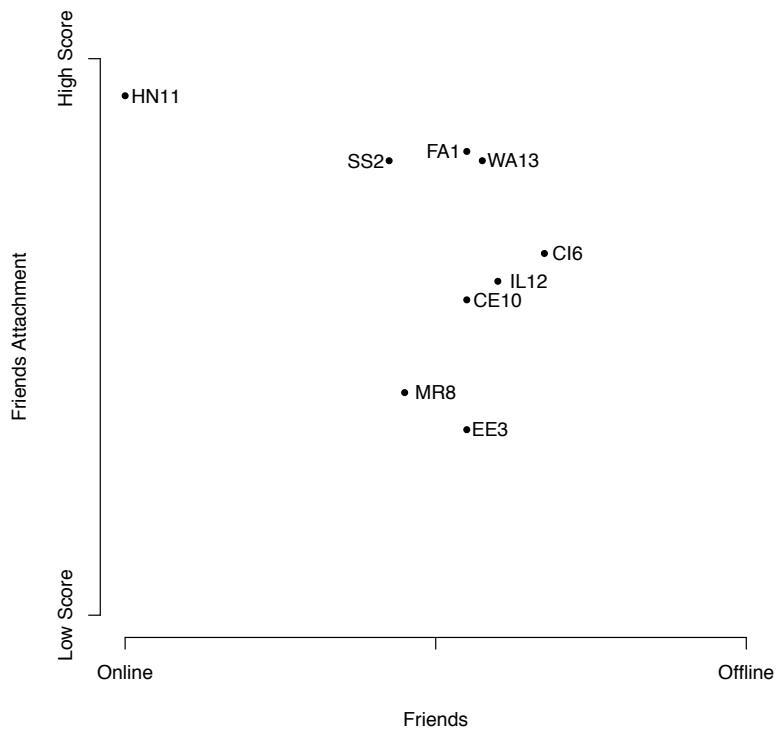


Figure 11: Total score on the adapted AAQ represented for online and offline friends for those participants indicating they had a close friend with whom they mainly interacted online. Online/offline is a function of the instrument, and reflects a dyadic rather than a dualistic perspective. The higher the score, the less likely the relationship is to be 'secure', showing that HN11, FA1, WA13 and SS2 are less likely to have secure relationships with the friends than MR8 and EE3.

Technology acted as a gateway to new friendships, and a way of maintaining connections with older ones.

All of the participants spoke about technology being a means for keeping day-to-day connections with friends.

I stay in touch with most of my church and school friends by text/BBM/facebook or twitter. (FA1, Interaction 1)

Yes, that's the main [practical] thing. Like meeting up with my friends...people I see at college. You're expected to be a bit more independent. (TR9, interview)

Some participants reflected a more nuanced understanding of the role technology was playing in those seemingly trivial uses.

I'd say that without technology we wouldn't be able to meet up...But in the same point that's not the only way we talk. Technology leads us to meet up, but it's not a facilitator in the kinds of conversation we have...Having said that [at a recent party started playing Wii] and it turned into this session for the next like three hours!...That way more than one person can do it, if that makes sense. (EE3, interview)

Some younger participants were using technology to explore difficult relationship moments in ways they may have perceived as 'safe', but that could be of concern to families or schools, for example TL5 during her interview said:

...then we have a text fight...And sometimes we just, like, make up.

DTL: Do you think the fact that you're texting makes it different to the kind of argument you might have face-to-face, or not?

TL5: Different, I think...I think it is more of a...it's safer to have text fights, just because then no-one gets hurt physically. (TL5, interview)

For two participants, technology was mediating very important friendships. MR8 had developed an online writing partnership and deep friendship with E, an American girl, which at the time of writing had been going for six years. This relationship was explored initially during my Masters work (Levine, 2011 and Levine and Edwards, 2014). MR8 and E had begun their writing together on the Maximum Ride fansite. Over time, they had connected on Skype, developed their

own secure writing portal, and extended their fanfiction to other source material, such as the popular *The Hunger Games*.

Their friendship continued throughout this study, and was a source of continuing support and inspiration to MR8.

Personally, I enjoy writing with E more than I enjoy writing on my own. The two of us are so in sync, and yet our characters can be completely unpredictable sometimes. Actually often. But E and I learn about our characters and each other's characters together. We know so much more about them now than we did at the beginning and I'm sure there's still much to find out. As to whether writing collaboratively has made the characters more real... Yes, I think it has. For one, they are real and for two; if I wrote on my own, then only I would see them as real, but because I write with someone else, i can share the reality with her and she with me. (MR8, I4)

For EE3, technology was facilitating an ongoing friendship with a school peer, M, who had had mental health problems, resulting in her becoming agoraphobic. EE3 had a regular weekly Skype conversation with M.

...And it turned out I was the only one that kept in touch with her... We still do it. Set time, Monday 8 o'clock, because she likes to have things organized in her head... And there was a period of time where she didn't go out the house for month... And I used to speak to her on Skype and we still do, as I say. I do remember her saying at one point 'you're the only friend I've got' which was quite a sad conversation. (EE3, interview)

From an attachment theory perspective, EE₃ was demonstrating availability to M that made her, in some sense, a secure base for her friend. As an early foray into attachments outside the home, this was an interesting example to explore. EE₃ had to maintain boundaries by limiting the amount of time she was available to M, but maintained the regularity and sincerity of the Skype connection.

I felt kind of special, in that she wanted to keep in touch with me, because there were points where I was like 'Do you want to actually talk?' and she was like 'Yeah, yeah, yeah'. And I felt like I was needed in a way. And I didn't mind that. (EE₃, interview)

However, a number of the participants expressed a need to guard their privacy and to maintain high levels of control over with whom they interacted online. This is counter to cultural perceptions of adolescents as high risk takers who are careless. It suggests that these participants have a more nuanced view of the role of technology in their lives.

...I'm fine saying hello to you in a corridor. I'm fine becoming friends with you, but because I'm NOT friends with you, I don't see the point. I don't want you to see what I am doing, and I don't particularly want to see what you're doing, so why have you added me? (EE₃, interview)

There's this girl who was like my best friend from school. She put something disgusting on Facebook the other day. I deleted her straight away. We may have been friends once, but I don't want to see stuff like that. You have to choose. (FA₁, sister dyad interview with SS₂)

Because its permanent, you can look back on it like picking a scab. It makes it harder to forget. You can more about other people's lives than you should.

(TR9, interview)

Technology also acted as an amplifying force for both positive and negative aspects of participants' relationships with others.

Participants' completion of the Strange Stories Interaction (I₄) showed a different perspective of their ideas about friendships and technology. Here, they demonstrated an understanding of technology as a way of amplifying the effects of normal human interactions.

This appeared in three main themes. Firstly, in relation to lying:

I think technology makes it easier for people to lie because sending a text to someone doesn't show your emotions or what you're actually thinking, its a way to hide behind your true thoughts. (CI6, I₄)

Technology does make it a lot easier to lie. (HN11, I₄)

I think that technology makes it easier to lie because you can give yourself a different character. (JL4, I₄)

Secondly, in relation to emotional engagement with friends and family:

But sending texts or being online with your friends means that often your friends cannot see that you are sad through your words, as you cannot see people's facial expressions for example, she had to use something drastic to make people think that she is in need of comfort. (EE3, I₄)

Finally, in relation to fear of loss of friendship. There were no examples of this fear in relation to parents:

Florrie is worried that she'll upset Ruby and make her think that all her hard work has gone to nothing. She doesn't want Ruby to feel underappreciated. If Florrie's anything like me, she was probably scared of losing her best friend over something petty like this. That fear normally comes from past experiences so it is possible that Florrie once had a friend who she lost over something ridiculous and she doesn't want that to happen again (MR8, I₄)

For some participants, digital artefacts were artefacts of self, and, as such, were mediating factors in friendships.

The responses to the Ruby/Florrie Strange Story suggested that several participants believe the things we create are representative of ourselves. They believed that an individual's confidence and sense of self was important, and therefore that to lie to protect a friend's sense of self is justified. Several raised the option of 'constructive criticism' as a more productive way forward, e.g.

Florrie cares a lot about Ruby and knows that Ruby is very proud of the website. Florrie doesn't want to hurt Ruby's feelings, so she lies instead to make Ruby feel better. She is trying to be a good friend... Instead, Florrie should have offered some helpful suggestions, although put them across nicely e.g I like that but I think this would look nicer like this. (IL12, I₄)

This isn't a big life changing thing Florrie is doing, it is if anything, a small act of kindness, keeping her friend happy for the sake of not telling the total truth.

Nobody is getting in trouble for Florrie not saying totally what she thinks, nobody is getting harmed, all she is doing is keeping her friend happy, and making her feel like she has achieved something, which is what friendship is all about, really....But alternatively, who says Ruby's website is 'ugly' anyway? Not everybody has the same definition of 'ugly', and just because Florrie thinks the website is 'ugly', doesn't mean anybody else would... Florrie should have given the website some constructive criticism because that will have helped Ruby to make her website even better. (CI6, I4)

Age did not appear to be a mediating factor in participants' online or offline relationships.

Overall, there were no obvious age differences in the ways participants were approaching their parents, or online and offline friendships. This was reflected most clearly in the adapted AAQ (I3) data in Figures 12 and 13 below, and was also the case for the wider data set.

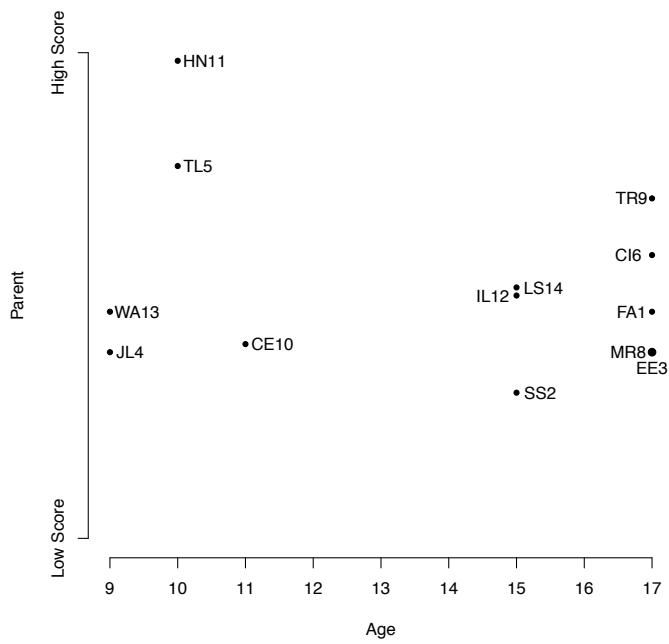


Figure 12: Attachment score for parents by age of participant.

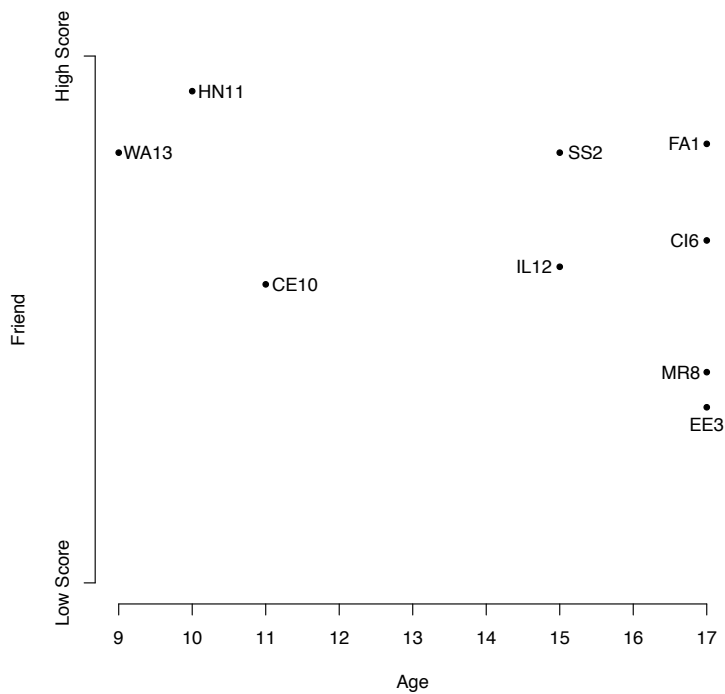


Figure 13: Attachment score for online and offline friends by age of participant.

This was surprising. The literatures on adolescence and attachment identify a change throughout the period from parents as a secure base from which to develop increasingly important peer relationships (see Chapter 2). As such, we might have expected to see this change reflected in these data, with older participants describing friends in more securely attached terms than parents, and perhaps offline friends more securely attached than online friends. These data do not reflect such a change. This could be for a number of reasons:

- a) It is a function of this particular sample.
- b) The length of the adapted AAQ has resulted in more automated responses than carefully thought through ones.
- c) Participants' mental models of parental relationships are so different from their mental models of friendships that they continue to see parents in the same light throughout the adolescent period, even though their friendships are becoming increasingly important.

In contrast to popular representations of adolescents as being in almost unceasing conflict with parents, this study suggests that secure attachments with parents are crucial throughout this stage. I grouped the questions in such a way as to maximise participants thinking of parents and friends in similar mental models (i.e. all questions relating to one concept were grouped together, covering mother, father, online and offline friendships in turn), but it is possible that the mental models of 'parent' and 'friend' are so different by this point that we cannot expect

to see a simple shift from one to the other, as described in the literature. Rather, perhaps the 'parent mental model' continues to be important in a different way as the girl progresses to adulthood.

While it is impossible to say with any certainty which of these three possibilities explains this apparent conflict in the data, the last hypothesis was supported in the pilot study reported in my Masters work and also in the wider data set for this study. For example, MR8 reflected that:

I do think relationships get more complicated as you get older. When you're younger, you're innocent and naive, and you know, you make friendships with someone and say you're going to be best friends for life. And you know, I haven't talked to some of the people I said would be my best friends for life for a good couple of years. I miss them. I do miss them... (MR8, interview)

Future research exploring this would be interesting, administering the adapted AAQ more than once to the same individuals over a longer period of time.

Socio-economic circumstance appeared to be a mediating factor in friendships, although this requires more investigation.

If seeing no obvious progression from parent-focus to friend-focus across participants' age was unexpected, the data relating to participants' socio-economic circumstances and their friendships was even more surprising.

Before discussing the relevant figure, it must be said that the Acorn categorisation applied to each participant was done so on the basis of my knowledge of the family and visits to their home. It is a tentative application of a

socio-economic framework on each family's circumstances, applied to ensure that I did not just speak with young women in one category or another. It cannot be considered a truly robust assessment in that I did not explicitly ask parents to complete any questionnaires or undergo any assessments that would provide a more accurate picture.

Arguably, this is a flaw in the design, but I was not actively seeking to explore the socio-economic differences of the participants. I did not wish to burden families with additional instruments given the amount of time they were already being asked to give to this study. Rather, I wanted a provisional measure of socio-economic circumstance that I could use to flag up any issues arising.

With the tentative nature of these data in mind, I now turn to Figure 14, which suggests a relationship between socio-economic circumstances and the strength of secure attachment to both online and offline friends. Those participants in more challenging socio-economic circumstances (although, importantly, not necessarily in less secure relationships with their parents) appear to be much less likely to have secure attachments with their friends. There was no similarly distinctive curve in terms of relationships with parents.

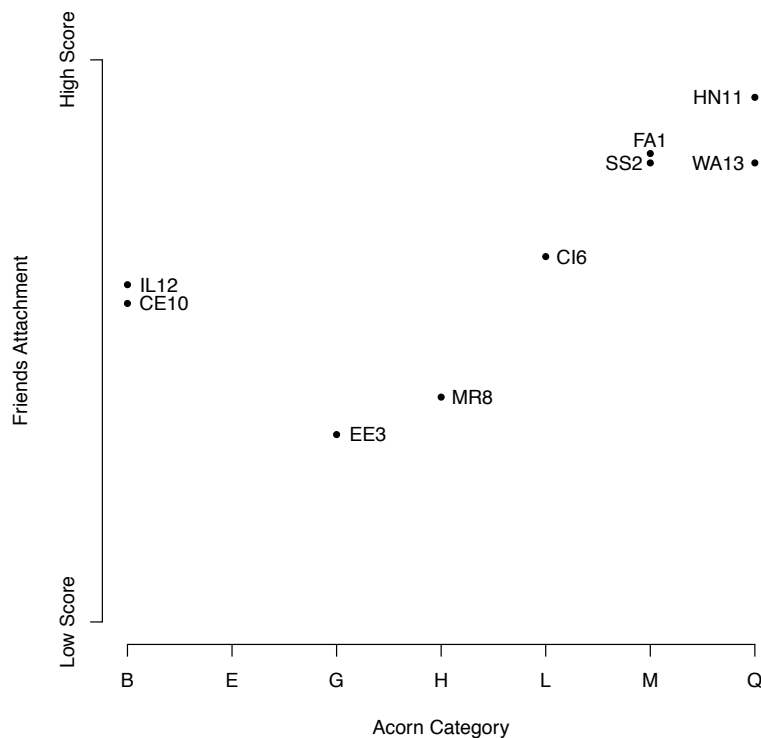


Figure 14: Acorn categorisation reflecting family socio-economic status and combined online/offline friends attachment scores. The distinctive curve suggests that participants in more challenging circumstances are less likely to have secure attachments with friends.

On seeing this graph I turned to the wider, more qualitative data to try to explore the reasons behind it. These data suggested that this pattern could be explained by variations in the sample, rather than being descriptive of more general trends. For example both FA₁ and SS₂ considered themselves to be great friends as well as siblings. They also socialized largely amongst other church-going young people, who they saw on a regular basis. They may not have felt the need to seek friendships outside these spheres.

I don't think I would know half as many fellow Christadelphians as well as I do if it wasn't for Facebook, but I do tend to hang around with one circle of

friends specifically when it comes to my church and its youth weekends etc. & I do keep in close contact with them all the time. (SS2, I1)

Equally, HN11 sees herself as introverted and struggles to create and sustain friendships. Her placing may be less to do with her socio-economic circumstances specifically and more to do with significant wider challenges in her life. Her technology use is an escape into a fantasy anime world, rather than a mechanism for seeking others with similar interests.

I like being on my own rather than with other people...Not many people like me at school...I am really annoying...I talk to myself...People make fun of my name...I have frequent mood swings...I'm not sure why I like all of this [anime, manga, J-pop], maybe because it's different?...Most people laugh at me because of this. And usually, because I don't have any manga's myself, I look at them online or I watch anime online. (HN11, I1)

Given these qualitative indications it became obvious that I needed to explore the survey data more closely so I separated out the online and offline scores. Figure 15 shows the Acorn categorisation in relation to online friends attachment scores. Figure 16 shows the Acorn categorisation in relation to offline friend attachment scores.

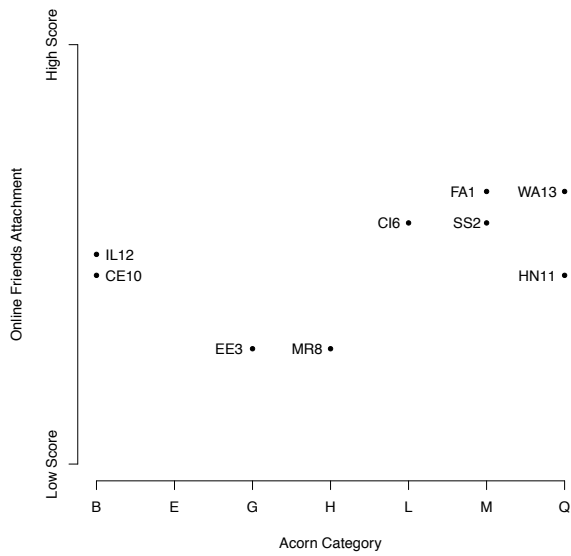


Figure 15: Acorn categorisation reflecting family socio-economic status and **online** friends attachment scores. There are no distinctive patterns to the data, other than three loose groupings of IL12/CE10, EE3/MR8 and the remainder of the sample.

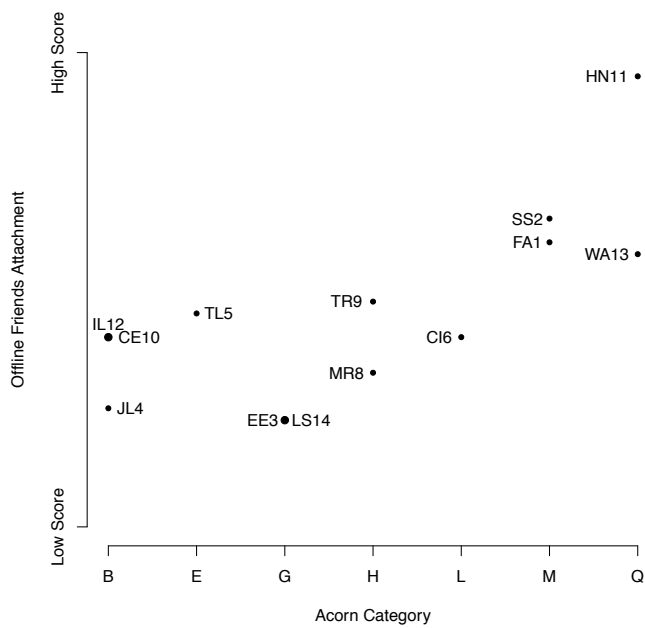


Figure 16: Acorn categorisation reflecting family socio-economic status and **offline** friend attachment scores only. Note the distinctive curve from bottom left to top right of the graph.

These figures suggest that sample variation is, indeed, the most plausible explanation for the relationship described in Figure 14. However, the curve in Figure 16 is so obvious and distinctive that it should not be wholly dismissed; there are other explanations that address the socio-economic issues more explicitly. For example, young girls in higher socio-economic groups may access technology from a younger age (since parents are able to afford the purchases) and therefore be more likely to develop online friendships. Perhaps they are more likely to make friends from a wider circle if they are involved in extra-curricular groups or take overseas trips that many families cannot afford, necessitating online contact. Perhaps girls from more affluent socio-economic circumstances have more confidence in navigating their online worlds. All of these possible explanations have implications for adolescent risk-taking and online behaviours that need to be explored in future research.

Overall, the data set provides a clear perspective on adolescent and pre-adolescent girls' use of technology in relation to their friendships and relationships with parents. Some of these perspectives are verifications of previous studies cited in Chapter 2. For example, we know that families – and especially mothers – are important to adolescents. The literature also discusses the increasing importance of peer relationships and friendships during this age range, and the ways in which technology can act both as a gateway to new relationships and a space in which to maintain connections with old friends and dispersed family. This study builds on

this work by suggesting that technology can also act as a means by which the positive and negative attributes of existing relationships can be amplified.

Other findings are more counter-intuitive, novel or in need of further exploration. Tentatively, socio-economic circumstances may be related to the strength and quality of online and offline friendships, and needs further quantitative exploration across a wider sample. It can be said more confidently that, for some participants, digital artefacts are artefacts of self and, as such, are factors in the way relationships are managed across individuals. My participants believed that they are as hurt by negative online interactions as they are by things that happen in the physical world. The emerging findings from this study's exploration of self and identity examine this further.

3. Self and identity

3.1 The process

The first three steps of the analysis process yielded data relating to technology-mediated relationships and attachment from almost all of the data sources. Interactions 1 (Twenty Statements Test on self), 4 (mental state stories on ToM), 5 (scenario-based tool on attribution) and the interviews were the richest sources, perhaps because they explored both participants' perceptions of themselves at the time of the data gathering, and also asked them to reflect on their memories and prior experiences.

3.2 The findings

Here, I will share the findings relating to each of the important aspects of self and identity outlined in Chapter 2. For each, I will reflect on what the participants shared in relation to the aspect more broadly, and with regard to technology more particularly. I will then draw these strands together to provide an overview of the interplay of technology and this aspect of social cognition.

Technological multiplicities: technology appeared to play a role in most aspects of the self-concept explored with the participants.

In Chapter 2, I shared the key message from the literature that the self is a multiplicity. I was interested to learn more about how the selves held by my participants changed over times and perceptions of times, emotional stimuli, neural and psychological health. I was curious about how my participants' sense of their multiple selves was subject to their wishes and goals, and adapted in their described contexts. Most of the reflections on the self shared here are of 'self-as-object' (Damasio, 2012, after William James), although this does not mean that these findings exclude implications for self-as-subject.

The data suggest that aspects of technology use manifest the global and working self-concepts in potentially interesting ways. Although we cannot say a great deal about the malleable working self-concept or the stable global self-concept, given that this research dips in and out of participants' lives, there are aspects of technology use that serve both ideas linked to the multiplicity of the self. For example, most participants expressed a preference for one or other form of

social media or website. For TR₉, the immediacy and parsimony of Twitter was attractive. For MR₈, Tumblr was opening up a new visual community that had been previously addressed by a text-based one. For HN₁₁ DeviantArt and HetaOni were fulfilling her wish to be 'alternative'. Although this study focused on moments in time, rather than extended periods of time, these reported uses of technology suggest that some aspects of participants' global self-concept (immediate connections with others, communities, alternative communities, creativity, popular culture) can be addressed by one or other form of technology, regardless of platform or specific type. For LS₁₄ Instagram, with its visual attractions, spoke to her enjoyment of both the arts and popular culture, interests she perceived to be an ingrained part of her personality.

With arts and stuff I'm more the, like, photographs...I'm always, like performing arts. I like more hands on stuff, because the other stuff just bores me...I don't know but when you do drama and stuff it is like YOU. You can put your own twist on it and stuff....And photography offers that as well. It's like, through your eyes in a way. (LS₁₄, interview)

Equally, the data suggest that technology can speak to participants' working self-concept too. TL₅'s move from Zondle to more sophisticated gaming and extensive use of YouTube hints at changing interests, alliances and communities becoming attractive to her as she matured. Several participants (e.g. TR₉, CI₆, IL₁₂) spoke of a move from Facebook to Twitter or enjoying the relative anonymity

of Instagram - reflecting changes in their lives or perceptions of the benefits and disbenefits of social media.

Both the NVIVO and mindmapping analysis phases saw similar themes arising from the data. These themes reinforce the perspective of the multiple self, and suggest that technology facilitates the creation, sustenance and navigation of self and social identities throughout adolescence.

The creative self

The majority of the participants mentioned enjoyment of one or more creative pursuit during the data gathering process. Eleven of the 14 participants played a musical instrument or sang in a choir. Five spoke of enjoying drawing, photography and design, two were regular creative writers, and two took weekly dance classes outside of school. Only two participants did not share any information about creative activities. The stereotype of technology-obsessed adolescents who exclude other activities from their lives is not borne out here.

Technology plays a role in the creative pursuits of several participants.

I am creative...I use technology (mainly the computer) to get most of my creative stuff down. You know about my roleplaying with E, and you also know I write a lot (both on the computer and in notebooks). So yeah, I guess you could say technology brings out my creativity. It's definitely not a barrier, its a way of getting the words down (MR8, I1)

...when you do drama and stuff it is like YOU. You can put your own twist on it and stuff....And photography offers that as well. Its like, through your eyes in a way. (LS14, interview)

Participants had widely varying perspectives on whether making something using technology was as creative as something made in other ways (a question I explored as part of Interaction 4). Table 15 shares the three main perspectives arising from the data. There was no obvious distinction between ages or socio-economic circumstances, suggesting that these perspectives are rooted in participants' self-schemas, rather than ecological/contextual factors. None of the perspectives were dominant across the sample.

Making with technology is as creative as making without technology.	Making with technology can be creative, but not as creative as making without.	Making with technology is not creative.
<p><i>i think when you make things through technology it is just as creative as in real life :) (FA1)</i></p> <p><i>If you make something, it's creative, no matter how it was made or what it is. There are different types of creativity and some are more creative than others, but it's still creation. (MR8)</i></p> <p><i>Things that we make with technology are creative as they are personal to you. (CE10)</i></p> <p><i>When it comes to creating</i></p>	<p><i>I think things we make through technology like websites are creative, but not as creative as say a piece of music because in technology they give you the base for everything, but writing a piece of music; you have to come up with every little detail. (CI6)</i></p> <p><i>Well, personally I think it's much better to create a piece of music or a piece of art, or write a story, they're more me I guess but yes, I do think the things we make through technology can be creative also, (I love</i></p>	<p><i>I don't think making a website is the same as writing a story or creating a piece of art. Writing and art requires imagination from inside your head, whereas when making a website the foundations are already there for you... However I may be slightly bias as I love writing and art, and don't really like ICT lessons at school in which we had to make a website as a project. I found it quite boring, and would much prefer</i></p>

<p><i>websites I think it is really creative! It has to be designed and created like any piece of art. The media that art is created on doesn't make it any less creative. (TR9)</i></p> <p><i>I think that they are creative as you can design your own personalized space. (JL4)</i></p>	<p><i>reblogging photos etc. on Tumblr for example)...overall it's better to do things without a screen in front of you. (SS2)</i></p> <p><i>I don't think making a website is the same as drawing or art, but you can make very creative stuff with technology. (HN11)</i></p>	<p><i>to do something with my hands rather than using technology for example I'd much rather write using a pen and paper than the computer, as I find it easier to let my ideas flow. (IL12)</i></p>
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Table 15: Perspectives on technology and creativity. All quotes are drawn from responses to Interaction 4.

In Interaction 1, IL12 also touched on issues relating to creative representation and authenticity. Her response suggested that there were layers of creative and representational authenticity that were mediated by technology.

I don't bother editing my pictures However if I did and I put it as my Facebook profile picture and 'likes' on it, I would feel false as I'd get 'likes' for something that isn't the way I look. (IL12, I1)

For IL12, technology facilitated the projection of her self-representation (in the form of an unedited photograph). To edit an image of herself was not a creative act; it was an act of creating an inauthentic self. To get 'likes' on Facebook was not a manifestation of people's approval of her self-representation or the creative adaptation of that representation, but rather a manifestation of approval for the inauthentic self.

The self reaching out, the self looking in

Most of the participants described themselves as being what we might more generally describe as 'extrovert' or 'introvert'. At the introvert extreme lies HN11:

I like being on my own rather than with people. (HN11, I1)

And at the extrovert extreme lies LS14

I think because I am this sort of person it makes it easier for me to communicate with people, all my friends are quite bubbly and outgoing like myself. (LS14, I1)

For LS14, technology was the means by which she was able to manifest her extrovert self and keep connected with her social identity.

I'm more of a face-to-face person. Yeah, I love going out all the time. Like, my favourite Twitter is a way of keeping me up to date with what's going on in my world.

DTL: How do you feel when you're alone?

LS14: I don't know. I prefer other people's company. I'm never alone with my phone. (LS14, interview)

I used it for twitter, tumblr, BBM, some Facebook, texting and music. I think this sort of technology makes you interact with new people and more than you would face to face. I love my phone I couldn't live without it. (LS14, I1)

EE3, on the other hand, described her comfort in being alone. She did not dislike social interactions, but valued being alone too. She mentioned technology almost as an aside, suggesting the integral level to which it was embedded in her life. She did not see it as a comfort, or a distraction, or a link with the outside world. To her, it simply existed as an embedded feature.

I mean - this sounds stupid - but it might be different because I'm an only child. I used to sit here on my own, talking to my teddies, having picnics with them. I like to have lots of friends. I don't have specifically one best friend who I always hang around with...I've never disliked being alone for a little bit...I don't mind that sitting on my own listening to my iPod or whatever. (EE3, interview)

The believing self

Several of the participants expressed a religious orientation or faith. Some defined themselves as Jewish, Christadelphian, Christian, atheist, and in MR8's case:

I don't believe in God, but I believe there is /something/. I just don't know what it is. I am made from the stuff that was once inside old stars (MR8, I1)

As with the other selves, technology facilitates faith manifestation, for example SS2's use of Facebook to share Bible quotes:

I mean nowadays on Facebook I literally just put Bible quotes. (SS2, sister dyad interview with FA1)

Or EE3's use of Skype to learn her Torah portion for her Bat Mitzvah

'...I used to read my portion to her over Skype and she used to give me tips...I remember sitting here with the phone and reading out my portion and she had the version over there correcting me as I went along. That also helped with the organisation of how the Bat Mitzvah was going to run, because realistically we didn't have a run-through before we did it with her. (EE3, interview)

There were also examples of technology facilitating connections with others in the faith identity.

I don't think I would know half as many fellow Christadelphians as well as I do if it wasn't for Facebook, but I do tend to hang around with one circle of friends specifically when it comes to my church and its youth weekends etc. & I do keep in close contact with them all the time. (SS2, Interaction 1)

TR9, in contrast, did not use the internet to connect with Messianic Jews worldwide. This is possibly because she had a wide circle of friends outside her religious community, and did not experience this as a gap in her life. Once she leaves college and goes to university this may change; role entries and exits are sometimes occasions when people seek homogeneity (Iyer, et al., 2009; Light and Visser, 2013) and she may seek these connections in the future.

The emotional self

Participants explored a range of emotions throughout the interactions and interviews. I did not actively seek to explore these in a systematic way, but took a more opportunistic approach to gathering insights into their emotional states.

Anger and frustration were recurring themes. For most participants exploring anger was something that technology could mediate, but none of them expressed the view that they believed technology had inherent characteristics that made it easier or more difficult to manifest, share or defuse their emotions. Rather, they believed that technology use in emotional contexts was a feature of their individual personalities.

I'm not like a really angry person at all...Like with one of my best friends, her ex, he cheated on her so many times, and she always used to go back to him. In my head I don't see why she didn't learn. And that used to anger me so much...I wouldn't like, box it all in. I can't do that. I can't keep it in. I talk it out, cry it out, get it out somehow. Can't keep it all in. Never...texting or facetime [is a way of getting things out] (LS14, interview)

FA1: To be honest, some stuff does really like get to me. Not many, but I have had things like that. I suppose you forget them over time.

DTL: Do you talk about these things?

SS2: Not really. But then that's more about who I am. FA1 tends to talk more about how she feels about stuff than me. Online or face-to-face. (sister dyad interview, SS2 and FA1)

I have frequent mood swings...My mood swings haven' always been there, but more when I went to secondary school. When I'm feeling low I just normally either listen to music o just sit on my bed until it goes away. (HN11, I1)

Five participants described themselves as 'happy', particularly with regard to friendships and social settings. There was no explicit discussion of technology in these examples:

I think that being happy and sociable can reflect on the others I am with I hope in a positive way! I think that I am quite happy around my friends and always try to cheer people up. (EE3, I1)

I see myself as a happy, outgoing, positive, and optimistic person! I think because I am this sort of person it makes it easier for me to communicate with people, all my friends are quite bubbly and outgoing like myself. (LS14, I1)

Two participants also spoke about having mood swings typical of the age range:

I have frequent mood swings. (HN11, I1)

Sometimes I'm happy, sometimes sad. (IL12, I1)

Admittedly, the exploration of emotions during the interactions lacked any nuance or sensitivity. The interviews were much richer in this respect. It could be that a method that comprised short interviews following each interaction might have encouraged more disclosure of emotional states; it is difficult (and sometimes inappropriate) to ask 'And how does that make you feel?' via email.

The evaluative self

There was less evidence of these young people as self-evaluators; there were no instruments that actively sought to find evidence of participants creating metamodels of the self as agent. That said, there were some examples of participants assessing themselves in relation to their lives, activities and interactions with others.

I am in the top groups for all lessons. I am never pleased with my levels.

(HN11, I1)

I like it to be right. (HA7, interview)

I felt kind of special, in that she wanted to keep in touch with me, because there were points where I was like 'Do you actually want to talk?' and she was

like 'Yeah, yeah, yeah'. And I felt like I was needed in a way. And I didn't mind that...I'm looking into music therapy, and I quite enjoy helping people get through their problems and stuff...So yeah, I've enjoyed it, and I always look forward to our Skype chats...I think it has helped both of us if that makes sense. (EE3, interview)

These evaluations appeared to be motivated by both contextual factors (e.g. prowess at school) and factors they perceived within themselves (e.g. the feeling of being needed). There was no evidence of conflicting ideas, goals or gaps leading to behaviour change, either through or without technology, but then this was not explicitly explored via the methods.

The vulnerable self

During discussions surrounding bullying and cyberbullying, many participants explored ideas around vulnerability, and whether technology makes them more or less exposed to challenging circumstances. Most of them believed that while technology might amplify or make it easier for bullying to be perpetrated, the personality and circumstances of the bullied individual were more important factors in the bullying ecology. For instance, EE3 and LS14 had similar views:

I don't know really. I mean it can't be completely pot luck, because if you think of all my friends, none of them have been [cyberbullied]. So you think there must be something different, maybe personality-wise or people you choose to make friends with, I don't know. Or 'friends'. It could be something to do with that...I mean you see things on Facebook and you think 'if you said

that to me I'd be really annoyed at you, but you're online so carry on.' And that's just personalities. (EE3, interview)

LS14: No, no definitely not. Never...

DTL: What, do you think, if anything, has protected you from that?

LS14: I don't know really. I think its like, I don't know, in my eyes I just think that people are mean - some will just pick on anyone don't they, but I think its normally the shy people. The fact I'm quite outgoing, I have a big circle of friends, I think that's an advantage. (LS14, interview)

CE10 shared that she had been traditionally bullied (i.e. not cyber-bullied) at the end of her primary school regarding her academic strength and interest in technology. Like LS14, a group of friends (rather than removal of technological presence) was a significant protective factor in ensuring similar experiences did not reoccur.

CE10: Near the end of Year 6 I got called a 'nerd' and a 'geek' by someone I thought was kind of my best friend...So I found a good circle of friends around me now (sister triad interview with JL4 and IL12)

MR8 was the only participant to believe that her lack of online presence in a social media context had protected her middle childhood from bullying, unlike her experience of traditional bullying. It is notable that at this stage she was already writing anonymously with a wide range of young people and adults on Maximum Ride, under the supervision of her parents.

DTL: What made you vulnerable to that face-to-face bullying in a way that you haven't been vulnerable to cyberbullying?

MR8: I think the main reason being the physical one - I was there. In the cyber one - I wasn't. I didn't have Facebook or Myspace, and I didn't know Tumblr existed. I hardly gave anybody my mobile number. People who'd have wanted to cyberbully me, they'd have been hard-pressed to find me in a way to do it. (MR8, interview)

She believed that the characters she wrote about online had encouraged her to develop stronger characteristics. She spoke about how growing taller and running faster had protected her from bullying later in adolescence.

The characters have your qualities, but then in return you start to get the qualities from your characters. I got a lot more smart-mouthed. I got a lot stronger. I was much more likely to throw the torch to someone than to walk away with my tail between my legs. (MR8, interview)

FA₁ was the only participant who shared an experience of having been cyberbullied (although three others had experienced traditional bullying in the past). She explained that her mechanism for dealing with the problem was to remove the bullies from her online spaces, and that it had had an impact on her online behaviours since the incident.

FA₁: Yeah...a few years ago on Facebook. It was X Factor 2009. I used to be a bit obsessed with Jedbert. And it was quite controversial. I used to go a bit over the top with how much I supported them. And it was quite shocking

actually how nasty people would be over something like that. I had girls at my school...I'd get comments about me and...and I'd just delete them off and that really...they weren't even in my class. They wouldn't say anything at school. But they thought it was OK to say stuff online. It wasn't hurtful or annoying, it was just a load of swearing. Delete and move on.

DTL: Do you think it made you make different choices about the things you posted about?

FA1: Absolutely. More careful. More cautious. (Sister dyad interview, SS2 FA1)

The adolescent self

The participants were aware of aspects of their development that appeared to be changing as they progressed through adolescence. Many described themselves as 'teenage girls' in the Twenty Statements Test, and raised the state of adolescence in the interviews.

For some participants adolescence was about the interaction of age with activity. They perceived themselves as taking on increasing responsibility as they progress physically through adolescence, preparing them for adult life.

I think that as I am still at school and am under 18 years old I can still be classed as a child but at the same time I think that I am growing up and now have a job and so am becoming a woman as I learn and get older. (EE3, I1)

I don't use the internet much but I will use it more when I go to secondary (JL4, I1)

I'm stronger than I was back then...a mixture of things. Partly experience. I'm 17 now, I was 11 and tiny. I'm now 17 and 5 foot 8. Stronger now - I can run pretty fast, which is obviously an advantage. Mentally, you know um, I've had more experiences. I actually think the role playing has impacted quite a bit on it. (MR8, interview, on handling bullying)

For other participants, adolescence was about an interaction between a wider range of factors, including their own personalities (which they appear to perceive as stable), confidence, likes and dislikes.

CE10: I think me and JL4 are more prone to going on MarioKart - we quite enjoy MarioKart. I'm OK with WiiFit. And IL12 is more about WiiFit.

DTL: And do you think that's more about who you are as people? Or your ages? Or something else?

CE10: I think it is about our ages.

IL12: I think it is about us as people. I think doing some exercise is more interesting than taking a car round a track.

CE10: Yeah, maybe a bit of both. Because IL has reached an age when she really wants to be slim, like a model.

IL12: I think I've got more self-conscious as I've gotten older.

CE10: And JL4 and I are probably more childish. We kind of prefer things like being competitive with each other.

JL4: Slightly!

CE: Yeah, I used to not be very fussed about my hair, and now I'm like 'Don't touch it!'

JL4: I like looking nice. So I usually, generally, get IL12 to do my hair.

IL12: I've got more image conscious as I've got older, but I'm also feeling more confident. (Sister triad interview, IL12, JL4 and CE10)

Most of the participants appeared to be satisfied to let technology-mediated experiences unfold as they progressed through adolescence. For example, with regard to Facebook use, CE10 and JL4 were happy to wait until the minimum age (13) to join, and to have their mother as a friend in online spaces.

CE10: I would like to when I'm older

JL4: Yeah. (Sister triad interview with IL12)

In contrast, TL5 appeared to perceive adolescence, and particularly online spaces, as a space to be colonized when she felt ready to do so.

There is like this one girl, G, and she's like [in a squeaky voice] 'You can't be on Facebook, you're too young.' We're 12 and 13. We're going up into Year 8. I joined Facebook recently because I didn't want to be like five years older than I already am. I'm just one year older. (TL5, interview)

Given the trajectories of almost all of the oldest participants (FA1, EE3, TR9 and MR8 – no relevant data available for CI6), it is likely that the attractions and perceived status of a Facebook profile would fade over time in favour of more immediate media such as Twitter, or more visual media such as Tumblr, Snapchat or Instagram.

I first got Facebook when I was 13. It was like the 'cool thing', like to finally have Facebook with your friends and you could like talk to each other online after school. It felt like a grown up thing. I haven't really used Facebook in a long time...[Twitter] its so much easier, because its kind of, you can have all your friends, and like famous people, and like your college, in one thing, and it gives you the information you need...its just more instant. (TR9, interview)

But in the moment of the interview, TL5 was clear that a Facebook profile was a way of staking a claim on adolescence, moving out of childhood, and aligning with others like her in her social group.

Both EE3 and TR9 mentioned some sympathies for their grandparents, whom they felt were more cautious, lacking in understanding and fearful of technology use. This suggests that, regardless of the lack of robust evidence of 'digital native and immigrants' (Selwyn, 2009), this myth could be as persistent among young people as the myth of the 'difficult adolescent' is among older people.

I do think that technology kind of helps, and I think that being a teenager and having these things around you growing up - like my generation has always had it - so it is probably not quite as scary as it is for, say, my grandma. (EE3, interview)

The described self

Participants described themselves in a myriad of ways in Interaction 1.

Poor memory (HN11)

Vain (IL12)

Funny (CE10)

Chatterbox (JL4)	Embarrassed (WA13)	Clumsy (JL4)
Deep thinker (MR8)	Optimistic (MR8, LS14)	Independent (SS2)
Nice (TL5)	Caring (SS2)	Strong (CE10)
Not stressed easily (TR9)	Positive (TR9)	Trustworthy (TR9)
Random (TL5)	Impatient (IL12)	I don't believe in perfection, but I believe in pretty damn close. (MR8)

Many saw technology as facilitating or amplifying these self-aspects. HN11 watched anime online, or accessed online manga to explore being 'different'.

I'm not sure why I like all of this, maybe because it's different? Most people laugh at me because of this. And usually, because I don't have any manga's myself, I look at them online or I watch anime online. (HN11, I1)

Yeah...always checking what's going on. And I'm always on Instagram...It's just, cos, its different pictures of everybody else's life...Just friends, and fashion pages, I'm like obsessed with those [laughs]. (LS14, interview)

Two participants did not see technology as an important feature in their self-concept.

HA7: I don't watch a lot of videos. I much prefer reading books...Its just [sister] really like technology, and I'm not bothered about it...Books have plots. And books you can always stop. You're in control of the book. (HA7, interview)

When I am talking about myself, i dont tend to think about technology because i dont think that it affects the person I am (FA1, I1)

SS2: To be honest, when I go on the computer I'd happily go on Tumblr rather than anything else. Again it is photos and blogs. The kinds of blogs I follow are like scenic views...sounds a bit weird, but arty photos and things like that. So Tumblr is really my favourite social network. I don't share things on there yet. Maybe in the future...On Tumblr you just re-blog other people, and Instagram you're putting stuff on yourself.

FA1: Yeah, it is more like that. But I think it is more personal. Because they are photos you've taken. People can't tell who you are on Tumblr - it is more anonymous...I think so [can develop an identity] Because if you go on somebody's Instagram page, or a fandom one, on your personal one there's a few photos of you and, so like, stuff you've been doing or places you've been to. (Sister dyad interview, SS2 and FA1)

As described above, the participants shared their multiple selves and the role technology played (or didn't play) in facilitating these complex perceptions. I now share key findings relating to other to functions and characteristics of the self.

Participants did not believe that technology use was associated with the self-traits of agency, persistence, enthusiasm or determination.

A number of the participants demonstrated the characteristics we would associate with **personal agency and choice**. The literature suggests personal agency manifests itself through *determination, persistence, competence and confidence*

(see Chapter 2). Some of these views were sought, for example in relation to determination and persistence. However, there was no real consensus among participants as to whether technology use facilitates persistence and some responses indicated that participants were thinking about the complexities surrounding the individual that might influence use. There was also no indication of a relationship between technological enthusiasm and belief that technology facilitates persistence or determination.

I think that as there are so many different resources on the internet and through using technology we have more options to try so will probably continue trying for longer. However, this may differ between generations as younger people seem to rely more on technology so would use that before using paper and a pencil or a book (EE3, I5)

I think we try to do difficult things when we're using technology because there are so many answers on the internet that can help us (CI6, I5)

We give up just as quickly. (HN11 I5)

I think when we're using technology we're more likely to get distracted and go onto other sites, which wouldn't be the case if you were using pen and paper. (IL12, I5)

The most obvious example of technology use influencing a participant's levels of determination or resilience arose during MR8's interview, in which she spoke about the ways in which the characters she wrote during her online role-playing sessions began to imbue her daily life with their characteristics.

Because I was, you know you take on the qualities of the characters you're playing. The characters have your qualities, but then in return you start to get the qualities from your characters. I got a lot more smart-mouthed. I got a lot stronger. I was much more likely to throw the torch to someone than to walk away with my tail between my legs. (MR8, interview)

Other examples arose more spontaneously, relating both to technology use and in other important aspects of participants' lives.

But I remember there were times when I was crying to my mum 'I can't do this.' But afterwards, like my mum said about my GCSEs, 'I know you can do it because you did your Bat Mitzvah. I know that if there's something you want to do now you will do it. (EE3, interview)

I have already started in design, as I have made a dress and it might get into the fashion parade at the end of the year which has encouraged me to do more than just make little purses and pin cushions, clothes are a lot harder, but it's worth it! (TL5, I6)

Participants' technological competence did not appear to be linked to the strength of their technological self-efficacy.

There were no consistent patterns suggesting that participants' technological competence was linked to the strength of their technological self-efficacy. For example, HN11, so lacking in confidence in many areas of her life, enjoyed significant technological competence:

I am annoying...I talk to myself...People make fun of my name. (HN11, I1)

I'm really good at HetaOni...keep trying things until I can do it. (HN11, I1)

Whereas HA7, academically very confident, lacked a strong sense of technological self-efficacy. HA7 saw herself as the 'bookish' person in the family, with her younger sister taking on the more technology-focused role (which was also, incidentally, an opportunity for me to correct an error in my interviewing style).

DTL: And do you and [sister] ever row about technology?

HA7: Not a lot, because when it starts I just go off again. I'm happy to let her get on with it....I like watching rather than playing because I'm better at watching. [DTL Laughs]

HA7: No seriously I do.

DTL: I'm sorry. I believe you.... (HA7, interview)

Most of the participants believed that they exerted at least some level of control over the technology used in their day-to-day interactions.

Technological environments are contexts in which we can explore the levels of **control** young people have over the technology use at their disposal, and hence the levels of personal agency they are able to exert over this aspect of their environment.

In Interaction 5, participants were asked who they believed had control over the technology at their disposal. As will be seen in Figure 22 below, 13 of the 14 participants who responded to this question said that they believed that they had control when they used technology. There was no correlation between age, socio-economic circumstance or other aspects of self and these questions.

This suggests that perceptions of power and control around technology use were more nuanced than those sometimes portrayed in the media. The participants were generally aware of how much control they had over their technology use, although some also acknowledged other adults' roles, and in some cases welcomed that presence:

I think we all trust Mum and Dad. And I think it is a bit of a deterrent - puts people off if they see your parents on there. (IL12, sister triad interview with JL4 and CE10)

I will discuss these issues of control and the way they relate to participants' perceptions of risk in the section on findings related to attribution below.

Older participants were more likely to say that technology amplifies positive self-esteem.

Interactions 1 and 5 and the interviews all yielded data relating to participants' **self-esteem**, and a number of indications that some aspects of technology use were more closely linked to self-esteem than others. For some participants, particularly the younger ones, self-esteem and confidence were both manifest in a sense of their academic competence.

I play chess very well (HA7, I1)

I am clever. I am good at art. (TL5, I1)

... i'm her bezzie and i'm top set for everything (TL5, I5)

HN11's responses, in particular, indicated low levels of self-esteem:

I am in the top groups for all lessons...I am never pleased with my levels...

Not many people like me at school...I don't fit in with my friends...I am really annoying...I talk to myself...People make fun of my name. (HN11, I1)

Older participants were more likely to share examples of technology use related to their self-esteem. During her interview, EE3 shared a memory of going for dinner with friends. One of her dinner companions took a photograph of EE3's dessert to put it on Instagram or Snapchat.

And I was like 'woah! What're you doing? Can I eat it now please?

[Laughs] ...I think probably part of it is you want people to like the stuff that you do. Which could relate to people liking you. Because I know when I put my picture up on Facebook yesterday I was like 'Please, somebody like it, or I'll feel like...I even told my dad to go on Facebook and like it! [Laughs]...But I mean it kind of makes you happy in a way to see that people are interested in what you're doing, and that little 'like' button actually does mean quite a lot to some people. (EE3, interview)

Similarly, during her interview MR8 shared that she had contributed a short story to a fandom on Tumblr. She spoke about how much the positive reception had had a reciprocally positive impact on her.

DTL: How did that make you feel?

MR: It was really really positive. I posted it late at night. Went to sleep. Woke up and had, like 50 notes already! I thought 'Oh my god! Attention! They like it!' [laughs]. There's something about the reward...(MR8, interview)

Younger participants were more likely to evaluate themselves in clearly defined roles. Older participants were more likely to evaluate themselves in a nuanced way.

CE₁₀, TL₅ and HA₇ all described themselves as ‘clever’ or competent at an academic subject or creative activity. For example:

I am clever. I am good at art. (TL₅, I₁)

This was not necessarily the case for their technology use; it appeared that this facet of their lives was more closely aligned to their personality and self-concept than their self-evaluations. HA₇, for example, while academically confident, did not see that competence as extending to her technology use. This was not because she perceived herself as being incompetent, but because (certainly in comparison to her sister) she had no meaningful interest in technology use.

I don't watch a lot of videos. I much prefer reading books...Its just she really likes technology, and I'm not bothered about it...Books have plots. And books you can always stop. You're in control of the book. (HA₇, interview)

In contrast, older participants were more likely to evaluate themselves in a more nuanced way, and this applied to ways they perceived themselves and their motivations for using technology. For example, EE₃'s relationship with her anxious agoraphobic friend, with whom she communicated via Skype:

I felt kind of special, in that she wanted to keep in touch with me... And I felt like I was needed in a way. And I didn't mind that...I'm looking into music

therapy, and I quite enjoy helping people get through their problems and stuff...I think it has helped both of us, if that makes sense. (EE3, interview)

Participants said that technology could help them realise their possible selves, but they did not see it as fundamental. Their ought self-guides were dominated by worries about academic performance and career paths.

Interaction 6 focused on exploring participants' possible selves. The Interaction began by asking them to reflect on who they might be, and what they might be doing at age 30. Only after this were they asked to reflect on the role technology might or might not play in making that aspiration a reality, as I was interested to see how much they might spontaneously say about technology.

Most participants focused initially on their career aspirations, sometimes linking these to their current interests:

Psychology (EE1)	Vet (CI6)	Teacher (FA1)
Design (TR9, TL5, HA7)	Architecture (IL12)	Doctor (JL4)
Zookeeper (WA13)	Author (MR8)	Science/maths (TL5, MR8)

The youngest participant, HA7, was not sure what she wanted to do when she grew up.

I don't know what I want to do when I grow up. The thing is, you find out as you go along - I need to learn what I like doing. I've got loads in my mind. I'd like a job that inside mainly. If its sunny then I want to be able to be outside. I've been thinking about being a designer. I like designing clothes. Girls' I like

designing dresses, I like designing tops, I like designing trousers. I like drawing things that look real. (HA7, I6)

All of the participants spoke about the future importance of family and friends and continuing activities they were currently interested in, reflecting the current importance of these networks in their lives. For some, being social was about being relaxed, for example, EE3 said:

I also think that it is important to relax and socialise. It is also important for me to keep doing my music but that is partly work and partly fun so I don't mind (EE3, I6).

Whereas for TL5, a future social life reflected her ambition and the somewhat stormy peer relationships she was navigating during the data gathering:

I'm a gamer at the moment and I would like to incorporate that into my adult life, while still being social and doing other things over gaming, such as parties and relationships. Antisocial people don't get far and I would like to get very far in life, therefore social before gaming. (TL5, I6)

Five of the participants spoke about the importance of children in their future, although many felt this a distant prospect and not one they wanted to reflect on in any detail, exemplified by HA7, who has a much younger brother:

I couldn't live on a desert island: that's hilarious...I'd like to have babies. I don't want to go through the actual having a baby part though, because that's gruesome. And the sleeping because they scream at night (HA7, I6)

Participants described a range of aspirations for their future self, reflecting diverse ideal self-guides.

I am fun to be around and have a good sense of humour. I want to be someone who likes to try different things. (CI6, I6)

Happy, friendly and always up for a laugh (FA1, I6)

I'd like to be a nice person to talk to, with lots of friends and an interesting life. (IL12, I6)

I like the comfortable and collected attitude of my future self (TR9, I6)

All of the participants felt technology would have a role to play in realising their ideal self, or in achieving their goals. None of them spoke about it in particularly excited or creative terms; they saw it as continuing to be a part of their daily lives in the way it is at the moment, as reflected in this exchange from the interview with IL12, JL4 and CE10:

IL12: People use technology more and more, and it becomes part of your life.

And something that is just there all the time. ...

JL4: I think it can help [me achieve my goals]. If it helps people then its good.

IL12: But technology does have its faults. So it's not good to rely on it all the time (Sister triad interview, IL12, JL4 and CE10)

During her and FA1's interview, SS2 even anticipated using technology less than she did at the time of the study:

SS2: I guess I'll use it less...I suppose you'll use it less because the more you're doing really, if you're off at uni or whatever, you won't have as much time to do that. (Sister dyad interview, SS2, FA1)

Overall, participants anticipated their future use would be mundane:

...technology is becoming more available and becoming more of a social and promotional tool it will help me in business...get in touch and keep in touch with business contacts as well as family and friends who might not live close. (EE3, I6)

I think technology will help me but just in every day stuff like now. I don't think it is a barrier but I don't think it will have a massive part in me becoming who I want to be (CI6, I6)

...help with research and also staying in contact with all my friends. (TR9 I6)

TL5 was the only participant who wanted to push her technological boundaries:

I would, if I had like a week and no restrictions, I would build, like the world [in Minecraft]. Like life-size the world. Like two metres is like two blocks, so it would be massive really. I'm going to build the world. The world as it is. Landmarks and stuff. (TL5, interview)

What this lack of technological vision suggests is that technology was embedded in participants' lives. Technology is seen as a facilitator of the much more important human contact that participants see as fundamental to their future. It did not represent a utopian future; in fact considering the future was not always pleasurable for young people, as LS14's response to Interaction 6 indicates:

I'm so sorry I didn't do this interaction by the deadline. I just can't do it. I have no idea what I'll be doing in the future and I don't want to think about it scares me. (LS14, I6)

As well as participants enabling a small insight into their ideal self-guides, the data also provided some indication of their ought self-guides. Most of the older participants were most worried about their academic performance in forthcoming examinations and their future security:

I worry that I will not get the right grades or that I am going down the wrong path but I think that I can improvise and always have my family and friends with me. (EE3, I6)

Whether I can achieve the desired A levels that will enable me to be a Primary School teacher...maybe looking after animals (FA1, I6)

I'm a little worried about the amount of studying I'll have to do to get the top grades, but if I revise well and organise what I do and when, I should be OK. Also...attending university, there'll be big debts to pay off. I'll need to organise my money well and get the debts paid off as soon as possible. (IL12, I6)

I'm worried if I studied interior design I might be limiting myself if it doesn't work out, so I'm still considering taking other subjects such as geography. If I went with a geography degree it would keep a lot of options open but I don't think I would enjoy it as much as design. (TR9, I6)

Most of the participants knew what they needed to do in order to achieve their idealized future self:

...get baptised (FA1, I6)

Work hard at school and get good grades as to be a vet you have to be very clever! I also think I need to see my family and friends lots so I have a social life outside of school and enjoy myself. (CI6, I6)

I have already started in design, as I have made a dress and it might get into the fashion parade at the end of the year which has encouraged me to do more than just make little purses and pin cushions, clothes are a lot harder, but it's worth it! Academia option, I'm top of the class in those subjects, so, :D (TL5, I6)

I need to get good A levels and study interior design at a university that has good connects with real companies. (TR9, I6)

MR8, IL12 and JL4 all spoke about the role technology could play in addressing their obligations:

I want to try and build it up so that I put my own input in there properly...

DTL: What's the attraction to you of being a producer?

MR8: I mean, you know, considering I want to be writer when I grow up, its always a good idea to advertise yourself and get yourself out there as soon as possible. (MR8, interview)

...carry on working hard to get good grades in my GCSEs and A levels.

Architecture requires good grades and I also want to go to Oxford or Cambridge as a university. I think technology will aid me in becoming this person and hopefully when I am this person, as it allowed you to do so much

more and saves huge amounts of time. Also, technology is constantly being developed so as I get older who knows what will be available? (IL12, I6)

Work Hard. I think that technology will help me become a doctor. If I don't work hard enough. An artist. (JL4, I6)

As explained in Chapter 2, fictional selves can provide an insight into an individual's self-concept as much as possible selves. There were examples of fictional selves in this data set. Some could be termed 'emerging', such as HN11 and TL5's gaming selves, and the avatars they might create in the future. However, one fictional self could be termed 'mature', that is MR8's long term online role playing, particularly the rich paracosms she has created with E. MR8 was explicit about the interaction between her physical self and the characters she wrote about:

Because I was...you know, you take on qualities of the characters that you're playing. The characters have your qualities, but then in return you start to get the qualities from your characters. I got a lot more smart-mouthed. I got a lot stronger. I was much more likely to throw the torch to someone than to walk away with my tail between my legs. (MR8, interview)

This is a fictional self of a maturing writer, with rich, experienced three-dimensional characters living so vividly in her imagination that she took them into her daily perception of herself and her way of being in the world.

I was in a really miserable mood because E and I were struggling to keep one of our characters alive (we managed it in the end, but only just). I didn't feel that anyone at school would understand if I was upset over a character and

not a real person (to them) so I told them that one of my friends was in hospital after being in a car accident...Eventually, we realised that we just weren't ready to let him go and Skye and the gang [other characters] arrived in the nick of time. (MR8, I4)

It was not possible to glean from the data whether MR8's individual characters could be said to have multiplicities of self as her creations, or whether together they comprised a single multiplicitous self reflecting her own self-concept. This is something that could be explored in future research.

There was diversity in the participants' social identities and characters.

Most of the young women participating in this study were involved in a wide range of extra-curricular activities. Four participants took part in instrumental or vocal groups, two were part of the Guiding movement, two attended a regular church youth club, two participated in other forms of religious group, one went to a French group, three danced, one was participating in the Duke of Edinburgh scheme and four enjoyed sports clubs outside school. More often than not, they would define their participation in terms of their identity, e.g. 'I am a musician' (EE3, I1). For most, their interests had been sparked through school-based activities, which they had then pursued outside the school setting. They did this to increase their mastery, to establish themselves in homophilic networks, or to simply spend more time doing something they enjoyed.

Although none of the participants described explicitly essentialist behaviours or attitudes, there were examples of individuals who chose to close down or limit their social identities and the networks in which they operated. MR8, for example, left the Maximum Ride website after a site upgrade led to vast amounts of prior writing being 'lost', as we shall see in Chapter 6. Instead of joining another fandom site, she and E chose to set up their own secure, password-protected site.

In part, this may have been because she wanted to maintain her exclusive friendship with E, based on their shared interests: E's *'likes and interests just came out because they were so similar to my own'*. They also set up their own site because they did not want to be reliant on a corporate server that might delete their writing in the future. Both girls acquired the necessary skills to set up the site and maintain it, with the help of MR8's father. This was interesting because beyond the nontrivial matter of being reliant on technology to support her closest friendship, MR8 would not consider herself an expert user of technology. In fact, she was sometimes disdainful of people who were more enthusiastic about social media.

I'm not very familiar with people who spend half their time taking photos and even less familiar with those who then photoshop those photos. (MR8, 15)

There were other examples of participants who limited their social identities, or actively searched out prototypicality. This is illustrated by FA1's summary deletion of any Facebook friends, SS2's connections with other

Christadelphians via social media, and LS14's focus on friends who were all, like her, *'quite bubbly and outgoing like myself' (I1)*.

Being an active user of technology did not inevitably mean a more limited adolescent social identity.

As described above and counter to popular representations of adolescence, the participants in this study were not glued to their devices to the exclusion of other social activities and the development of associated social identities. This is not a novel finding; Luckin et al (2008) found that adolescents who used more technology were also more likely to be part of extra-curricular activities. What this study does highlight, however, is that the delineation between 'using technology' and 'not using technology' is false and unhelpful in trying to understand adolescent girls' social identities. For many, technology mediates these groups in simple, practical ways; EE3 and CE10 both used technology to record their instrumental practice or to play along with recorded accompaniments, TL5's French group communicated via email outside of school – in French, CI6's rounders team arranged all their practices and fixtures electronically, including the parental car pool rota.

Some participants' identity statuses and social characters were observed in their use of technology. In particular, it was a medium through which some chose to explore and commit.

For some young women, the 'rules' they create around who they interact with through technology, and who is 'in and out' of their online social networks, is something explicit. This was particularly so for the older participants in this study, for example EE3:

So in my head I've got a rule which is on Facebook the only friends I have are friends in my year at school, or people who aren't at my school that I'm friends with. (EE3, I6)

For most participants, friendship was the main social character they were creating and exploring during the lifetime of the data gathering. Even HA7 enjoyed 'making new friends' (I1), and sustained a close friendship with M who had moved abroad via Skype and email. Other participants were using technology more explicitly to explore and commit:

SS2: FA1 uses it to connect with fandoms as well. She's a big fan of Merlin, so she talks to other fans off there...

FA1: I think Instagram...I like pictures better than words, and Twitter is like, just all words...

FA1: I do like to follow lots of people. (Sister dyad interview, FA1 and SS2)

Tumblr is opening a new more visual community...Um...the community. Some of the people on there. (MR8, interview)

And like, if you watch YouTube, you can like, see a WHOLE OTHER WORLD, and like, there are so many people that are online and not out there...I follow just one certain group of people. They're called the Yogscast...and they do gaming stuff. (TL5, interview)

For MR8 and EE3, technology mediated identity commitment as well as exploration. For MR8 relating to her identity as 'online role player', and for EE3 in her role as 'needed helper' with her Skype friend.

It would be difficult to say that there were many obvious examples of the four identity stages discussed in Chapter 2. We might tentatively call EE3's sense of being 'needed' by her Skype friend 'Achievement', or TL5's use of YouTube 'Diffusion' and gaming as 'Foreclosure'. However, these applications of identity theory would not be especially illuminative beyond signalling what participants might do next as they progress through each process. The absence of data on identity stages is most likely because I did not actively explore identity status as part of this study, and it remains therefore a potentially fruitful line of research.

Technology was used to serve a malleable religious identity in practical ways, but it did not appear to be fundamental to the religious self.

Although it was not an explicitly sought variable in the sampling strategy, several of the participants in this study had a religious orientation or belief. Again, technology appeared to have a practical role to play in helping participants explore their religious identities:

To prepare for our Kabbalat Torah the five of us used Skype to practice together and sort out the service as we live quite far away from each other.

(EE3, I1)

It's sometimes easier to just pop up to them on FB, than ringing them or anything like that...I'd say we use texting more with school friends. That's to arrange meet ups. (SS2, sister dyad interview with FA1)

I stay in touch with most of my church and school friends by text/BBM/facebook or twitter (FA1, I1)

None of the participants however - even TR9 who was quite isolated from other young people of a similar faith orientation - spoke of technology as being fundamental to helping them develop or explore their religious identity. This is for several possible reasons:

- they were sufficiently linked into physical social networks meaning technology wasn't used to explore or commit to new faith-based networks
- religion is more family-focused than friend-focused, particularly for younger participants such as HA7, and as such there is no need for technology to mediate understanding
- lack of adequately engaging technological resources that might motivate children or young people to explore their own faiths.

TL5, who changed from considering herself Christian to atheist during the lifetime of the data gathering, did not discuss technology as a factor in that changing identity; rather, it had been a process of questioning, of a perceived increase in the

value of ‘science’, and perhaps in some small way a rebellion against the prevailing religious identity of the home.

4. Attribution

4.1 The process

Interaction 5 was at the heart of the analysis surrounding attribution. This Interaction comprised four closed questions and corresponding open questions. The closed questions asked the participant to describe what they thought a friend would do in response to a technology-related scenario. The open questions then asked what the participant would do, and delved further into why the participant thought people behaved in a particular way.

Following the thematic analysis using NVIVO, the software package R was once again used to create a graphical representation of the data. For each question, proxies were created that enabled simple comparisons between possible responses. These are detailed in Table 16 below.

Question	Proxies	Findings
2. Think about a close female friend, about the same age as you. Imagine your friend enjoys spending time on the internet. Someone she doesn't know has just tried to start chatting while online. What do you think she does next? You can tick more than one answer.	High risk propensity response options c, d, e, f, g Medium risk propensity: a, b Low/no risk propensity: h Low risk respondents: 1 point Low/medium risk respondents: 1.5 points Medium risk respondents: 2 points Medium/high risk respondents: 2.5	Yes, relating to economic circumstances

	points There were no high risk respondents (scored 3 points)	
6. Think about a close female friend, about the same age as you. Imagine your friend has taken a lovely photo with her phone camera. She edited it on the computer, and thinks it looks even better. What do you think she does next? You can tick more than one answer.	Technology-mediated response options: b, d, assigned 1 point Non-technology-mediated response options: a, c, assigned 0 points	Yes, relating to age
10. Think about a close female friend, about the same age as you. Imagine she texts her friends a lot. She gets a text from another girl with whom she recently had an argument. What do you think your friend would do next? You can tick more than one answer.	Resolution-seeking response options: b, c, f, assigned 1 point Continuing hostilities response options: a, d, e, assigned 0 points	Yes, relating to Acorn, age and attachment
14. Imagine your friend is having problems with her English homework. She's tried to do the worksheet the class has been given, but she is finding it really difficult. What do you think she does next? You can tick more than one answer.	Technology-mediated support response options: a, c People support response options: d, f	No distinctive trends

Table 16: Proxy group measures for each closed question in Interaction 5, with an indication of the presence or absence of distinctive trends. In all cases 'I don't know' or 'None of these' options were explored further in the open questions, and responses assigned to a proxy category accordingly. In cases where there were distinctive trends, these are explored further below.

The emerging findings for each of these questions were compared to the open responses, enabling a comparison between what participants thought their friend would do, against what they would do, and why they thought people behaved in particular ways. Again, NVIVO, Mindnode and yEd were utilized to enable qualitative data representation. The key findings are shared below.

4.2 The findings

In this section I share the key findings relating to each of the four clusters of questions in turn. *All quotes from participants are originated in Interaction 5 and the ensuing email discussion.*

Participants living in more comfortable socio-economic circumstances believed their friends were less likely to participate in risky behaviours.

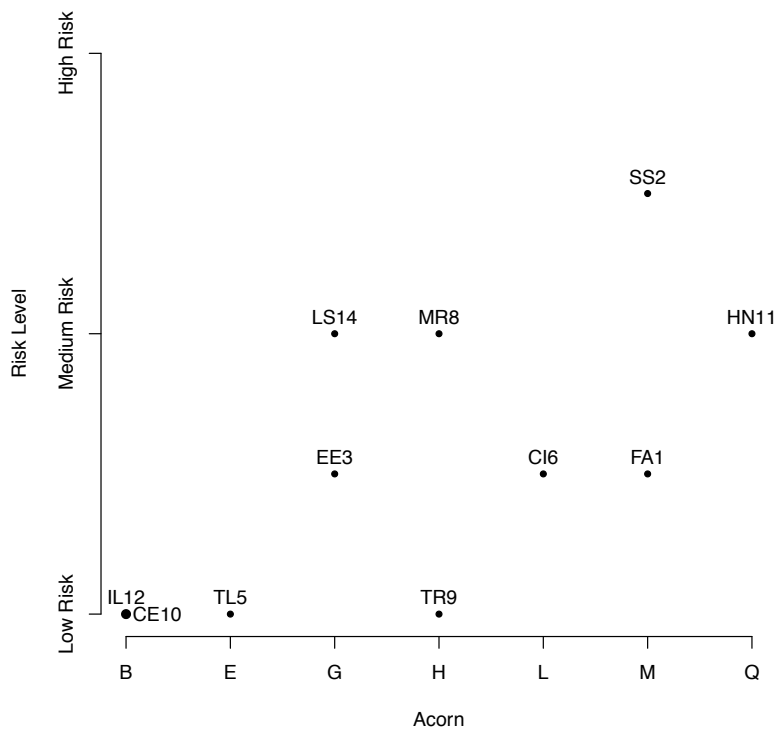


Figure 17: Risk scores detailed in Table 16 in relation to estimated Acorn categories showing the possible correlation between socio-economic circumstance and perceived friend's risk propensity. IL12 and CE10 thus believe their friend is least likely to take risk, in contrast to SS2, FA1 and HN11, with the curve progressing upward from bottom left to top right.

Figure 17 demonstrates a slight possible correlation between socio-economic circumstance and perceived friend's risk propensity. In particular, it raises interesting questions regarding the interplay between dispositional explanations (an individual's propensity for risk) and situational explanations (socio-economic circumstance, and availability of high quality e-safety training).

Several participants mentioned internet safety in the open responses:

She knows about internet safety and she probably wouldn't give personal information out to others. (CE10⁴)

Because everyone has done the internet safety lesson (TL5)

It might be assumed that this (likely school-based) training will have provided some risk mitigation for all participants and their friends, regardless of their socio-economic circumstances. The data suggested, however, that socio-economic circumstances were potentially a mediator of these e-safety messages, or perceptions of friends' risk-taking behaviours and social pressures. Situational explanations may be more important than might be hypothesized. Note that while one sibling group is closely oriented in Figure 17 (CE10/IL12), the other (SS2/FA1) is not, suggesting neither sibling influence or shared parental messaging could explain the finding. Similarly, there were no distinctive correlations between age and risk propensity. This relationship between risk, attribution and socio-economic circumstance would bear scrutiny in future research.

Most participants said that they would not take the risks they believed their friends might take.

Eight of the participants said that they would block or not reply to any overtures from a stranger (FA1, CI6, TL5, EE3, IL12, CE10, TR9, HA7). TL5' commented:

tell them to go away you peado

⁴ All quotes in Section 4.2 originate in Interaction 5 and the ensuing email conversation.

These young people demonstrated certainty in their own ability to self-regulate their technology use, and to make adequate assessments of risk in technological contexts, for example CI6 commented:

I would not start talking to a random stranger on the internet, but I know some people that do and I think it is sometimes dangerous.

A further four participants said they would talk, perhaps if there were mutual friends in place, but would not take further risks and would exercise caution (SS2, MR8, JL4, WA13, LS14). Only HN11 believed that both she and her friend would chat to a stranger online.

However, most participants believed that girls their age take more risks using technology than when they are face-to-face.

Ten of the participants said they believed that girls their age take more risks using technology than when they are face-to-face, for example:

Yes, because when they are on the computer or on their phone they can lie about themselves and they can hide behind it if they are in trouble or not telling the truth. (CI6)

I think a lot of girls take risks via technology which they would be less likely to do in real life. How many girls do you see walking up to strangers in the street and telling them about themselves? Yet they'll do exactly that on the internet. (MR8)

yes because they don't know who their talking to. the internet is so wide and dangerous these days (LS14)

Some spontaneously explained why they believe young women take risks online, mainly centred around the anonymity and lack of physical presence technology use affords:

because when they are on the computer or on their phone they can lie about themselves and they can hide behind it if they are in trouble or not telling the truth. (CI6)

Anyway, I think 99% of people wouldn't say/do half the things in the flesh that they would over a computer screen. (SS2)

Technology allows people to hide behind a screen, doing things they wouldn't otherwise do because nobody can see them. (IL12)

They demonstrated an awareness of consequences, although these were generally dramatic and are perhaps related to the hyperbole they hear about internet safety.

One of my friends met somebody online who she happened to have a friend-of-a-friend with coincidentally, they've known each other for years and she's now not sure if she's pregnant with him! (SS2)

Yes because if they are given an email...then it could be a virus. (JL4)

Two participants (EE3 and TR9) were more circumspect about their responses, qualifying and conditioning them with considerations of the range of individuals and a similar range of behaviours. Only WA13 did not know.

These cumulated messages show a group of young people who believed that their peers were more likely to take risks using technology, and that some of their friends were among those taking risks. Most did not believe they would take similar risks, but they understood that circumstances are not always binary and must be seen in the context of an individual's personal competence, levels of caution and sense of safety. Where they took risks they were, in the main, calculated and with conscious knowledge of what they were doing. This is not to downplay the potential seriousness of those risks; rather, this study is suggesting that young people have more meaningful insight into the reasons others take risks than the adults around them might assume. They attributed behaviours on the basis of their knowledge of an individual (or themselves) *and* the context in which they were operating. We might say that they were attempting to balance the dispositional and situational in their own navigation of technological life.

Older participants were more likely to believe that others would use technology to share something they had made.

As Figure 18 demonstrates, the older participants (LS14, SS2, MR8, EE3, CI6) were more likely to believe that a friend would share something using technology than the younger participants (WA13, JL4, HN11, CE10).

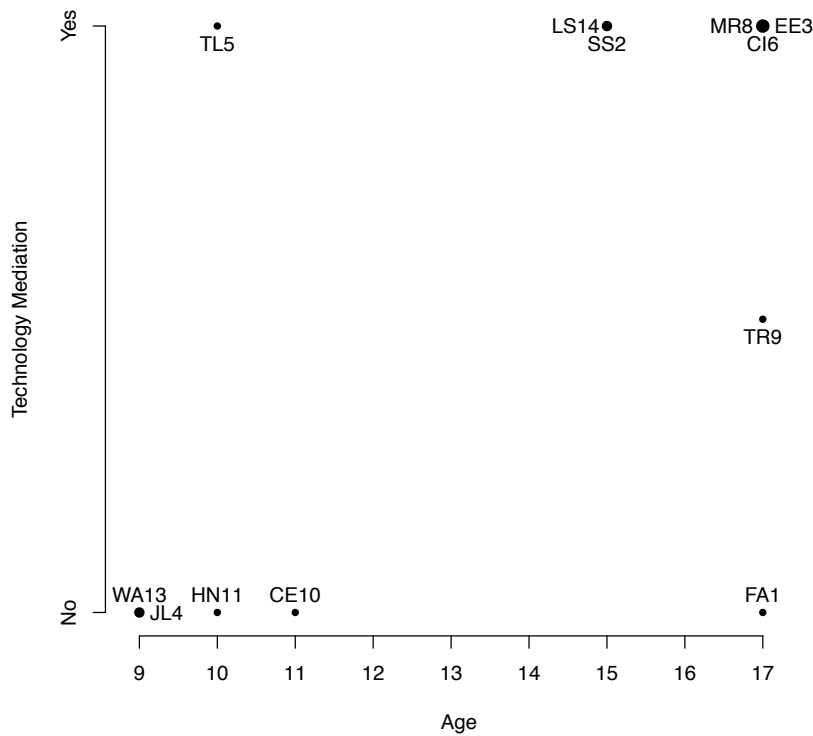


Figure 18: Older participants, largely clustered in the top right hand corner of the graph, are more likely than younger participants to believe that a friend would share a creative product using technology.

Participants gave a range of reasons for their responses. As can be seen in Table 17, some of their responses were dispositional, and some situational, and some took account of both conditions. Some were explicit examples of the factors affecting the attribution process of character, social desirability and motivation. It was interesting to note how many participants assumed the photo was of the friend, rather than a more neutral subject.

Participants and example	Dispositional/ situational	Factors
Demonstrate attractiveness or seeking attention		
TL5, CI6, LS14 For example: <i>Facebook, so she can show off her awesome new look (TL5)</i>	Dispositional	Social desirability, character, motivation
Pride in the creative product		
JL4, HA7, WA13, MR8, TR9, CE10 For example: <i>because she gets proud about things that she has done so she likes praise. (CE10)</i> Interestingly, it was mainly younger participants who gave this attributional cause.	Dispositional	Character, motivation
Rapidity of distribution		
EE3 <i>Also nowadays if you put something on an internet site the people you are friends with are more likely to see it quicker than if you wait to show them a printed off copy.</i>	Situational	Motivation
Representational use, but not actively shared		
FA1, SS2, IL12 For example: <i>Because any of the others would look a bit attention seeking, but she'd want to look nice online, so she'd put it as her profile picture on say, Twitter for others to see. (SS2)</i>	Dispositional	Social desirability, character
Sharing with family only		
HN11 <i>Because she wants to show her parents</i>	Situational	Motivation

Table 17: Attributions given by participants for their friend's behaviour, indicating alignment with situational/dispositional causes and factors.

Most participants said they would share their own photos using technology

Seven participants said that they would share their own photos using technology. Two further participants said that they would share their own photos using technology, but qualified their response with comments relating to controlling who would see it (CI6 and EE3). Two participants said that they would rather show their parents (CE10 and JL4), and two said they would not share their photo electronically or feel comfortable doing so (MR8 and IL12). WA13 would have liked to share her photo electronically, but did not believe her mother would allow her to do so.

Q9 asked participants to consider what made people share, or not share creative products online. Table 18 below shows the main themes emerging from the data, and the attributional causes and factors associated with those responses.

Participants and example	Dispositional/ situational	Factors
Demonstrate attractiveness or seeking attention		
CI6, SS2, IL12, CE10, WA13 For example: <i>People edit pictures to make themselves look better and they might do this to appeal to people or simply because they like the picture. (CI6)</i>	Dispositional	Social desirability, character, motivation
Pride in the creative product		
FA1, EE3, TL5, JL4, HA7 For example: <i>therefore by sharing through technology it is</i>	Dispositional	Character, motivation

<p><i>a quick way to find out what people think of your work as it is easy to 'like' something on a website. (EE3)</i></p> <p><i>The goodness of there work and the time and effort they have put into the piece of work. (JL4)</i></p>		
<p>Rapidity and range of distribution</p>		
<p>HN11, LS14</p> <p><i>I think people want to share the stuff they have made on the internet so lots of people can see it. (HN11)</i></p> <p><i>If something's personal then someone may not want to share it. If something's interesting then people like to put it on blogs like ROOKIE for others to comment or share. (TR9)</i></p>	<p>Situational</p>	<p>Motivation</p>
<p>Sharing with family only/not shared</p>		
<p>MR8</p> <p><i>It depends on the person. Some people are unafraid and eager for everyone to know them (including appearances) and if they have to edit themselves to make them more beautiful... That's their problem. I don't understand it but there you go. More paranoid people like me don't add pictures as we don't want to be traced or recognised. (MR8)</i></p>	<p>Situational</p>	<p>Motivation</p>

Table 18: Attributions given by participants for others' behaviour, indicating alignment with situational/dispositional causes and factors.

It is worth noting that only EE3 raised the particular characteristics of technology (rapidity of distribution and ease of gaining others' views) in her responses to the first set of questions. In response to Q9, more of the participants raised consequences relating to technology characteristics (LS14, MR8), although not always favourably.

Older participants believed their friends were more likely to seek resolution in technology-mediated conflict than younger participants.

As Figure 19 below demonstrates, older participants were more likely to say that their imagined friend would seek resolution than younger participants. Because of the small sample size it is impossible to be certain what is at play here, but we can speculate that this is due to increased maturity levels leading to more competent resolution-seeking behaviours. This would certainly be in line with what we know about the psychology and physiological development of the age range.

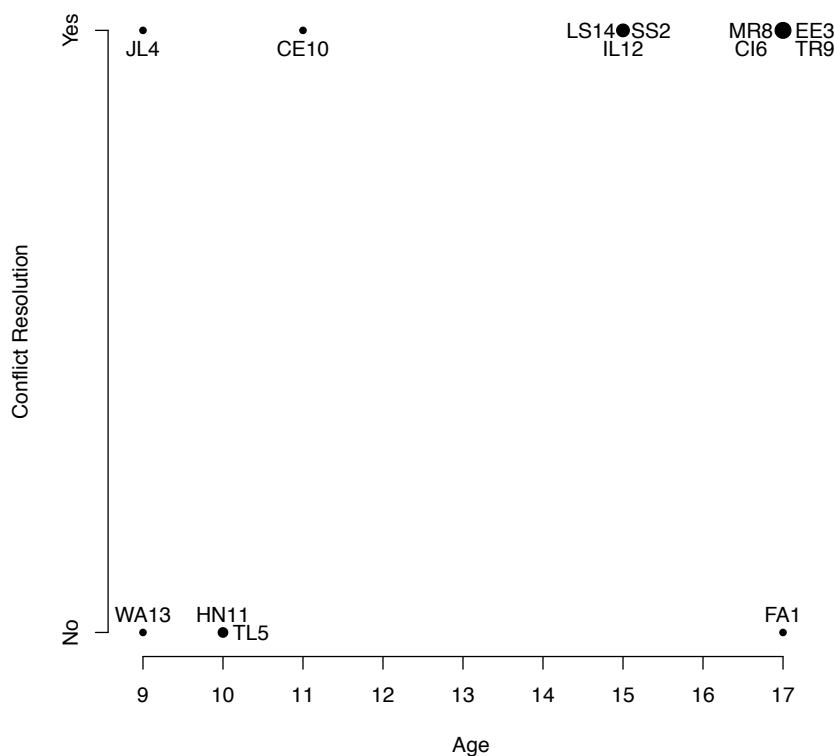


Figure 19: The cluster in the top right corner suggests that older participants were more likely to believe that their friend would seek resolution to conflict.

They gave a variety of reasons for their friend's behaviour, although several said her response would depend on the context and the nature of the argument, suggesting a more subtle awareness of the nature of peer conflict than we might initially assume.

It honestly depends on what the argument was and who it was with. Some things can be sorted out, especially between two friends who don't want to lose each other. If the girl was someone my friend was mild acquaintances with or even didn't like that much, I doubt she'd try and sort it out and would probably be rather annoyed that the person had her phone number in the first place. (MR8)

For some participants, it was important that the emotional impact of the disagreement was made explicit, perhaps indicating the first step of a common approach to conflict resolution:

To show the how much she was hurt about there argument. (JL4)

To let the girl know how she is feeling. (CI6)

For others, the reason given for her friend's behaviour was more dispositional:

because she's very judgemental and thinks you can't change (TL5)

she would ignore the fact they had an argument and carry on texting as normal because she knows that mentioning it again would just perpetuate the argument and is unnecessary to do (TR9)

None of the participants spontaneously raised the ways in which technology might facilitate or not facilitate disagreements or conflict resolution, despite the explicit mention of technology in the original question.

Most participants believed that they would behave in the same way as their imagined friend.

Unlike the preceding questions, almost all of the participants went on to say that they would do something similar or identical to their friend.

Same thing, to be honest. Although I doubt I'd delete the contact. Just in case I needed it for another time. (MR8)

Some participants from more challenging socio-economic circumstances believed that their friend would not choose to adopt conflict resolution strategies.

As Figure 20 below demonstrates, three of the four participants in more challenging socio-economic circumstances believe their friend would not choose to adopt conflict resolution strategies. Given that most participants also believed they would do the same as their friend, this suggests that they, too, would choose not to adopt conflict resolution strategies.

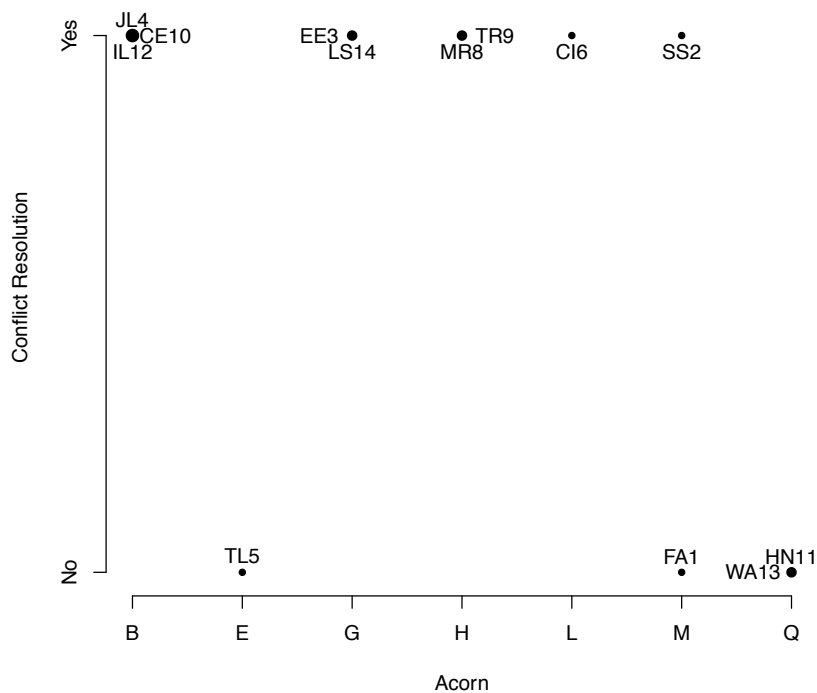


Figure 20: Participants in challenging socio-economic circumstances are more likely to believe that their friend will not choose to adopt conflict resolution strategies. This was not a strong finding, however, and should be considered with caution.

We cannot say anything about the conflict resolution capacities or capabilities of young women in challenging socio-economic circumstances, or hypothesize about any relationships with their experience of observing modelled conflict resolution strategies. However, the distinctive split between the clusters is noteworthy, and needs further exploration in future research.

Participants with weaker attachments to their friends were more likely to wish to continue hostilities than those with stronger friend attachments.

While exploring the socio-economic issues above, it seemed prudent to try to establish whether there were any explanations to be found in participants' relationships with their friends and families. In order to do this I correlated findings relating to participants attachments reported above with friends and families with the conflict resolution findings under scrutiny here.

There were no significant patterns relating to parental attachment, but there appeared to be commonalities relating to friends attachment, as shown in Figure 21 below. It appears that participants with weaker attachments to their friends are those least likely to believe their friend (or themselves) will adopt conflict resolution strategies. It should be noted that this and the previous finding (relating to socio-economic status) are not independent findings as socio-economic status and friend attachment were also found to be correlated.

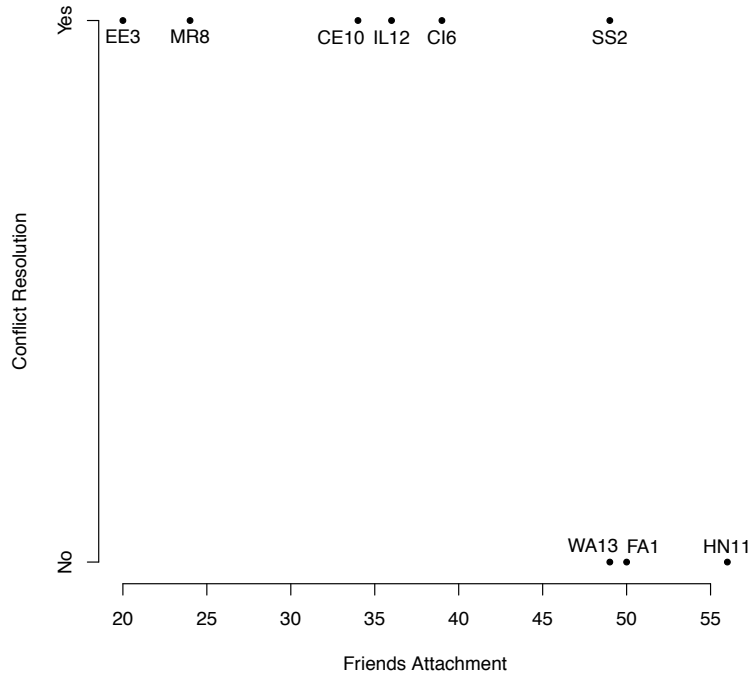


Figure 21: Participants with weaker attachments to their friends are also those least likely to believe their friend (or themselves) will adopt conflict resolution strategies. It should be recalled that the higher the attachment score, the less likely the attached is to be secure.

Those participants who did not have strong attachments to friends appeared to have less faith that their friends would seek to resolve conflict, or would have the skills to resolve conflict. This suggests that this finding is not about technology functionality or use, or any ways in which technology might mediate, channel or direct human behaviours. Rather, it is about how we understand human relationships in any context, and the likelihood that those contexts are likely to be unclear, messy and complex. Some of the participants were beginning to express this understanding:

It honestly depends on what the argument was and who it was with. Some things can be sorted out, especially between two friends who don't want to lose each other... (MR8)

It depends what the text says (CE10)

That said, most participants believed that technology-mediated communication made a difference in people's interactions.

Regardless of whether these data suggest that technology functionality has a particular role to play in conflict and attribution of conflict behaviours, the majority (nine) of these participants largely believed technology use does make a difference. Three said they did not believe it made a difference (TL5, IL12 and JL4), one was equivocal (EE3) and one didn't know (HA7).

The participants who believed that technology made a difference to the ways in which we communicate with one another spontaneously gave a range of reasons, none of which were especially surprising:

- lack of face-to-face makes people do or say things they would not normally do or say, and leads to challenges in expressing tone, conversational nuance or emotion
- fear
- confidence or lack of confidence

Several participants spoke in fairly deterministic ways about technology use in this context, highlighted in bold in the quotes below.

*I think **that technology can influence** the way we speak to each other and the tone of what we are saying as we need to make sure that we are careful we do not offend others whereas when you are talking face-to-face you can use your tone of voice to express different emotions. However I think the way we treat others does not change dramatically whether you are communicating through technology or face-to-face. (EE3)*

Using technology makes it easier to say hurtful things to someone else, because we don't have to deal with their reaction immediately. But I think most people wouldn't do or say anything that they wouldn't do or say face-to-face. (TR9)

*Definitely, **it makes alot of difference** with some people. I think it depends on how confident you are to some degree though. (SS2)*

This determinism is important because it reflects the level to which participants believed they 'own' technological spaces. Q18 of Interaction 5 asked participants to share their views on who they believed was in control when they used technology. Almost all of the participants (bar the very young HA7 and JL4 who did not respond to this question) believed that they had control when they used technology (Figure 22).

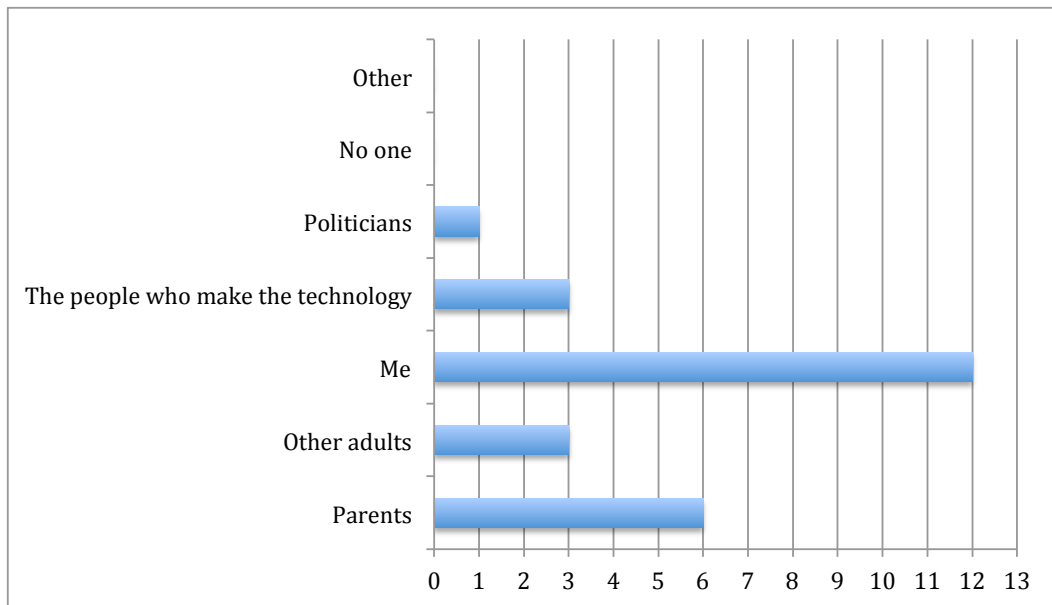


Figure 22: Most participants believed they are in control when they use technology.

Like the findings from this study, boyd's research also claims that adolescents 'own' the technology they operate. This is more than colonisation of online spaces, or the weak digital natives paradigm beloved by many in social research. Rather, boyd's perspective is that technology-enabled adolescence is a space in which significant agency lies with the young person. This point bears scrutiny as it could be considered somewhat utopian and celebratory; the adolescent in control of a space, exploring their growing identity in the manner of a pioneer. Equally, we could condemn the failure of some adolescents to exercise agency, which is an uncomfortable idea and does not sit well within epistemological contexts that aspire to understanding the development of non-deviant youth.

These data suggest that participants in this study would agree with boyd; they do have significant control over their technology use, and are also aware of the nuances, tensions and responsibilities that come with that agency. Their attributions are not easily divided into situational vs. dispositional; they know that it is a combination of individuals' dispositions, combined with the situations afforded by technology use, that engender behaviours and actions.

There were no distinctive patterns relating participants' attributions relating to technology use and homework/self-discipline.

Q14 of Interaction 5 asked participants what they and their friend would do in response to a challenging homework assignment. Almost all of the participants believed that they and their friend would be able to resist the distractions (bar SS2, who would be distracted, and HN11 who would do both homework and distraction activity). In terms of seeking help, almost all participants would draw on both people and technology support. The exceptions were TL5 and CE10, who would only seek advice from people (and SS2 who was only distracted).

5. Theory of Mind

5.1 The process

While the interviews at times yielded glimpses of data relating to ToM, Interaction 4 was unsurprisingly the richest source of insight into this aspect of social cognition. This Interaction comprised three one-paragraph Stories based on the original Strange Stories created to test ToM in individuals with neurological difficulties or autism spectrum disorders. Each Story comprises a realistic, simple

account of an event that explores the non-literal choices and behaviours we experience in everyday life. The Stories created for this study also explored issues such as lying, seeking sympathy and sensitive friendships, but each had a technology-mediated angle. I did not explicitly ask the participants to comment on the technology angle as part of the original instrument, as I was interested to see whether they would raise this as an issue spontaneously.

Once the NVIVO thematic analysis and Mindnode mindmapping were complete, I was still struggling to identify the patterns and perspectives emerging. In order to overcome this, I explored the data in a different format using yEd, a graphical software programme, to draw together connecting ideas and participant thoughts from each of the Strange Stories. yEd provides a range of graph drawing algorithms that enable the user to arrange the data in different ways and see it from a different perspective. The radial representations seen in Figures 23, 24 and 25 were chosen for their clarity, the ease with which the reader can see the volume of connections in each diagram, and their elegance. I experimented with making more connected nodes larger, but these were unhelpfully distracting from other noteworthy nodes. The files are stored at http://figshare.com/account/my_data#session=96260139 for those who wish to explore them in more detail.

5.2 The findings

Because data informing the ToM strand of social cognition is largely restricted to one Interaction, caution must be applied to the findings shared here. At best, they

should be seen as indications of potential future research, and as raising issues for consideration by parents, teachers and software developers. That caveat in place, there are some points that are worth noting.

Most participants identified common key themes and ideas emerging from each of the Strange Stories. This suggests that for the most part, they were developing competent and compassionate ToM.

Although key words within the Strange Stories sometimes formed the basis of participants' responses to the questions, in many cases common affective modes arose from the analysis. For example, Figure 23 shows a radial representation of the key themes emerging from Strange Story 3. In this Story, participants were given the following set up:

3. Ruby has made a new website. She is very proud of it, and shows it to her friend Florrie. Florrie cares a lot about Ruby, but she thinks that Ruby's new website looks very ugly indeed. But when Ruby asks Florrie 'What do you think of my new website?' Florrie answers 'Oh, it looks really good.'

Q: Why does she say that?

As Figure 23 demonstrates, most of the participants reasoned that Florrie was motivated to lie in order to save Ruby's feelings, even though this was not explicitly mentioned in the Story. Several also suggested that a more sensible approach for Florrie to take would have been to provide constructive criticism.

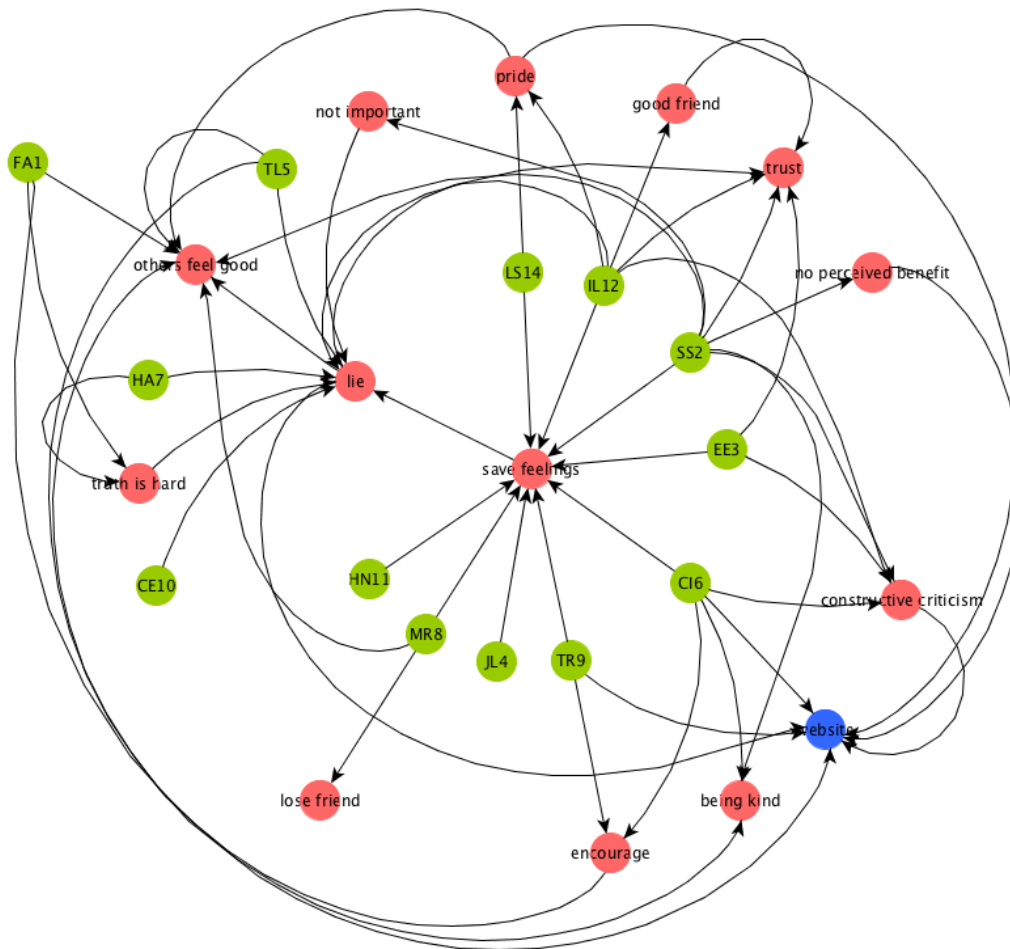


Figure 23: Radial representation of themes emerging from Strange Story 3. Green nodes represent the participants. Red nodes represent emerging themes relating to social cognition. Blue node represents the theme in which participants made explicit reference to technology. Most participants believe that Florrie is motivated to lie to save Ruby's feelings for reasons based in friendship, and make connections between feelings and friendship. A number also spontaneously suggested that a constructive criticism approach might be a productive way forward for the friends in the Story.

Similarly, Strange Story 2 (see Figure 25) yielded common responses relating to sympathy-seeking, friendship, engendering positive feelings in others and communication. Strange Story 1 (see Figure 24) was significantly more focused on the themes of anger and lying, which were directly referred to in the text.

However, the themes of online characteristics, jealousy and 'deserving' also came through strongly.

This finding suggests that having technology embedded in their daily lives has not impaired these young women's ability to recognize sensitive emotions or complex circumstances. It has not stopped them from developing insight into others' mental states.

Most participants believed that using technology makes it easier to lie.

While we cannot say from these data that technology has actively *enhanced* participants' developing ToM, further exploration with them on the matter of lying indicates that most believed that using technology made it easier to lie (CI6, EE3, SS2, TL5, FA1, MR8, CE10, JL4, TR9, HN11). Several referred to 'hiding' behind a screen or an alternative persona. For example:

I think technology makes it easier for people to lie because sending a text to someone doesn't show your emotions or what you're actually thinking, its a way to hide behind your true thoughts. (CI6, I4)

Yes, technology definitely makes it easier to lie - I can talk from personal experience when I say I have said things over the computer that I could never/would never have said in real life, and that's coming from somebody who isn't afraid to say things in real life. (SS2, I4)

I think that technology makes it easier to lie because you can give yourself a different character. (JL4, I4)

Only TR9 qualified this response by distinguishing between lying to strangers, and lying to people you know well.

I think it's easier to lie to strangers because they don't know who you are. But if you are talking to a real friend online then people lie less because it is recorded in the chat history, so you can't take back what you're said. (TR9, I4)

These views were reflected in the themes emerging from analysis of Strange Story 1, where many participants connected online activity with lying, (see Figure 24).

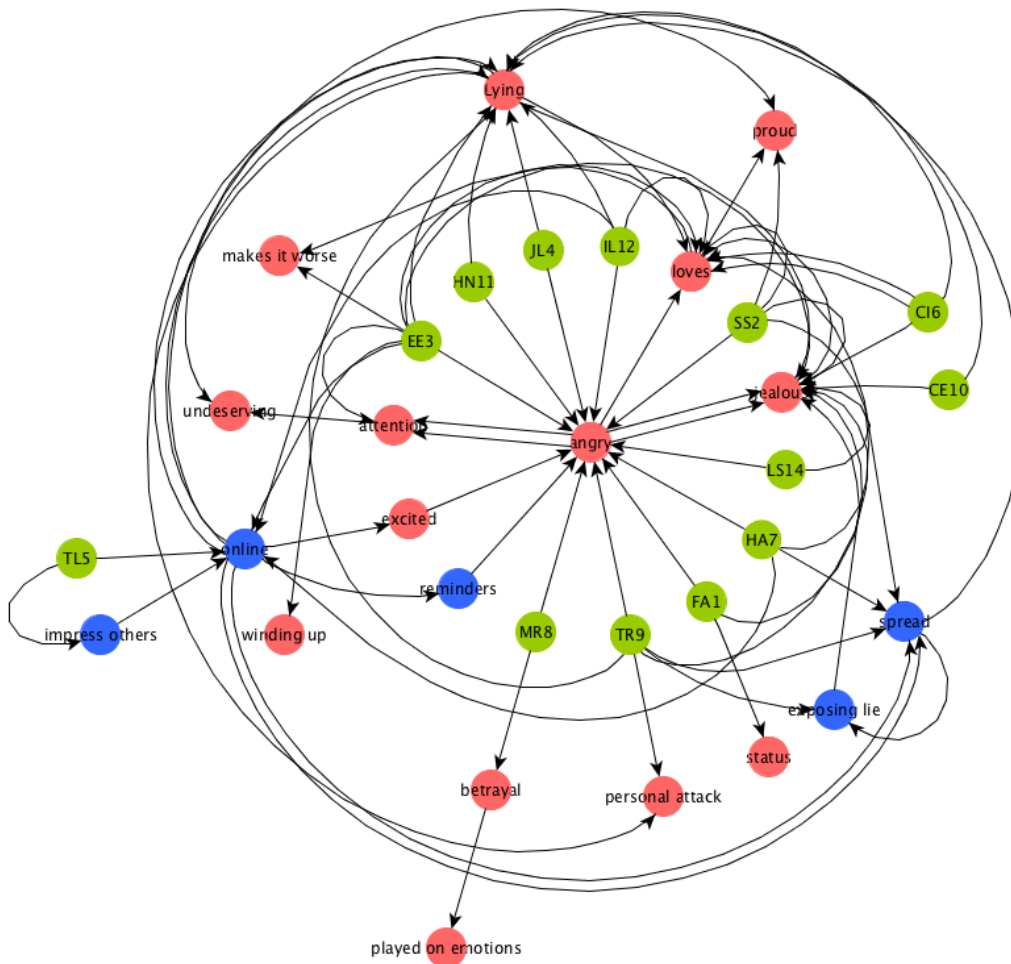


Figure 24: Radial representation of themes emerging from Strange Story 1. Green nodes represent the participants. Red nodes represent emerging themes relating to social cognition. Blue nodes represent themes in which participants made explicit reference to technology. A number of participants suggested that there was a connection between technology use and ease of lying, and that technology sustained angry states.

Participants believed that the ways in which technology enables

'remembering' intensified hot mental states.

Participants also expressed the view that the ways in which technology 'reminds' an individual of a stressful experience, either via update messages or by permanency in the chat history, can intensify the anger affect, or 'hot' mental state. This intensification of emotion was evident to a small degree in other analyses, for example as LS14 said during her interview:

...like, someone made an indirect tweet. It happened the other week, my friend with her ex, there was like a prank call going round and it got back, and then she said that she heard his voice and it was like 'Don't get happy'...its just pointless and silly. I don't see the point of that....Stuff like that really does annoy me. Like, I'll stand up for her. I don't care where it is. I'm not going to be mean about it, but I'll say, 'You don't need to say that.' Ah...he angers me.
(LS14, interview)

There was almost no indication of a connection between 'cold' mental states and technology arising from the data. Only HA7 spoke about her maths teacher during her interview, who 'hates...um...computers and technology and stuff...He just says it is too much, you know. I actually...[agree]'

Although technology may have a distinctive role to play in relation to developing ToM, we cannot say that it is a key factor in that development.

Linked to the absence of data relating to cold mental states, as can be seen in Figure 25 technology did not feature heavily in participants' responses. From this we can draw three possible conclusions: either technology is so embedded in the Strange Story (and possibly in participants' real lives) that without making it grossly explicit it would never arise spontaneously as a key factor in participants' interpretations of the character's mental states, or technology use is not a factor in participants' developing ToM, or the Story itself was not sufficiently nuanced to bring out technology-oriented themes.

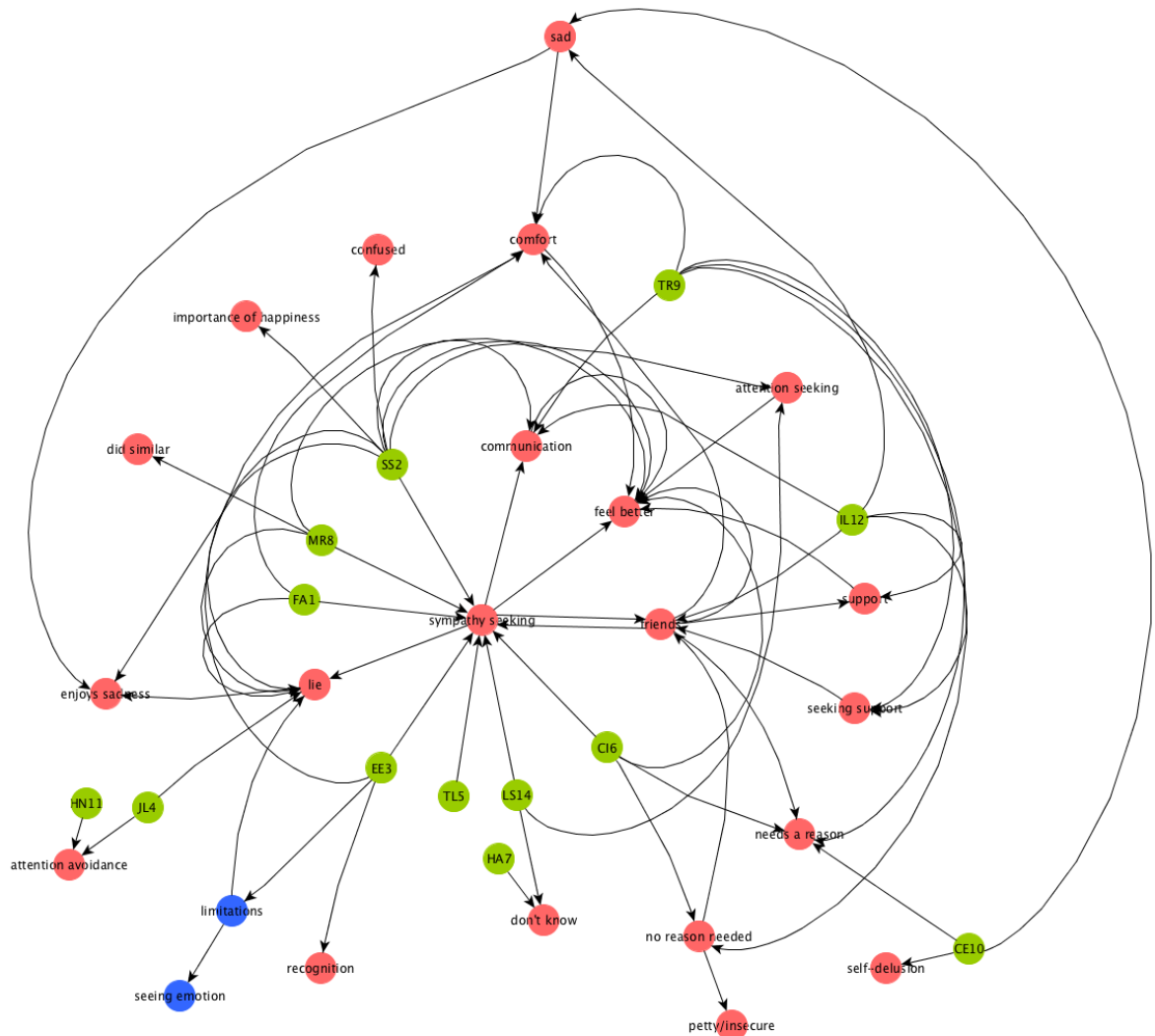


Figure 25: Radial representation of themes emerging from Strange Story 2. Green nodes represent the participants. Red nodes represent emerging themes relating to social cognition. Blue nodes represent themes in which participants made explicit reference to technology. Technology use does not appear to be a key factor in participants' interpretation of Strange Story 2.

To explore these further, we can turn to the remaining data set, despite any conclusions we can draw being mainly speculative.

There were a small number of examples of participants indicating that their experience of using technology had directly informed their understanding of themselves (i.e. first person understanding), mainly from older participants.

DTL: So it isn't to do with the volume of the RP you've been doing?

MR8: I don't think its so much to do with what you're doing as with 'who you're doing it with'.

DTL: In terms of characters?

MR8: Yeah, the characters. I know them better now than I did back then, which is good in some ways because you know I can play the better. But it is bad in a sense because you know I can get into them better. It's a sort of win/lose thing. On the one hand it's great that I know how they react to certain things and all that kind of stuff. On the other hand it's probably easier for me to get lost in them. (MR8, interview)

And also for understanding others (third person understanding):

I don't know if its a need to be with people, but I mean there's definitely...I have a friend...but she's on, like everything. So she's on Tumblr, she's on Twitter, she's on Facebook, she's on everything. But she's not on it all the time. So its connected to her iPod and she will sit there on it, but she won't sit there on it while you're talking to her, unless you're looking at something together. But again she's a weekly boarder...and has family in Nigeria that she needs to keep in contact with...And then, I've got another friend who's always on social networks, but I don't know why. She is quite 'look at me' all the time. And very

loud and things, and she does like to have that constant people talking to her thing. (EE₃, interview)

There were only a very small number of examples of participants demonstrating egocentric and allocentric ideas relating to technology, again from MR8 and EE₃:

I just don't see how anything /could/ be simple, because, you know, even with people that you're closest to, there'll always be arguments and riffs and days when you go round glaring and ignoring each other, so I don't think you can talk about a simple relationship. I don't think that really exists, either online or offline. (MR8, interview)

...but I think you can control it so that it doesn't affect you in that kind of way, but a lot of people don't feel like they can do that. (EE₃, interview)

Given that all of these examples relate to EE₃ and MR8, we might speculate that this is about their relative ToM maturity rather than anything distinctive about the nature and volume of their technology use. TL₅, for example, was much more stereotypical in her attempts to describe her challenges with her mother (e.g. in relation to dyeing her hair), in which technology appeared to play no part. For this reason, although technology may have a *distinctive* role to play in participants' developing ToM (e.g. the intensification described above), we cannot say that it has a *key* role to play. This aspect requires focused further research, perhaps engaging neuroscientific techniques in order to deepen our understanding.

6. Final thoughts

This analysis has been both wide-ranging and detailed, sharing insights into my participants' lives. In it, I have shared the key findings emerging from each of the aspects of social cognition explored in this study, beginning with attachment and relationships, moving through self, identity and attribution and concluding with ToM. The findings have been drawn from responses to research tools, email exchanges and interviews, and respond to the research questions relating to specific aspects of social cognition and our understanding of technology and social cognition. Chapter 5, which follows, develops this range of findings into a theoretical perspective of the interplay between the three core concepts – technology, adolescence and social cognition - and constitutes the composite analysis of the data.

Chapter 5: Understanding adolescent girls' technology use: composite analysis

In the preceding chapter, I shared the key findings emerging from the analysis of each aspect of social cognition. Here I respond to the remaining research questions:

- How should we understand digital technologies in pre-adolescent and adolescent contexts?
- How can we conceptualize the relationship between the aspects of social cognition explored in this study and adolescent girls' technology use in informal settings?

I will do this by placing the findings in a theoretical landscape, using constructs from social psychology to reflect on the interplay between socio-cognitive development, adolescence and technology.

1. How should we understand digital technologies in pre-adolescent and adolescent contexts?

In Chapter 2, I explained that a key concern for those theorising about technology in social settings is the variety of ways that its development and use is conceived. Technological determinism dominates one end of the paradigmatic spectrum. Determinists believe that technology drives behaviour. Behavioural outcomes can be negative, for example the idea that gaming causes violence, or positive, for example, the idea that technology can enable the memorization of times tables.

Even 'soft' or 'diluted' determinists (Selwyn, 2012), believe that technology impacts on adaptable social contexts, although they recognize that other complex influences are at play. In soft determinism, instead of gaming *causing* violent behaviour, gaming can be said to *influence* behaviour to one degree or another.

At the other end of the paradigmatic spectrum lies the 'anti-essentialist' movement, in which technology determines nothing and everything is open to interpretation, for example a radical social constructionist perspective in which the agency of the individual game player is the only factor or real interest in whether technology engenders violent behaviour. In between lie a raft of positions, such as activity theorists who locate technology use heavily within social and cultural contexts (DeVane and Squire, 2012).

Faced with this extensive paradigmatic spectrum, some studies orient themselves firmly in one space or another, or alternatively dismiss the issues as being only of interest in a semantic sense. This study, however, suggests that in investigating whether it is technology or people that drive behaviour, we may be asking the wrong question. Rather, we should be looking to explore the interwoven patterns in our technology-mediated lives, understanding the key issues that emerge from each story and using these to illuminate the generality.

This study has found a number of patterns that exemplify this approach. It has found that young women have a considerable amount of control over what they do – or do not do – with technology outside the school context. They exert *choice*, even in contexts where choice is curtailed by technological, parental, social

or cognitive structures. In this study, at times they chose to withdraw or distance themselves from groups, activities and ideas. For example, MR8 actively maintained her distance from Facebook because she felt having a presence in that space made her vulnerable. At other times, they chose to collaborate with others in technologically mediated ways. For example, EE3 worked with her Kabbalat Torah group online in order to develop a co-created religious ritual (within the pre-existing framework) that could be shared with the wider Jewish community. Their social cognitive skills and competencies played a role in their choices, as in the case of the reflective three sisters IL12, CE10 and JL4 who explicitly and without prompting linked their technology-mediated behaviours to their own maturity levels. As will be seen later in this chapter, these three were not passive in making choices to invest in technology use. They felt that their choices reflected both their stable personality characteristics and the more dynamic, changing aspects of their 'self'. Most of the participants felt able to make informed choices. They felt that parents and schools had done an adequate job in providing them with the kind of knowledge and understanding to make effective choices; as TL5 said, *'Everyone has done the internet safety lesson'*.

Choice should not be interpreted as an unmitigated good, however, for two reasons. Firstly, it might be argued that choice can lead to inequity. Young women with access to a range of technologies and strong protective factors (both personal and situational) are likely to be better placed to make effective choices than their less fortunate peers, or to be less likely to suffer harm after a poor choice. Secondly,

the participants in this study understood that they and their peers did not always choose to do the most sensible or appropriate thing. However, most of them showed confidence that their relationships with their parents and friends were protective factors that would shield them from the worst of the consequences. They also showed that they did not always see their choices as binary. For example, when contacted by a stranger they did not immediately block, report or ignore them. They might have explored whether that person was known to a peer (as in the example of LS14). However, most of them had a 'red line' that they would not cross, such as meeting a stranger.

What these behaviours suggest is two layers of choice: one conscious, one more reactive. We might speculate whether this is related to the 'fast and slow thinking' described by Daniel Kahneman (2011) in which 'System 1' choices are intuitive and responsible for making mistakes, and 'System 2' choices are made following reflection and in the context of more complex problems. What this study tells us about risk-related choices is that the participants were constantly assessing the context in which they found themselves, whether technological or face-to-face, and making decisions about their attitudes and behaviours based on that assessment. Their social cognitive development was key to making those assessments and the ensuing decisions. To apply any dichotomous or paradigmatic stance to the role of technology in young women's lives is to ignore the complexity of what is actually taking place.

Taking a stance on the socio-technical spectrum has implications for the quality of access young people might have to their devices in their day-to-day school and home lives; institutions may restrict or rely on technology based on how they might be placed on the paradigmatic spectrum. For example, schools where a prevailing deterministic ethos manifests as enthusiasm are likely to embed learner-owned device usage in every lesson, and where it manifests pessimistically, staff are likely to ask students to hand in their phones at the start of the day. Our view of technology and what it does lies at the heart of the ways in which we regulate technology use. Our view of technology defines how we account for adolescent girls being seduced into religious extremism, how we respond to online paedophiles, and whether and how we restrict use of technology in homes and schools. Technological and moral panics are connected, and amplified because of our lack of deep understanding about the interplay between the core concepts of adolescence, technology use, and social cognition.

The relationships between the three core concepts of technology, social cognition and adolescence are complex, as Chapter 2 demonstrated. Any response will therefore by necessity be complex. This is made even more so by the complexity of adolescent physical, neurological and psychological growth. In the case of technology and adolescence, the theories on which this study is based do not represent one single immutable Truth. This is also true of the theories this study is aiming to advance. Rather, the theories invite us to do two things. Firstly, we are asked to look at the context in a particular way and from well-defined

angles in order to gain a meaningful understanding of the whole. Secondly, they invite us to make implicit thinking about technology explicit and therefore viewable by others.

In Chapter 2, I shared the conceptual framework around which I built the study. There, I drew on existing theoretical perspectives from psychology, physiology and sociology to set a landscape in which to locate my participants' contexts, behaviours, attitudes and skills. What was omitted from that framework was a socio-technical structure.

This became a significant issue once I began attempting to fit my data within a single framework. Trying to fit real-life findings into a single pre-existing theoretical construct or diagrammatic representation:

- resulted in a loss of complexity
- led to unhelpful assumptions
- did not reflect the commitment demonstrated by my participants,
- arguably was a barrier to me identifying the clearest messages emerging from the study, in favour of the model.

It became apparent that what was needed was a more flexible model, which I then developed and which is shared in this chapter.

After some discussion with my supervisor, it became clear that what was lacking was a socio-technological foundation on which to base the work. Life course perspectives (introduced in Chapter 2) provided a mechanism by which to reflect on the interplay between individual, other people and the structures in

which they were operating. This mechanism was sufficiently comprehensive and had a solid foundation in the sociological and social psychological literature. In the Key Concepts chapter I shared Crosnoe and Johnson's work, which is rooted in the life course tapestry paradigm (2011). Their review identified three key strands of possible activity:

- developmental trajectories, that is the biological, cognitive and psychological development associated with adolescence
- social pathways, that is the institutions that influence adolescent life, and are influenced by them
- social convoys, that is adolescent close relationships, for example with peers, parents, influential adults or heroes and burgeoning romantic relationships.

However, a mechanism by which to reflect on life course perspectives through a technological lens was missing.

I tested a number of possible socio-technical framework candidates:

- I had discounted *affordances* as a socio-technical conceptual underpinning for the research following my Masters level study, in which I had found the term to be so dispersed in understanding and so woolly as to be almost impossible to operationalise in a robust way.
- The *communities of practice* paradigm (Lave and Wenger, 1991) was not suitable because this study focused on individuals rather than communities, and as a result the findings were distinctively oriented on individual

participant's perspectives and ways of participating in online worlds, rather than using the group as the unit of analysis.

- *Activity theory* presented several attractive aspects. For example Engestrom's (1999) focus on internalisation, consciousness and object-orientedness, and in recent advances in Cultural-Historical Activity Theory CHAT. However, activity theory places emphasis on the importance of artefacts as integrated in social practice. I was concerned that this might exclude activities, beliefs or stable personality traits held and shared by my participants outside social contexts. In addition activity theory is better placed to understand systems, rather than the individual focus of this study (Timmis, 2014).
- Feenberg's *critical theory of technology* (2002 and 2010) was then discounted because although his postulates and paradoxes might provide some insight into the technology focus of the research, they were not sufficiently inclusive to encompass the social-cognitive and adolescent perspectives of this study.
- Finally, I considered taking a *semiotic* approach to the analysis, and to take each of the stories of individual participants as semiotic or literacy events in interpretation. I had had some experience of semiotic analysis as a younger researcher and in musical analysis, and there is much to recommend it as an approach (Davies, 2014). However, the roots of this study lie in social psychology and social explanation, and it seemed

important to maintain stability in this respect, particularly given the already interdisciplinary nature of the work.

What was needed was a socio-technical framework or approach that would be sufficiently flexible and broad enough to take account of the interdisciplinary context and the detailed insight my participants had generously shared. As my work fit loosely and partly within the field social psychology, I turned to this field for a possible approach that would, *together with life course perspectives*, provide the complementary warp and weft for a theoretical perspective to explain the technology-mediated social cognition of my participants.

Following discussion with my supervisor, and reading a draft paper by a PhD colleague Bader Alotaibi, Valsiner's Zones appeared to fit this brief. Specifically, it appeared to enable an examination of context as well as an individual's personal experience, and take us some small steps forward in our conceptual understanding of the interplay between technology and adolescent endeavour (Valsiner, 1984, 2005). In the next section I introduce the Zones, discuss their relationship to life course perspectives, and begin to draw out this conceptual understanding.

2. How can we conceptualize the relationship between the aspects of social cognition explored in this study and adolescent girls' technology use in informal settings?

Valsiner proposed three Zones within which to reflect on the individual and social characteristics of human activity. These Zones are detailed in Table 19 below.

Within the constraints of each Zone, an individual is free to choose from a range of

options presented to him or her. Valsiner’s theoretical framework recognizes the interdependency between actor and environment: between individual agency and the social structures in which the individual operates. It therefore offers a promising response to the theoretical challenges presented earlier in this chapter. However, it could not do so as an isolated framework because it does not easily account for longitudinal change across the life course. The life course triptych encompassing developmental trajectories, social pathways and convoys provides a complementary theoretical space for the analysis of issues relating to adolescence and technology use. It enables the examination of the context for a range of internal and external factors, which condition the choices available to an individual within the Zones described by Valsiner.

Zone	Dimensions	Intersecting the Zones and life course perspectives
Zone of free movement/ freedom of movement (ZFM), in which physical, thought and emotional movement are defined or created.	Physical, thought and emotional movement are defined, created or channelled. Personal, social and cognitive constraints within defined boundaries. Technology: access to technologies and software.	In the ZFM, developmental trajectories could be perceived as definitional in themselves; physiological and psychological change <i>are</i> constraints and create boundaries within which a young woman can choose (or not choose) to use technology. This fits well with Valsiner’s use of the Vygotskian ‘internalisation’ (Vygotsky, 1994): the young woman sets developmentally appropriate boundaries for her own technology-mediated behaviours. These behaviours are further constrained and bounded by technological and social pathways - such as limited access to technology at school or parental technology rules

		<p>– and social convoys, such as peer encouragement to adopt a social networking profile.</p> <p>The participants in this study demonstrated that the relationship between what adolescents can do within the online ZFM and the offline ZFM are interconnected, but also separate spheres. Thus, while they were constrained by both adults in their lives (e.g. home technology use rules, or forbidden mobile phones at school, and the technologies they chose to use (e.g. age restrictions on software) they moved increasingly competently between these spheres as they progressed developmentally.</p>
<p>Zone of promoted action (ZPA) in which others' goals for the individual or perspectives of them are enacted.</p>	<p>Others' goals for the individual, or perspectives of them are enacted in this space. This both promotes and limits movement and action.</p> <p>Invitational</p> <p>Technology example: avatars in a gaming environment promote movement and action.</p>	<p>While a young person's age or perceived readiness for engaging with a form of technology might have a bearing on the kinds of goals others might promote to them, the ZPA is much more important to social pathways and convoys.</p> <p>This is because the ways in which relationships and social structures are manifested promotes, or limits technology-mediated behaviours.</p>
<p>Zone of proximal/potential development (ZPD) in which the possible development of the individual is conceptualized, usually through interaction</p>	<p>The possible development of the individual is conceptualized, either through interaction with others or self-scaffolding.</p> <p>Vygotskian in origin.</p> <p>Has momentum; we traverse a ZPD to get from one learning state</p>	<p>This Zone is both social and individual – a young woman may choose to traverse this Zone alone, or with others. She may choose to engage with a form of technology that is presented to her and from that point, her use may be mundane or creative, but it will serve <i>her</i> purpose. This is at the heart of what this study has found: in the context of informal uses of technology, that purpose is</p>

with others	to the next.	<p><i>owned</i> by the adolescent individual.</p> <p>This is why dichotomous discussions of agency versus structures are not reflective of my participants' realities. They largely believed they were in control of the technologies at their disposal, but they acknowledged the social pathways and convoys that influenced them.</p> <p>Developmental trajectories are fundamental to the ZPD, and are the place in which we can locate this study in social psychology. My participants' biological, psychological and cognitive growth, exemplified in their socio-cognitive development, defined their activity in the ZPD.</p>
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Table 19: Characteristics of Valsiner's Zones, and their relationship with life course perspectives.

Where I have departed from Valsiner is in considering how the boundaries of Zones, and the choices available to an individual within these Zones, may differ between cultural contexts, and when seen with a technological lens. Individuals may find their choices enlarged, restricted, or directed, by specific cultural expectations and pressures, and by the technological tools at their disposal.

This analysis introduces the idea of a 'technological pathway'. Technological pathways are **invitational**; their characteristics invite actions or behaviours from young people, which the user can choose to take up, or choose to ignore. Thus, a young person can choose to adapt or immediately share a photo they take, or not. They can choose to take a risk and chat with a stranger, or not. They do these things in the *social context of trajectories and convoys*, and within the *boundaries of the Zones* in which they operate. Young women find themselves in – or choose

to be in - technology-mediated environments. These environments present them with opportunities and constraints. They can act, or not act. However, because they operate in the Zones their activity is channeled. Channelling, or 'canalising' is a key word in Valsiner's conception, and describes the ways in which activity is channeled in each of the three Zones. For example, TL5's father canalised activity within her ZPD by introducing her to coding and enabling her (restricted) access to Minecraft.

As well as being invitational, technological pathways are transactional. By this I mean that in the relationship between user and technology device and/or software there is a movement, agreement or communication. Something is transacted between the two. The adolescent can choose to act upon the technological environment as well as the environment acting upon them. This is particularly important during adolescence because of the well-documented striving for independence, and increased capacity for abstract thinking during this phase of life (Sawyer et al., 2012). In the transaction, the adolescent is changed, but so is the technological environment. Thus, each of us interacts with *our* Facebook; there is no Facebook that is identical to us all.

Table 19 describes the Zones and the way they are interwoven with life course perspectives. Blending the Zones and the life course perspectives is an ambitious task for two main reasons. Firstly, they are rooted in different branches of social research and psychology, leading to the inherent conflicts and lack of shared constructual language that I discussed in Chapter 3 (Methodology) in

relation to interdisciplinary research. Secondly, it might be argued that the life course perspectives fit *within* the Zones, rather than being a complementary or intersecting set of constructs. This would undoubtedly be a neat way of locating them for the purposes of the analysis, but it would not be an accurate one because life course perspectives are ongoing, fluid, and constantly in progress. The Zones are more staged, situational, predictive and provide insight into moments in time and potential moments in time.

This is why the 'warp and weft' metaphor is appropriate for the theoretical structure I have employed. The warp on a weaving loom is the longitudinal thread on which the weft is woven in a myriad of possible patterns and ways. Life course perspectives are the ongoing thread on which the Zones can be woven; they are the warp of technology-mediated adolescence. The Zones are the horizontal thread creating the patterns; they are the weft of technology-mediated adolescence. Thus, the people who interact with an individual adolescent - her social convoy warp - *operationalize* the Zones (the weft) by channelling, constraining and promoting activity in Zonal spaces. Technology, in contrast, both *is operated by* adolescents in the form of technological pathways (the warp), and constitutes Zones *in which the adolescent operates* (the weft). Some of the challenge relating to describing our relationship with technology is because we do not always distinguish between these two technology modes, or describe them with sufficient clarity.

Valsiner was clear that there is a close relationship between the ZPA and the ZFM, and this is exemplified in technology-mediated environments and

interactions. For example, on Facebook certain types of interaction are both possible (ZFM) and promoted by the design (ZPA). An individual can choose to post on another individual's wall that others (or depending on the settings, everyone) may see, or send a private message that only the designated recipient can see. Both actions are possible. Both actions are promoted by options to click 'Message' to send a private message, or by the slightly more laborious option of several clicks to post on a friend's wall. Social convoys also promote types of interaction within technological pathways. Continuing the example above, private messaging invites cyberbullying in a way that public posting does not; it is promotion by the design. Parental presence on a friends' list might be a protective factor against cyberbullying behaviour; this is promotion by others.

It is important to note at this point a subtle language difference between 'promotion by the design' (i.e. that the design of the interface promotes a particular action) and 'promotion by design' (i.e. that it is designed with the aim of promoting one action). In the Facebook cyberbullying example above, this is an important distinction; private messaging promotes bullying 'by the design', but this is presumably inadvertent. It is unlikely the designers created the system in this way to promote bullying – private messaging can be used to send messages of support too.

It should be noted that *post hoc* implementation of a theoretical framework has disbenefits as well as providing opportunities for more sophisticated analysis. Had I encountered the Zones during the literature review stage and adopted them

as a space in which to explore human relationships with one another and with technology, the study may have been formulated quite differently. For example, I might have included measures for the Zones within each research instrument, or developed a more structured framework for the interviews.

As it was, this delay was in fact the optimum decision for two reasons. Firstly, it has made the data collection phase more open and less constricted by presupposition. Secondly, the choice of theoretic framework has been influenced by what I saw in real life, viewed through the lens of the social-cognitive literature. Regardless of the neat, step-by-step approaches expounded in methodological textbooks, theory has come after the data events, as it frequently does.

This is not the first study to use the Zones to reflect on human technology-mediated activity; Valsiner's work has been used in Continuing Professional Development and mathematics educational research for over ten years (Bennisen and Goos, 2010; Eun, 2011). The close relationship between the Zones – and particularly the ZFM and the ZPA - is exemplified in Koot and Garde's study applying the Zones to the popular game World of Warcraft (2013). They conceive the game as a ZPD in and of itself, in which language, typing, and mastery skills lie alongside the development of social relations needed for playing co-operatively with others. Players' access is limited by imposed characteristics, such as distance from other players, and is facilitated by an increasingly competent avatar and team challenges. None of these Zones operate in isolation from one another. Valsiner posits that the ZPD is a mechanism by which both developmental *and* social

possibilities are enacted. His ZPD is neither dependent on perspectives of learning as innate, nor as wholly reliant on social participation, but lies somewhere between the two. Koot and Garde attempt to describe WoW in this subtle way, with mixed success.

What is lacking from Koot and Garde's (otherwise neat) analysis is a mechanism for reflecting in a deep way on the interplay between WoW and the Zones as they conceive them, and their empirical data, comprised largely of interviews. For example, in discussing what their participants said with regard to developing cooperation skills within WoW, they only briefly touch on the ZPD. They do not describe in any detail how the skills and skills acquisition their participants described are facilitated or otherwise by WoW as a ZPD. This is perhaps because the interview format did not enable this sort of analysis, or it could be that they were lacking a weft upon which to weave the Zonal warp analysis. This is the function that life course perspectives have filled in the study reported here. The use of life courses improves upon Koot and Garde's work because they create a space and a language in which to reflect on longitudinal, individual characteristics and the complex patterning of familial and social relationships.

3. Stories of the system

I will now use examples from the study to illuminate and explain the system in more detail. I have chosen to share three examples here.

Firstly, I will share something of TL5's maturational journey during the data-gathering year, included because her choices and interactions with her social convoys exemplify other recurrent findings. Then I will reflect on IL12's perspectives and behaviours surrounding privacy. Finally, we will delve into the collaborative online writing world of MR8, and consider technology as an amplifier. I chose this example because the amplification theme recurred throughout the analysis. These stories are interspersed with examples from other participants in order to enable comparison and for transparency. I could not include all possible stories of the system - they would have taken up this entire dissertation - but my analysis suggests that the other stories shared by my participants would fit into the framework I am proposing.

3.1 Technology and adolescent maturation

This story explores 10-year-old TL5's use of technology within technology Zones as she matured over the year of data gathering.

When TL5 began our research journey she was interested in the online game *Howrse*, an online simulation game in which the user breeds and manages a stable of horses. She reported spending a considerable amount of time on it.

TL5 did not have the opportunity to learn to horse ride, and arguably, she was enacting the exploration phase of identity status development by using an online ZPA that she could not manifest in physical life. It promoted an exploration of her interest in horses, her (then) aspirations to work with horses in the future, and the possibilities of future adult life. This is interesting because the ZPA is often

located in the present and reflects a current circumstance. In this example, the ZPA was promoting *consideration* of the future (normally associated with the ZPD) and an exploration of a possible self. The choice to consider lay with TL5. It was not, however, promoting a *specific* future in a determinist sense; it was not long before TL5 had rejected this possible future self, an identity as a horse enthusiast, and indeed the game itself.

Two months after data gathering began, TL5 was introduced to simple coding by a parent. A new set of Zones became available to her. It was enacted within the constraints of the ZFM created by family social pathways – she was only allowed to use Minecraft when her younger brother (who had had it as a birthday present) permitted it, and if she supported him in developing his own skills (arguably scaffolding his ZPD alongside traversing her own). She was also dependent on effective social relationships with, and understanding of, her brother to negotiate access; her cognitive maturation was closely linked to her social maturation in the context of the social convoy. We can interpret this as an archetypically Vygostkian developmental opportunity, scaffolded by her father who shows her the basics from a position of knowledge.

What TL5's early experience of gaming and more importantly 'becoming a gamer' suggests is that technology-mediated Zones are places in which we can observe equally diverse social characters and identities as young women explore their relationships with others – their social convoys. Technology acts as an operator for and against aspects of TL5's attachments and relationships with her

family. Her attachment quality (see Chapter 4) might be related to her propensity or otherwise for resolving conflict with her brother surrounding access to technology (parental ZFM), although interestingly her attachment bond with her father – the promoter of her gaming skills – is not especially secure. The social convoys of families, peers and friends promote and constrain within the Zones, and at times they do so in technology-mediated ways and via technological pathways, as in TL5's case.

TL5 began to demonstrate increasing confidence and independence in her own coding skills, and enjoyment in gaming. She expanded her technological ZFM within Minecraft; she accessed the conceptual knowledge and skills she had internalized in a different setting. She extended that knowledge by choosing to draw on learning opportunities afforded by ZPDs/technological pathways such as YouTube and Code School.

What is absent is a sense of the role of her friends within these technology-mediated gaming Zones; the 'social' in her developing cognition. In other aspects of her active social life, her friends acted both as objects within her ZFM, and creators of their own intersecting Zones through the sharing of artefacts or through the frequent '*text fights*' promoted by the ZPA of the mobile phone. In contrast, her age peers were not her social convoys in gaming ZPA/ZFMs, and at the time of the data gathering, she was not seeking to develop relationships in gaming spaces. She did not express any explicit interest in the reasons her age peers might choose other technologies to 'play' with, or the reasons behind gaming

behaviours online. This could be related to her developmental trajectory – she was not permitted to play Minecraft with anyone outside the family unit. It is possible that once those constraints were removed, she might have begun to be more curious about what others operating in gaming spaces might be thinking. Alternatively, it could be because as she acquired mastery, another technological pathway less reliant on community groupings or human relationships was serving her needs, namely YouTube.

As she became a more dedicated observer of YouTube gaming channels, TL5 was familiarising herself with gameplay, understanding why something might be compelling to a gamer in an attributional sense, and expressing an interest in becoming part of beta testing and collaborative game design. YouTube as the ZPA promoted a range of exposure to different types of gameplay, and a range of tutorials. As the ZFM, it limited the opportunities to connect with like-minded individuals because of the dispersed and enormous user numbers – TL5 had not connected with a peer community because *‘there are millions of other people watching the same thing’*. If this reflects a personality trait we might describe as independence, her choice of technology was facilitating that trait. She was the active agent in broadening her own ZPD, in the process of developing her ‘creative self-as-gamer’ alongside her maturing cognitive developmental trajectory. She expressed her creative self through her wish to *‘code the entire world in Minecraft’*; her working self-concept was adapting to a different expression medium standing on the foundations of a global creative self-concept.

This is an important difference between TL5's example, and in contrast, HN11. This study suggests that operating social convoys within the Zones is not always simple for a young girl. It depends on both her own developmental trajectories and the ZFMs in which she is operating. It also has an impact on her navigation of the ZPD. HN11 is an example of an individual seeking connection with others within the Zones, and through social convoys, but with negligible success. She felt herself to be outside the mainstream interests and social characters located in her school. She found hints of others with similar interests and feelings of loneliness and isolation online on sites such as DeviantArt and in engaging with alternative games. She had not been able to make meaningful connections with these others, however, because of personal and situational challenges. The former related to her difficulties in forming relationships with others (arguably rooted in poor early attachments) and her less well-developed theory of mind. Situational challenges related to environmental limitations of access, negative peer experiences at school and safety rules put in place by her mother. Hers is a challenging example of a young person frustrated within a ZPD that she has little choice in creating or controlling, and hence is having difficulty in navigating.

Returning to TL5, her example demonstrates the ways in which development is continual, rather than a finite goal reached. It shows how maturation is exemplified through a combination of changing social cognition and technology skills and behaviours within the contexts of the three Zones and life

course perspectives. It also demonstrates the close relationship between the Zones, and some of the ways in which they interact in the context of technology-mediated adolescent life. Catalytic triggers such as her introduction to coding, were optimized by successful operation of social convoys and cognitive developmental trajectories in order to navigate promotion, channelling and constraints.

TL5's is not the only example of this nature. In the sister triad of JL4, CE10 and IL12, we see how maturation elicits similarities and differences in individuals along what is a common journey through adolescence. This was exemplified in Chapter 4, when the sisters reflected on their own maturation and its effect on their technological interests. CE10 and JL4 attributed their enjoyment of Mario Kart to their belief that they were more childish than their older sister. They reflected on her changing sense of her own body and IL12 herself suggested she'd become more self-conscious, and yet more confident, as she'd become older – her working self-concept had adapted based on the foundations of a calm global self-concept. The sisters were operating both within the constraints of their own chosen Zones, and a shared ZFM created by their parents, for example the remote location in which they lived and the resultant reliance on technology for keeping in touch with friends. These personal and community Zones intersected with one another and channeled different choices of activity, with different levels of choice for each child, dependent on their views of their own developmental trajectories and their developing sense of self in each intersection. An example of this might be the kinds of technologies that were promoted to them in the ZPA that they chose

to use based on their assessments of their own maturation, and the ZFM constraints placed upon those technologies by their parents. For example, their parents enforced social networking age restrictions. Also, the young women had a positive attitude to the parental rule of 'friending' their mother on Facebook. CE10 and JL4 were interested in what their technology-mediated futures might hold, but they were not overly anxious to reach those futures.

This story has a number of implications for the theoretical framework I have described in this chapter:

- technology-mediated Zones may act as spaces in which to explore possible selves and identities.
- Familial social pathways, when rooted in effective relationships, may promote new technological Zones and pathways.
- Adolescent girls may choose to use technology to traverse their existing Zones, and to create new Zones. They may choose to do this alone or within social pathways and convoys where those pathways and convoys exist, and where the girl has both the personal and situational capacity to access them.
- Technological pathways may act as catalytic triggers in social cognitive development, both within the Zones and the life course.

3.2 Technology and privacy

The next story focuses on what this study tells us about the interplay between technology and the perspectives on privacy shared by the participants. Social

research has long been frustrated by the apparent gap between what young people know they ought to do, and what they actually do when using technology. This story explores this issue using the Zones and life course perspectives to see the problem in a new way.

The study showed firstly that each individual participant held complex tensions between private and public, and between risk appetite and aversion. They had, for example, a range of attitudes to the taking and sharing of digital photographs as we saw in Chapter 4. None of the participants said that she varied in her approach – this is possibly an example of Kahneman’s ‘slow thinking’ in which a complex issue has been considered and a stable approach taken by each individual. LS₁₄ frequently took and shared photographs using Instagram, which is a site that is designed specifically for this purpose and which channeled her choices with easy linking to fandoms and friends. EE₃, unhappy with the thought that a friend at a communal meal might photograph her food to share that image on the site, did not use Instagram. IL₁₂ felt that the adaptation and sharing of digital images was a kind of falsehood.

Let us examine the last of these examples in more detail. IL₁₂ at age 15 saw herself as a private person. She did not associate her wish for privacy with her illness (scoliosis), believing it is a stable personality trait that manifested long before her diagnosis. Her social convoy included good relationships with her family, and a group of close friends. She enjoyed socialising and participating in sports and musical activities. She did not consider herself extrovert. These factors

are important because they located her sense of self, personality traits and developmental trajectories with the Zones in which she operated.

IL12 did take digital images; she wanted a mobile phone that would facilitate 'decent' quality photography, and her parents supported her in this. IL12 chose to take a wide range of images: friends, herself, items of clothing in shops that she liked, attractive places, homework requirements, items of curiosity such as flora and fauna. Her phone, therefore, was invitational in two ways. It acted as a ZPA that promoted the recall of positive experiences and feelings, and also as a ZPD within which she could explore aspects of the world that interested her.

IL12 was one of the more conservative participants in her responses to questions surrounding using technology for sharing images or reaching out beyond safe and known social pathways and convoys. She chose to maintain a high level of privacy, for example by maintaining a very small number of Facebook friends, and limiting the nature of the posts she used in that space. She created her own ZFM within the space offered by Facebook, partly because its invitational aspects were insufficiently attractive, and partly because the ZFM created by her parents around technology use at home had encouraged techno-scepticism. (Interestingly, her younger sister CE10 demonstrated more techno-romantic perspectives, suggesting that it is a combination of nature and nurture that is at play in our developing attitudes to technology).

Facebook as a ZPA promotes the almost indiscriminate sharing of information and images online; the site as ZFM restricts only a limited set of image

styles and genres. Although IL₁₂ used the site, she approached its use with some significant caution. For example she ensured she was friends with her mother, arguably bringing the safety of the home social pathway ZFM into the more open, uncontrolled space of the Facebook ZPA. She also set her privacy settings as tightly as possible and used a generic profile photo rather than one that would identify her. In this way she maximized both the promotion and the constraint aspects of the Facebook ZPA/ZFM. She did this in order to respond to her wish to remain private in online spaces.

Despite her common use of her mobile phone to take images, IL₁₂ said that she did not use the editing features of the camera app to edit photos in any way. She shared an interesting perspective on this; for her, editing an image of oneself was creating a false representation of that self. Furthermore, the act of sharing and receiving any approval or appreciation of it would be an extension of that dishonest representation of her physical self.

I don't bother editing my pictures. However if I did and I put it as my Facebook profile picture and got 'likes' on it, I would feel false as I'd get 'likes' for something that isn't the way I look. (IL₁₂, I₁)

IL₁₂ was not the only participant to express a view that their online lives represented a part of themselves. SS₂ and FA₁ experienced their online lives as outward exemplifications of their Christadelphian faith. In their circumstance, their mother heavily modelled faith-based online activities, for example posting daily quotes from the Bible on her own Facebook page. Both girls were happy –

even enthusiastic – about following this model. IL12's online ZPA could be considered 'broad' (Bader and Hammond, in press) – she was rarely channeled (or canalised) into specific online activities by social pathways or convoys. As a result she had devised her own ways of maintaining the tensions between the different intellectual, moral, religious and social expectations she experienced, and her own 'rules' for projecting her self online. In contrast, SS2 and FA1's ZPA could be considered 'narrow' – they were heavily channeled towards specific online behaviours and, as such, drew on existing models and norms for managing tensions and projecting their religious selves.

IL12's privacy is likely to be linked with her wish to project only her authentic self (selves) via social media. There was no evidence that she associated her authentic self with a more global self-concept. This is not solely about her developmental trajectories – her perspectives on authenticity and privacy are unlikely to be very malleable over the course of her maturation. It is also not about her social pathways or convoys - her peers might have been promoting the sharing the images on Facebook, and the site-as-ZPA promotes this by making it very easy to upload photos from mobile devices, but IL12 chose not take up that invitation. Rather, it is about how she maintained the tensions of promotion and constraint within the technology-mediated Zones and pathways that she had at her disposal, and as a result of the interplay between different aspects of her social cognition.

This is the beginnings of a response to the problem of adolescents knowing what they should be doing online, but choosing to do other things. Young people

are continually establishing, evaluating and re-evaluating, and acting upon the tensions they maintain between digital and non-digital, cognitive and social, societal and personal. The tensions they experience are often explicit to them; they know them, reflect upon them, and largely accept them. Each young person is likely to respond to these tensions differently, and we could argue that the task of the social pathways of school and home are to create ZPDs that enable young people to learn to manage these tensions competently and safely.

3.3 Technology as amplifier: safety and emotions

A recurring finding in the preceding analysis chapter is of technology as an amplifier: of relationships, processes, experiences, perspectives, connections and disconnections. This final story reflects on the example of MR8, her online collaborative writing, and her forays into new online environments.

Seventeen-year old MR8 began her writing journey at the age of 12, when she began to use the Maximum Ride fansite having read and enjoyed the books. She quickly began to use the collaborative writing pages on the site, attracted by the likeminded community and by an existing enjoyment of writing fiction. The site offered both ZFM-style constraints, such as strict guidelines surrounding anonymity and the sharing of personal information, and ZPA-style promoters, such as creating/offering structural opportunities for fans to link up with one another and to write with a regular cohort of peers. These collective voices catalysed MR8's interest in writing fanfiction, amplified her existing interests and

identity of herself as 'a writer', and piqued her interest in the perspectives and opinions of others on topics in which she had an interest.

The question raised by this stage of MR8's story is 'when does a site cease to be a list of code, and become a promoter (or constraint) of an activity?' We might argue that MR8's beginning to contribute text to the site regularly and with commitment was the moment of change. This commitment occurred as a result of the coming together of a range of factors surrounding MR8 as an individual. This included the timing of exposure, developmental trajectories relating to cognitive development and the ability to contribute to collaborative fan fiction. The seeking of social convoys peopled by individuals interested in similar topics developed a sense of identity and sense of self-as-writer. Prior to MR8's commitment, the site existed. Once she committed, she began to change the site through her contributions, and in a transactional act it began to change her. (It enabled her introduction to E, facilitated deeper exploration of the fandom, in the form of a community sharing an identity characteristic, and enabled the exploration of fictional selves). At that point the site ceased to exist just as a site, but became a set of Zones in which MR8 could begin to explore herself and her relationships with those around her.

MR8 continued to use the website for several years, forming trusted writing relationships with a small number of individuals, but most particularly E, an American girl. Together, the two girls wrote hundreds of pages of fanfiction, discussing characterisation and plot development via private message, and

experiencing the emotions of any 'real' friendship. The social convoy was being embedded as the attachment grew within the technology-mediated ZPA of the friendship. After a year, they both obtained advice (in the case of MR8) and permission (in the case of E) from their parents to make contact via Skype, which the Maximum Ride ZFM filters had not yet been adapted to detect. This can be read as an expansion of the ZFM.

As the girls continued to write, sometimes several stories in parallel, MR8 began to notice changes to her personality, sense of self and behaviours that echoed and resonated with the online characters she was writing. She was continuing to change the site through her contribution of text and ideas, and simultaneously the site was changing her.

This manifested in two ways. Firstly, she began to feel increasingly confident and invulnerable from her middle childhood bullies. This was closely related to her developmental trajectories – she grew tall, learned to run faster and dance. It was also related to her social convoys; she protected herself from vulnerable situations by choosing not to take up the invitational temptations of Facebook, used widely by her school friends. We might argue that a bullying victim changing her behaviour is not a positive outcome, but MR8 was quite clear that she felt this was an exercising of a choice and a representation of empowerment and distinction from her age peers. And as we have seen in the section relating to the vulnerable self, she also spoke about how she found herself taking on the confident characteristics of her characters.

Secondly, MR8 noticed that she was finding it increasingly difficult to distinguish between reality and her written worlds:

I think I'd sort of subconsciously known for a long time that this was what was happening. But I hadn't really cared. And then somewhere along the line I thought, 'This is getting kind of serious. I'd better do something before it goes any further.' And that's when I talked to Mum. I can't remember what she did. She kind of talked to me and helped me decipher what was real, and what wasn't real. (MR8, interview)

This is an interesting example of an intersection between the 'hot' and 'cold' mental states (see Chapter 2, Section 4.6.2), perspectives of one's own mind, and an intensive exploration of possible selves through writing. Her online writing amplified these feelings in a way that would be difficult to see happening in offline contexts. Line by line story writing by letter, for example, would lack the immediacy and immersion that logging on multiple times a day enables, and improvised storytelling in a face-to-face setting would lack the record and permanence promoted and constrained by the ZPA/ZFM from within the site. Her psychological maturity enabled her to identify the risk, her attachment security to her mother led her to find an effective solution within her ZPD.

E and MR8's friendship grew, and then the Maximum Ride website was updated. Overnight, the large oeuvre of text created by the two girls (and thousands of others) disappeared. MR8 experienced this as an attack on her sense of self as a writer, and the space in which she had chosen to create to explore her

writing identity. No amount of comprehension surrounding the reasoning behind the site owners' actions was sufficient to console her in the loss of these stories, and the record of her friendship with E.

After the shock wore off, E and MR8 resolved to set up a new website that they would use to continue their writing, having expanded beyond the original Maximum Ride series into other series of common interests. They were enacting their creative-selves in order to solve a problem. Vygotsky wrote in compelling ways about creativity within the ZPD:

Later we saw how these new problems led to the development of the central and leading function of the entire psychological development, i.e, to the formation of concepts, and how a great number of entirely new psychological functions come into being as a result of the formation of concepts, how the adolescent's perception, memory, concentration and practical activity are transformed as a result of the new reigning principles, and, most important of all, how they become part of a new structure and how gradually new bases for higher syntheses of personality and world view become established.

Vygotsky, 1994, pp. 285-286

Arguably, this was what MR8 and E were experiencing as they created their new site - created their own Zonal system. Their site promoted the continuation of their friendship and shared storylines through privacy and simple usability. They built in some ZFM-style constraints by making it exclusively for their own use, and

through an agreed 'no write' period each week where they would back up the site content, showing that constraints and boundaries are not always something negative. They both felt it was important to be able to read back, enjoy shared memories, and have examples of ways in which they'd worked through difficult character or plot transitions.

Thus we see that the way in which technology can impact on the maintenance or remembering' of 'hot' emotional mental states as well as cold cognitive ones can also be something productive. As young women become increasingly able to reflect on their own and others' mental states they understand that the characteristics of specific technologies can embed them in 'hot' mental states, acting as a barrier to resolving problems. For some, perhaps, this is also exacerbated by significant hormonal change during the period of pubescence.

We will continue with MR8's story shortly, but it is worth noting that for a number of the older participants this propensity of technology to maintain hot mental states had become explicit to them. They referred to it in relation to technological permanence and characteristics of individual types of software. So for TR9, technological permanence and ease of sharing created freedoms that were not always positive. She felt that being able to look back on negative experiences made it more difficult to forget, and ease of sharing meant that 'you can learn more about other people's lives than you should.' Similarly for LS14, just speaking about a Twitter disagreement brought strong emotions flooding to her, and IL12

spoke of how the constant beeps from Facebook updates meant one could not easily switch off from the site.

The potential for technology to amplify or maintain an emotional state in the context of the Zones and life course perspectives offers a hopeful outlook on the impact of technology use on young people's developing emotional self-regulation. Positive experiences such as MR8's enjoyable writing interchanges with E may be revisited online, and warm feelings reignited across the barriers of time and distance. MR8's example shows us that even negative experiences such as bullying or sadness might be validated, internalized and progressed beyond through a technology-mediated ZPD. Her example also demonstrates that this progression is strengthened by protective factors in her social convoys and pathways, such as strong parental attachment, resilience and a strong self-concept. Here, the patterning of warp and weft is crucial to the individual's capacity to manage difficult situations, and to move forward.

As MR8 approached early adulthood, she continued to write, but broadened the range of Zonal systems in which she chose to operate. She continued to maintain distance from Facebook, for example, preferring to keep away from social media contexts. This was partly from lack of interest and partly from a sense of privacy.

The invitation offered by Tumblr, however, called to other aspects of her identity, such as her interest in writing, public sharing of that writing with likeminded others, the choice of anonymity, and an on-going enjoyment of

fandoms beyond the written text. Her social convoys were expanding within a new social and technological pathway as Tumblr opened up '*a new more visual community*' (Interview). She gained some considerable pleasure from the appreciation of online heroes esteeming her writing, for example, with a demonstrable effect on her self-esteem and confidence.

MR8 felt the right balance of ZFM and ZPA in the site, believing (like several other participants) that using technology makes a difference to the way we communicate – different types of software and social networking engender, invite, stimulate, constrain or suppress ways of communicating with other people. Each technological space could be considered a virtual 'institution' that affects the ways in which young people can operate, for example through acceptable use policies, age restrictions and forum rules. Tumblr channels a different sort of ZPA to YouTube. Facebook channels a different sort of ZPA to Twitter. The Twitter ZFM, for example, limits users to a small number of characters. The Twitter ZPA, therefore, is about pace and the rapid exchange of almost transitory ideas, which could arguably form the basis of an individual's ZPD depending on their choice of whom to follow.

MR8's connection to E continued. They were planning their first face-to-face meeting when E visited MR8 in the UK, the summer after the data gathering for this study finished.

4. Reflecting on the framework

The three stories shared above have illustrated the ways in which Valsiner's Zones and life course perspectives can be woven together to frame, describe, and in some limited way, explain the findings shared in Chapter 4. The warp and weft metaphor describes the ways in which the Zones, coming and going from an individual's life in the way that they do, are woven onto the more consistent or evolutionary developmental trajectories, socio-technological pathways and social convoys of the life course. The weaving metaphor allows for complexity, patterning, multi-layeredness and interconnectedness in interpretation that other representations would not.

Thus, technology-mediated Zones, with their constraints, promotions and possibilities, mingle with the constraints, promotions and possibilities of physiological and psychological development. These are spaces in which an individual makes techno-social choices, and those choices are enacted in digitally-oriented behaviours. Those choices are both constrained and promoted by social pathways and convoys, and are also the function of a deeper pattern of the ZPD. Online and offline Zones intersect, but are fundamentally separate spheres. They may influence one another, and even be reliant on one another in some circumstances, but behaviours manifested in an online Zone cannot be guaranteed to manifest similarly in the equivalent offline Zone. This is because of the contextual complexity inherent in the fabric of learning and life.

Despite being a limited number of examples from a limited data set, my analysis of stories from each of my other participants suggests that the ideas are applicable to all cases within the study. This transferability is possible because both the conceptual and analytical frameworks used in this study offer flexibility of interpretation and are rooted within the literature.

Frameworks have been an important part of this study. They enable us to reflect on contexts through an adaptable lens and they have practical consequences for data interpretation. I have found that it is not one conclusive framework that is needed to understand young women and technology. Through the warp and weft metaphor, the Zones-life course framework has made it possible to:

- recognize adolescents' active choice and agency
- make explicit development opportunities within individuals, relationships and technological environments
- locate physiological and psychological development within the broader socio-technical realm
- see technology as neither positive nor negative, but as shaping, rather than defining adolescent perspectives, behaviours and relationships.

These possibilities suggest that, rather than attempting to shoehorn adolescent experience into a single paradigm or model, the curious researcher, parent, software developer or policy maker needs to ask themselves some key

questions; accepting that there will not be a single answer, but a range of possibilities. Some of these questions surround the individual:

- Who is the user?
- How does the user see herself, and the groups within which she operates?
- What can we say about their developmental trajectories?
- What role do their relationships, attachments and social convoys play in the ways they engage with technology?
- What does the user understand about the motivations, perspectives and behaviours of other users and technology designers?
- What behaviours does this understanding lead to?

Some of the questions are more technology-specific:

- What does this specific piece of technology allow to happen?
- What attitudes and behaviours does this piece of technology promote?
- What attitudes and behaviours are constrained by the technology?

A third group of questions surround the interplay between individual and the technologies they choose to use:

- What happens when the user interacts with the technology?
- How does the user change and develop when interacting with the technology?
- What choices is the user making, and what are the factors that influence her choice?

This final issue of choice is the one brought to the fore by the composite analysis. The surprising level of choice exerted by my participants, even within restricted contexts, usually lead to informed behaviours (although not necessarily safe ones). This is not a question of adolescents' agency, or them taking ownership of online spaces in the way described so passionately by boyd (2014). It is a more fundamental question about the ways in which we perceive young people – the respect we have for them and their developing social cognitions – and the ways in which our behaviours as adults respond to those perceptions.

5. Conclusion

This study has used Valsiner's Zones and life course perspectives as a way of exploring key influencers in the developing interplay between young women and their use of technology. The biological context is also important for gaining insights into young people's use of technology, and we are still not in a position to explore this in sufficient depth. Despite a historical interest in the changes experienced by adolescents, these changes are seldom seen as more than a backdrop against which young people experience their lives. Indeed, this study suggests that even for the adolescents their physiological change is – in the main – not seen as having implications for their beliefs and behaviours.

Once the framework's premise is accepted, then the thinking it supports becomes transferable to the wider group of adolescents. It does not, however, constrain them as active participants, nor us as interested researchers or parents. It does not tell us what we will, or should, find as we continue to understand the

interplay between adolescence, technology use and social cognition. This thesis is not promoting a model. Rather, it is suggesting a theoretical lens that enables us to see how technology-mediated activity is likely to be channeled, providing a structure within which to identify interwoven patterns in a context in which nothing is predetermined.

The concluding chapter reflects on what has preceded, the implications for young people, the adults who care for them and interact with them, technology developers and the future research that might be undertaken.

Chapter 6: Conclusion

This dissertation has taken the reader through a year of data gathering with a group of 15 young girls and women, and the subsequent analysis. It began in Chapter 1 by discussing the prevalence of technology and socio-technical change in contemporary society, and highlighting some of the moral panics that continue to resonate in families and the media. The research questions made their first appearance, and I justified my choices to work with adolescent girls, and to look at a range of aspects of social cognition rather than 'going deep' on just one. I made the study's novelty explicit, and introduced myself as the researcher.

Chapter 2 began with an explanation of the review processes, and then reflected on the terms 'adolescence' and 'puberty'. It briefly explored matters surrounding adolescent girls' use of technology, and then touched on each of the aspects of social cognition included in this study in greater detail. The chapter concluded with the conceptual framework underpinning the thesis. This was my first attempt at mapping and bridge building. I found that there was more cross-fertilization and connection between concepts than I had anticipated, which was encouraging given the conceptual complexity. Some concepts, such as 'self', acted in more hub-like ways than others, although arguably all are inter-connected and rely upon one another to encompass a healthy, developing social cognition. Importantly, the framework showed that to place the concepts at the heart of the study was misguided; rather, the young people themselves held that space. It also

highlighted the gaps in the literature that needed exploring in the analysis: firstly, what we understand by technology in the context of adolescence and secondly, how we conceptualize the relationship between adolescence, technology and technology use and social cognition.

Chapter 3 began by outlining the research questions and introducing the sample. I then explained the study's epistemological and interdisciplinary foundations. I reflected on each of the data collection methods used, and shared the processes for data organization and analysis. I considered the trustworthiness and ethics of the study, and ended the chapter by reflecting on the relative successes and challenges of the methodological approach.

The key findings chapter (4) shared key findings relating to each aspect of social cognition included in the study. It was both wide-ranging and detailed. It demonstrated the range of techniques used to gather and analyse the data, and shared each set of findings in some detail. The findings were arranged to respond to the research questions surrounding each aspect of social cognition. They established that there is, indeed, a relationship between technology use and attachment, self, identity, attribution and ToM, and that these relationships are complex and rooted in participants' access to technology, choices, attitudes and relationships with others.

This led naturally to Chapter 5, which focused on the composite analysis. Here, I responded to the research questions. I drew on two existing frameworks (Valsiner's Zones and life course perspectives) to create a warp and weft metaphor

in which young women's operations within technology-mediated Zones are woven onto the weft of their more continuous life courses. I used three stories from the Zonal system to exemplify the theoretical approach, and briefly discussed the transferability of these reflections to the remainder of the cases within the study and the wider population. The chapter concluded with the observation that this study provides a theoretical lens through which to examine young women's uses of technology, and suggested a set of questions emerging from the data that could be used by researchers, families and young women themselves interested (in true social cognitive style) in understanding themselves and the worlds around them.

The study's novelty lies in two main areas. Firstly, it adapts existing tools developed in a particular paradigm and field to a different paradigm, and has developed new tools where existing tools were not available or appropriate. These tools have yielded novel data, to which several representation methods have been applied. Secondly, it proposes a new theoretical framework for exploring young people's use of technology.

1. Implications for young women, their families, teachers and the media

Whether we adopt the restrictive perspectives of Prof Susan Greenfield, or the laissez-faire ones of a radical unschooler, our own perspectives of technology influence the ways in which we see young women. This study has found that young women themselves have strong and highly personalized perspectives and behaviours relating to technology use. If we want to support adolescents'

technology use we need to both elicit those views and take them seriously. We can do this by creating and managing technology-mediated Zones of movement, action and learning with and for them. Without wishing to veer into romantic perspectives of adolescence, most of my participants demonstrated the ability to manage their own Zones as adequately as the Zones imposed upon them.

The young women in this study have demonstrated that they exercise choice on a moment-by-moment basis in their technology-mediated lives. Their choices are mitigated by a range of factors; internal and external, and factors within their control and factors outside their control. The findings would suggest that the most empowering thing a young woman can do as she approaches adulthood is to arm herself with mechanisms by which to understand herself, articulate that understanding, and apply her developing social cognition to socio-technical landscapes. By making at least some of her choices both explicit and contextualized, preferably with at least a rudimentary awareness of the key aspects of the ideas raised in this thesis, she becomes safer and less vulnerable to those who would engage with her online lives in dangerous ways.

This is the message I would carry forward to teachers and families. In our strivings to work with young people to develop the social cognition that will enable them to live full and rich lives, we are laying the foundation for more meaningful relationships with them. Our interest in their lives is not resented; on the contrary it can be welcomed. Young adolescent women do not live in another world; on the contrary, their many worlds intersect with ours in increasingly

complex, carefully chosen and managed ways. This study tells us that we can use the discourses inherent in social psychology to create shared languages within which we can explore adolescents' increasing independence. These languages are rooted in the physiology of adolescence, and the aspects of social cognition that are the foundational concepts for this study. Self-awareness will enable them to exercise conscious choice in developing the positive relationships, interests and understanding of others and others' actions that will help them to remain safe online as they enter young adulthood.

Basic levels of internet safety are, by and large, taught competently in school. What this study tells us is the reason young people still take unhealthy risks using digital technologies is because we do not teach them to reflect on safe use of technology *in the context of their life course using consistent language and framework*. This study challenges us to apply the theoretical approach described in Chapter 5 to the context of teaching digital safety – whether at home or in school – in much more sophisticated, evidence-based ways than we have in the past.

Finally, this study has implications for the media. It suggests that the stereotypes about adolescence peddled in the press are not just tired, but outdated and potentially damaging. In the Introduction I spoke to the moral panics surrounding young women's use of technology, and expressed the aim of bringing a rational approach to understanding that use in more meaningful depth. This study has found that young women, in sensible contexts, with the right kinds of environmental support, are likely to do sensible things. This enables us as adults to

focus our input in two ways. Firstly, in families and schools we can try to develop and provide the environmental support and shared languages to facilitate effective choice-making in all young people. Secondly, we can focus targeted societal intervention on young women who do not have helpful personal and situational contexts in which to make their choices.

The moral panics around both adolescence and technology have two detrimental effects. Firstly, they distract us from matters of significant concern, such as the radicalisation of young people and their exclusion from their communities, or the predatory behaviours of people wishing to take sexual advantage of children. Secondly, they do a disservice to the young people trying to navigate their way through the institutions, structures and increasing independences of adolescence with their integrity and happiness intact. This is not to say that intensive or serious responses aren't needed for aspects of online life such as cyberbullying, online predation or online radicalisation. Rather, we should be using our insights from these 'ordinary' young people to help others in similar circumstances develop the resilience, persistence, risk-awareness and creativity they will need to be effective as young adults.

It could be argued that the cases discussed here are not 'ordinary' at all, but constitute special examples from which we cannot learn or transfer to other settings. I would counter that each young person is an individual, operating in and through complex circumstances. What the composite analysis in Chapter 5 enables us to do is apply a standard lens to each individual. This lens allows us to interpret

what is happening in that individual context. Our view through the lens is clear because it is well-founded in both the existing literature from a range of disciplines, and the wide range of data gathered in this study. So the learning emerging from this study is not about the population of young adolescent women in England as a whole. Rather, it is about the ways in which we perceive and understand those young women and their technology-mediated lives.

2. Non, je ne regrette rien...almost

In this section I will reflect on the strengths of the study, and areas that could have been more productively developed with more time. It feels a little like undertaking a possible or fictional selves task; I made choices during the study that both formed it in the early stages, and changed it in deep ways later on.

2.1 Successes

There are a number of aspects of the study that appear to have been successful. Firstly, the topic under scrutiny appears to be both original and salient. This extent of social cognition has not previously been explored in relation to adolescence and digital technologies. It has generated positive comment and interest from the academic community during the conferences I have attended, and also from practitioners and the general public. For example, I have recently been asked to write a guest blog post for Parenting 4 A Digital Future and an article for The Green Parent magazine.

Secondly, the success of my working relationship with my participants led to a significant amount of data. I could not have reported on all of the data

collected without moving far beyond the word limit for this thesis. I believe that part of the positive relationship lay in the fact that I took adolescence seriously, and located it within a broad awareness of the literature from across the number of disciplines. My participants knew I was researching from a position of respect for them and their views, and this led to good levels of trust and openness. This was exemplified for me when MR8 agreed to speak at a conference with me. We co-created our presentation from the conceptual framework and very early data, necessitating frank, challenging conversations about interpretation. She then trusted me to ensure she was in a safe environment in which she could be honest about her perspectives, and did so with great fluency, leading to many compliments.

Finally, this thesis makes an original theoretical contribution to understanding the interplay between adolescence, the ways young people understand themselves and the worlds around them, and the role digital technologies play in those worlds. It did this partly through making interdisciplinary methodological advances in applying psychological concepts and tools in an interpretive, social research setting. An extensive corpus of data was gathered to explore the breadth of concept included in the study's scope. And most importantly, the ideas shared in this thesis, supported by a new marriage of Valsiner's Zones and life course perspectives, use the data from this study as a springboard from which to progress our thinking about what technology means in

the human context. While this is not the neat model my naïve self imagined at the outset of this project, I am proud of this progress.

There are, however, aspects of the study that I would approach differently if I were to undertake a similar piece of work in the future. The counterfactual is difficult to articulate, but the lessons learned will, perhaps, benefit other researchers working in this field.

2.1 Micro-reflections

One aspect of the study I might have approached differently is the sampling strategy. It might have been illuminating to draw all of my sample from more challenging socio-economic groups, for example, or to only work with young women on the cusp of adolescence. Drawing the sample from across the country, or from contrasting locations (rather than solely from the Midlands) might have made the findings more trustworthy. A comparative sample (for example, technology averse young people) would have provided an insight into alternative perspectives. Or I could have worked only with young women using technology in particular ways, for example gamers or even more extreme users, such as those on pathways to extremism or deviant behaviours. Each of these sampling choices would have yielded significantly different data sets.

Different sampling choices may even have shaped alternative research questions, and it might have been interesting to plan one further stage of data gathering in which the findings were reflected to a larger group. This would have enabled the exploration of common themes and their applicability to a larger

population. One might say that this likelihood casts a shadow over the trustworthiness of the study. However, this sample has never purported to represent the entire population of young adolescent women in England. On the contrary, the findings suggest that a single model is enormously unlikely to exist because of the distinctive variations within the population. Indeed, we might argue that from a philosophical perspective, no single model could ever fit. Rather, as in the best tradition of qualitative research, the thesis invites the reader to apply the illuminations provided by my fourteen young women to their own and others' understanding of the use of technology throughout adolescence. In addition, my thesis is that the final theoretical perspective (Zones + life course) would still be applicable, although this requires verification in future research.

Alongside sampling issues, I could have drawn on a myriad of alternative research tools. My priorities were around their proven efficacy in whichever field they were drawn from, and the need to minimize the time and effort burden for my participants. On reflection, I may have chosen some alternatives, for example a more detailed attachment tool. I may also have included more existing examples from the Strange Situations stories in order to provide a comparator response to my new, adapted scenarios. I would also have carried out two interviews with each participant, one at the outset of the study and one at the conclusion. This is not because I wanted to create a faux pre- and post- test condition, but simply because I would have been able to have at least one interview to draw upon for all of the participants. For those participants who contributed a second interview, it would

have provided an interesting perspective of their change over time trajectory over the year-long data gathering.

I would have encouraged my participants to speak to one another, perhaps through a focus group event or by facilitating participant action research. Facilitating a conversation between participants might have been liberating and empowering for them. And finally, were I to design the study again I would have worked with a technologist to devise a more systematic, non-voyeuristic method of observing participants' online use with their consent.

2.3 Macro-reflections

At the macro level, this study would have evolved very differently had I chosen to focus on one (or perhaps two comparative) aspects of social cognition. This was an option; there is no existing research on the interplay between adolescence, technology use and ToM, for example. I have no regrets about taking the more strategic perspective, however. This structure played to my strengths, and has resulted in a study that I believe could be the basis of narrow studies in the future.

Similarly, instead of exploring social cognitive concepts, I could have explored contexts for evidence of social cognitive growth – in other words the study design could have been based in grounded theory. Again, I do not regret using a conceptual framework from the outset – a grounded approach would have been high risk in that it could have yielded very little. Given that I would not have used or adapted existing research tools at all, it may also have been more difficult to make a case linking the outcomes of such a study to social cognition.

Also at the macro level, I could have taken a more positivist approach to the study. Indeed, this is something I explored at the outset, hoping to work with a neuroscience team to co-create the study. However, I was not able to find a research team that were interested in such work without funding behind me to carry out experiments. Perhaps I was proposing a research bid, rather than a PhD-level study. This is still something that would be interesting to explore in the future; applying the findings from this study to a more positivist approach may move the topic forward in terms of scalability, or it might yield interesting findings regarding the biophysical and neurological processes experienced by young girls and women as they use technology.

3. Future research

In addition to the point made above regarding the application of the findings from this study to more positivist methodologies and earlier points regarding sampling, there are other fruitful lines of research that could be explored in the future.

- Focusing on one aspect of social cognition in more depth might yield insightful results. For example, it would be interesting to take a further step into online attachments, and explore whether young people have differing Inner Working Models in online and offline environments.
- It would be interesting to carry out a comparative study with boys. I suspect that the findings would not be dissimilar, despite the differences in developmental trajectories documented by the existing literature.

- This study hinted that there may be socio-economic explanations for some technology-mediated behaviours, and this needs exploration. We do not know whether young girls from more affluent SEC are more likely to develop online friendships because they access technology from a younger age or a more diverse range of technologies (due to parents seeing value in 'kit' and introducing it early). Perhaps a different form of confidence comes with growing up in more comfortable SEC, resulting in greater confidence in navigating online worlds. Further, understanding the SEC of online engagement in this age range would be illuminating and may break down unhelpful class perspectives; it may be that young people from a range of SEC know how to create, access and participate in online or technology-mediated environments that are very rich, or there may be barriers that are SEC-related that need identification and addressing. All of these possible explanations have serious implications that need to be explored in future research.
- The ideas emerging from this study could be applied in a more emancipatory setting. For example, it would be interesting to work with a group of young women in a more learning-focused way, teaching them (and enabling them to learn from each other) about the Zones and life course perspectives, and the socio-cognitive aspects explored in this study. The data emerging from their own mini research projects, diaries or

creative outputs could then provide a different mirror in which to view their understanding and management of their worlds.

- Exploring adolescent social cognition in school settings using the frameworks developed here could elicit learner voice and enable young women to improve the quality of their own learning.

The broad range of possible directions for future research described above reminds us that bringing together adolescence, technology use and social cognition is still in its infancy. We are only beginning to deepen our understanding of the interplay between these mechanisms, which we use to describe ourselves and the worlds in which we operate.

4. Ithakas: the personal significance of this research

In the Introduction to this thesis, I shared that I was at a transitional stage in my career when I began the study.

The past five years have been an extraordinary privilege. The privilege has been intellectual because I have been able to delve deeply into a topic that interests me, challenging my preconceptions and biases, and making the most of the strategic awareness I have relied on for many years. The privilege has also been emotional because the process has been so fulfilling, and because the participants have been such a joy. I have laughed with them, worried with them, listened to them, and even challenged them for a year, and in that time they generously opened their technology-mediated hearts and minds to me.

The last stanza of C.P. Cavafy's poem *Ithaka* reads:

And if you find her poor, Ithaka won't have fooled you.

Wise as you will have become, so full of experience,

you will have understood by then what these Ithakas mean.

This sums up the intention, process and outcomes of this study. My participants have presented a set of 'Ithakas', or opportunities to travel into the experiences, perspectives and beliefs of a group of young women. I would not profess to wholly understand the young women in my sample. However, my contribution suggests that in carrying out this odyssey, this study has facilitated a little wisdom that can be carried forward by those setting out on their own 'marvellous journeys' towards understanding young women and their developing social cognition in the context of technology-mediated lives.

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Appendix 1: Technology diary instruction text and grid

What technologies do you use over 24 hours?

Choose a Saturday or Sunday to do this activity. Make a record every time you use technology. This includes mobile phones, video cameras or cameras, computers, gaming consoles or anything else that you think of as technology.

You can record this any way you like. You could use the notebook and pen that was provided in your starter pack. You could use a camera or video camera (if you would like to use one of these but don't have one, let me know and I can lend one to you). You could draw a set of pictures or sketches, or you could do all three.

For each record, please make a note of:

- the time you started using the technology
- how long you spent using the technology
- what sort of activity you did
- how you felt when you finished using the technology. You can record this in words or smiley faces or any other way you want. If you didn't feel anything, then don't worry about recording an emotion.

Don't worry if you forget to record an exact time or emotion – just do your best. 😊

At the end of the record please say whether this was an ordinary Saturday or Sunday for you, or whether it was unusual.

Technology	Time started	Time ended	Activity	Any emotions?
Mobile phone	10.00	10.10	Phoning relative	😊

Appendix 2: Adapted Adolescent Attachment Questionnaire and introductory text

Thank you for agreeing to complete this questionnaire! We will be finding out about your friendships and attachments. 'Attachments' are the relationships you have with people who are very important to you - a bit like friendships, but deeper.

I want to remind you that all of your responses will be kept confidential, stored securely, and reported in a way that means that no-one will be able to tell who you are.

The questionnaire should take 15-20 minutes. All the questions have the same format. Please say how much you agree or disagree with the sentence in the question just like in the example question. There are no right or wrong answers, just your views! ☺

If you have any questions, please get in touch with me at D.T.Levine@warwick.ac.uk, or on 07866 511137

Example question: I like listening to music.

Strongly agree	Agree	Don't know	Disagree	Strongly disagree	I don't listen to music
	√				

Please write your name here:.....

1. My mother only seems to notice me when I am angry.
2. My father only seems to notice me when I am angry.
3. My closest online friend only seems to notice me when I am angry (By 'online' I mean a friend you *mainly* interact with online or on the phone).
4. My closest offline friend only seems to notice me when I am angry (By 'offline' I mean a friend you *mainly* interact with face-to-face).
5. I often feel angry with my mother without knowing why.
6. I often feel angry with my father without knowing why.
7. I often feel angry with my closest online friend without knowing why.
8. I often feel angry with my closest offline friend without knowing why.
9. I feel my mother is someone who can help me deal with things that make me angry.
10. I feel my father is someone who can help me deal with things that make me angry.

11. I feel my closest online friend is someone who can help me deal with things that make me angry.
12. I feel my closest offline friend is someone who can help me deal with things that make me angry.
13. I get annoyed at my mother because it seems I have to demand her caring support.
14. I get annoyed at my father because it seems I have to demand his caring support.
15. I get annoyed at my closest online friend because it seems I have to demand his/her caring support.
16. I get annoyed at my closest offline friend because it seems I have to demand his/her caring support.
17. I am confident that my mother will listen to me.
18. I am confident that my father will listen to me.
19. I am confident that my closest online friend will listen to me.
20. I am confident that my closest offline friend will listen to me.
21. I talk things over with my mother.
22. I talk things over with my father.
23. I talk things over with my closest online friend.
24. I talk things over with my closest offline friend.
25. I enjoy helping my mother whenever I can.
26. I enjoy helping my father whenever I can.
27. I enjoy helping my closest online friend whenever I can.
28. I enjoy helping my closest offline friend whenever I can.
29. I feel for my mother when she is upset.
30. I feel for my father when he is upset.
31. I feel for my closest online friend when he/she is upset.
32. I feel for my closest offline friend when he/she is upset.
33. It makes me feel good to be able to do things for my mother.

34. It makes me feel good to be able to do things for my father.

35. It makes me feel good to be able to do things for my closest online friend.

36. It makes me feel good to be able to do things for my closest offline friend.

Appendix 3: Attribution tool

1. This is Jane. She is the same age as you. Jane enjoys spending time on the internet. Someone Jane doesn't know has just tried to start chatting while online. What do you think Jane does next?

Tells her new friend about her likes and interests. Y/N

Why do you think Jane did/didn't tell her new friend about her likes and interests?

Chat to her new friend on the internet using her real name. Y/N

Tell her new friend which school she goes to. Y/N

Send her new friend a photo of herself so that she can see what she looks like. Y/N

Agree to meet up with a parent nearby. Y/N

Tell her new friend her phone number. Y/N

Tell her new friend where she lives. Y/N

Why do you think she does these things?

What would you do in a similar situation?

Email exchange prompts: Which of the following feelings do you think make you do things, or stops you from doing things?

- *How you feel about how you look?*
- *How you feel about how clever you are?*
- *How confident you are feeling?*
- *How brave you are feeling?*
- *How safe you are feeling?*
- *How calm you are feeling?*
- *Any other feelings?*

2. This is Florrie. She is the same age as you. Florrie has taken a lovely photo with her phone. She edited it on the computer, and thinks it looks even better. What do you think Florrie does next?

Calls her parents to the computer to see what she has done. Y/N

Texts or emails the photo to her friends and family. Y/N

Prints off the photo and puts it on the wall.

Puts the photo up on a photo-sharing site, e.g. flickr. Y/N

What would you do in a similar situation?

What do you think makes people share, or not share, things they've made through by using technology?

3. Imagine your friend has a new mobile phone. She has been using it to text and chat people she knows from school. One person she is communicating with is her friend Anna. Last week your friend and Anna had a bad falling out. What do you think your friend does next?

Makes sure Anna's phone number isn't in her contacts.
Sends Anna a text asking if she wants to go to the cinema.
Sends Anna a text saying she was very hurt by their argument.
Sends Anna a text saying that she is ugly as a joke.
Sends Anna a text saying that she is ugly because she's feeling angry.

Why do you think she does these things?

What would you do in a similar situation?

What do you think makes people get on well, or not so well, when they're communicating using technology?

4. Imagine your friend is having problems with her English homework. She's tried to do the worksheet the class has been given, but she has given up. She goes to the internet to see if she can find out more about the topic. What do you think she does next?

Types the topic into Google to see what she can find out.
Opens up her favourite website and starts playing on it.
Looks at a site that she's used before that could help with her homework.
Starts chatting with a friend about the homework.
Starts chatting with a friend about the weekend.

What would you do in a similar situation?

Do you think we're more likely to try difficult things for longer when we're using technology? Or do we give up just as quickly as when we're using paper and pencil?

5. Who's in control when we use technology? (Choose any that apply)

Parents
The person using the technology
People who make the technology
Politicians
No one

Appendix 4: Interview schedule and images taken during interviews

PURPOSE 1: to establish self report role attributes – sense of self.

Technology

- My parents
- My friends
- Myself
- My school
- My other family
- My future self
- Other

Each sentence on a separate post-it (maybe 7 different colours/shapes post-its?, mark T in the corner of any technology ones).

SSI questions:

Are there any post-it notes that you feel are about you being a teenager, rather than something that could apply to anyone at any age?

I've asked you to show differences between your life in relation to technology, and your offline worlds. Does that feel like a real difference, or an artificial/pretend one?

Purpose 2: personal priorities

Three circles (one inside the other). Most important sentences in the centre circle, least important outside circle.

SSI questions:

Interviewer to note any trends or patterns: I can see a pattern. [Describe]. Any thoughts?

Follow up:

Can you think of any examples of this in your online life? Can you think of any examples of this in your offline life?

I see you have placed [describe] as most important to you. Why do you think that is? Can you think of any examples?

Take photo

Purpose 4: inquiry about clashes or conflict

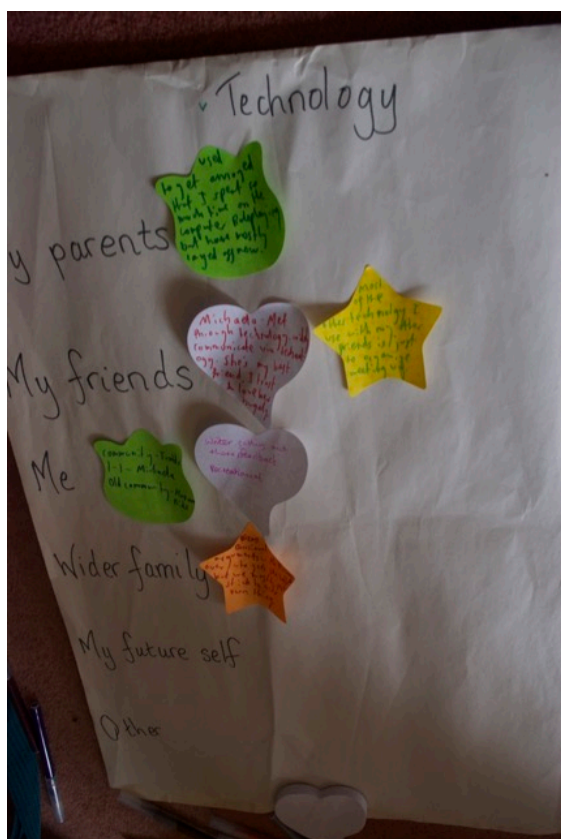
SSI question:

Could any statements be considered opposites from one another? Why? Are any of these opposites clashing/disagreeing/fighting/in conflict with one another?

You've been part of this project for nearly a year now, and that has involved you responding to all sorts of interactions. How have you found them? (Follow up – Annoying? Thought-provoking?)

Have you ever had any online experiences that really affected the way you did things online after that point? An obvious example would be experiencing something like being cyber-bullied, but I'm also interested in more day-to-day things, like one of your online friends saying/writing something that really moved you or affected you in some way.

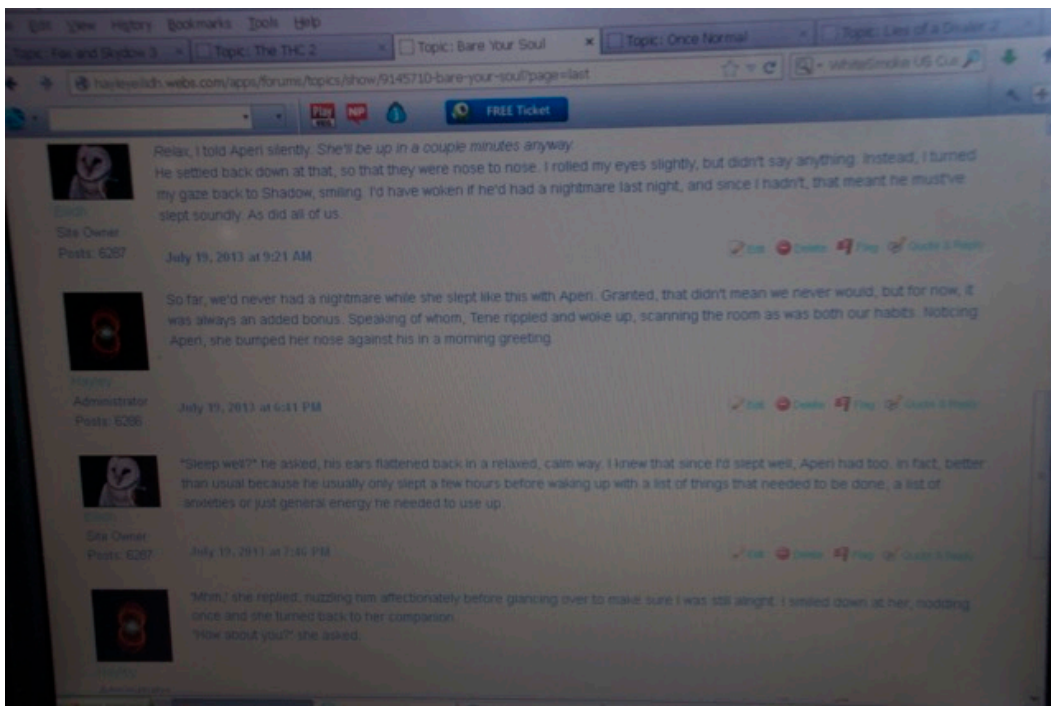
Have you ever had any offline experiences that really affected the way you did things online after that point?



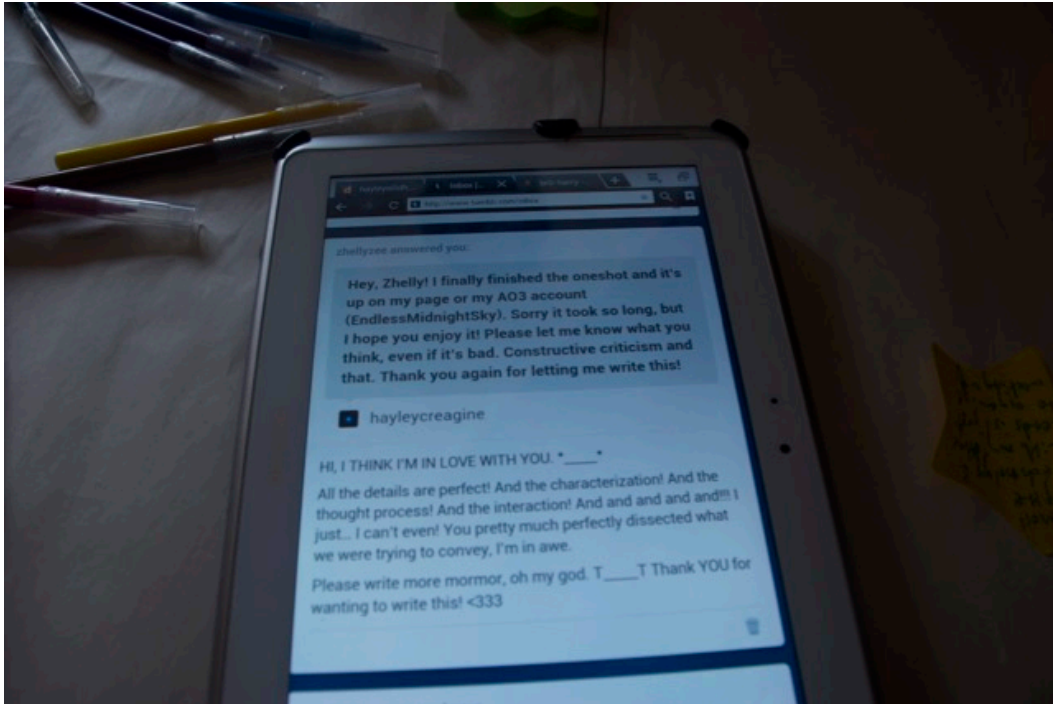
MR8 Interview image 1



MR8 Interview image 2



MR8 Interview image 3: the secure working space E and MR8 have created for themselves



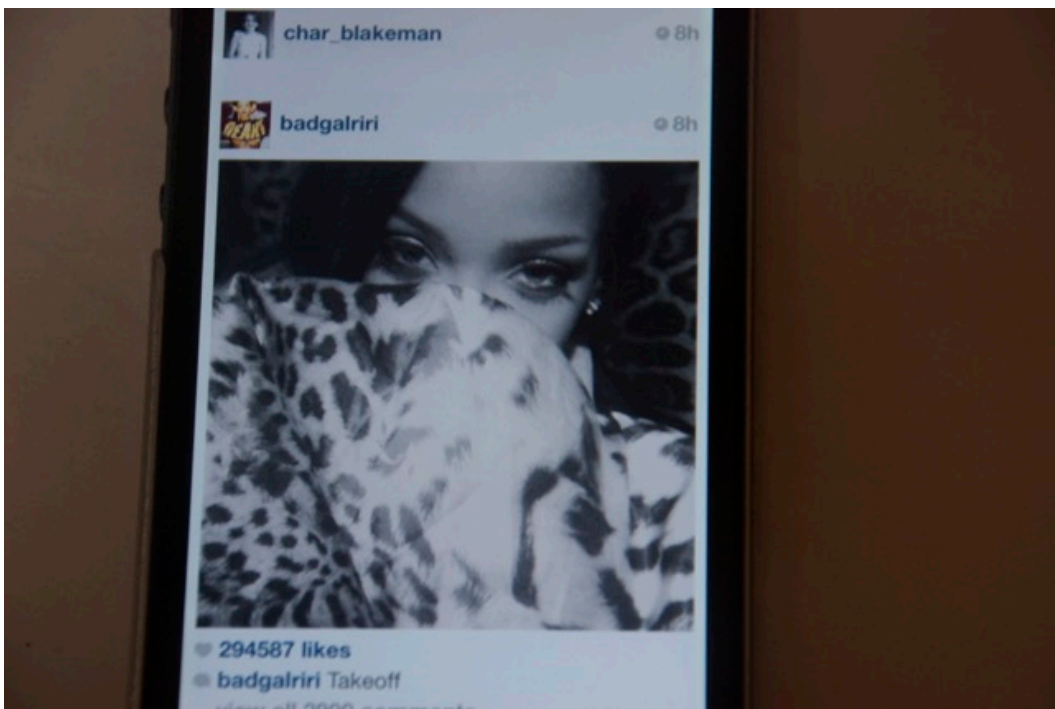
MR8 Interview image 4: approval from Tumblr personality after MR8 wrote a fanfiction based on their work



LS14 Interview image 1



LS14 Interview image 2



LS14 Interview image 3

Appendix 5: Codes and sub-codes from NVIVO coding

Nodes			
Name	Sources	References	
Activities	31	81	
Fandom	3	6	
Solitary	1	1	
Age	10	15	
Alternative self	15	45	
Future self	6	34	
Analytical	6	8	
Animals	10	18	
Aspiration	20	29	
At school	38	60	
Attachment	21	164	
Angry Distress	13	66	
Availability	14	57	
Goal Corrected Partnership	13	47	
Attributions and perceptions	33	164	
Being different	13	25	
Big ideas	18	25	
Calm	3	3	
Career	12	27	
Caring	3	5	
CE10	1	15	
Characterising others	13	32	
Characteristic of Adolescence	19	48	
CI6	1	15	
Clothing	9	10	
Communication	26	75	
Community	5	8	

Nodes			
	Name	Sources	References
	Comparison with others	15	35
	Conflict	26	57
	Connection	5	10
	Creativity	49	93
	Daily life	6	17
	Determination	13	15
	Dislikes	19	25
	Doing the right thing	9	11
	EE3	2	15
	Empathy	6	11
	Ethnicity	1	1
	Exercise	12	15
	FA1	1	18
	Family relationships	49	241
	Attachment	13	113
	Siblings	6	13
	Feeling strongly about things	9	17

Nodes			
Name	Sources	References	
Feelings	64	295	
Anger	15	66	
Authenticity	1	2	
Boredom	2	2	
Competitiveness	1	1	
Darker moments	4	4	
Fear	2	2	
Frustration	1	1	
Negative feelings	11	16	
Positive feelings	27	58	
Pride	4	5	
Security	13	23	
Food	13	20	
Friendships	80	333	
Attachment	13	117	
Bullying or being bullied	3	3	
Frequency of contact	3	6	
Range	3	4	
Gender	17	19	
HA7	0	0	
Having children	4	5	
Helping others	6	10	
Heroes and heroines	3	4	
HN11	1	18	
Identity	24	60	
IL12	1	19	
Illness	6	7	
Image	7	13	

Nodes			
Name	Sources	References	
Immediacy	2	2	
Independence	3	5	
Influencing others	5	5	
Introvert-extrovert	18	27	
JL4	2	18	
Likes	35	145	
Popular culture	7	8	
LS14	1	17	
Lying and deception	13	53	
Maturity	3	3	
Memory and remembering	2	2	
Mobile phone~~~~- the time you started usi	1	1	
MR8	1	13	
Music	18	34	
My physical body	17	28	
Negative impact of technology	13	23	
Optimism-pessimism	7	8	
Ownership and person	4	6	
Perception of own intelligence	8	9	
Perfectionist	2	4	
Personal strength	6	9	
Personality	17	25	
Physical environment	0	0	
Place of birth	0	0	
Problem solving	14	22	
Reading	8	8	
Real vs virtual life	20	58	
Realism	2	2	
Reflection point for me	5	6	

Nodes			
Name	Sources	References	
Relationships	9	13	
Relaxation	7	11	
Religion	12	22	
Atheist	0	0	
Christadelphian	5	11	
Christian	1	3	
Church of England	0	0	
Jewish	4	5	
Messianic	2	3	
Resilience and persistence	23	42	
Rites of Passage	3	5	
Ruth feels angry because she feels jealous	1	1	
Science Maths	1	2	
Self	53	208	
Self-projection	2	2	
The kind of person I am	27	168	
Self-confidence	24	42	
Self-control	14	18	
Self-discipline	7	9	
Self-knowledge	40	90	
Self-preservation	7	8	
Self-satisfaction	3	3	
Shopping	4	6	
Size	1	1	
SS2	1	20	
Stress	3	3	
Taking risks	25	55	

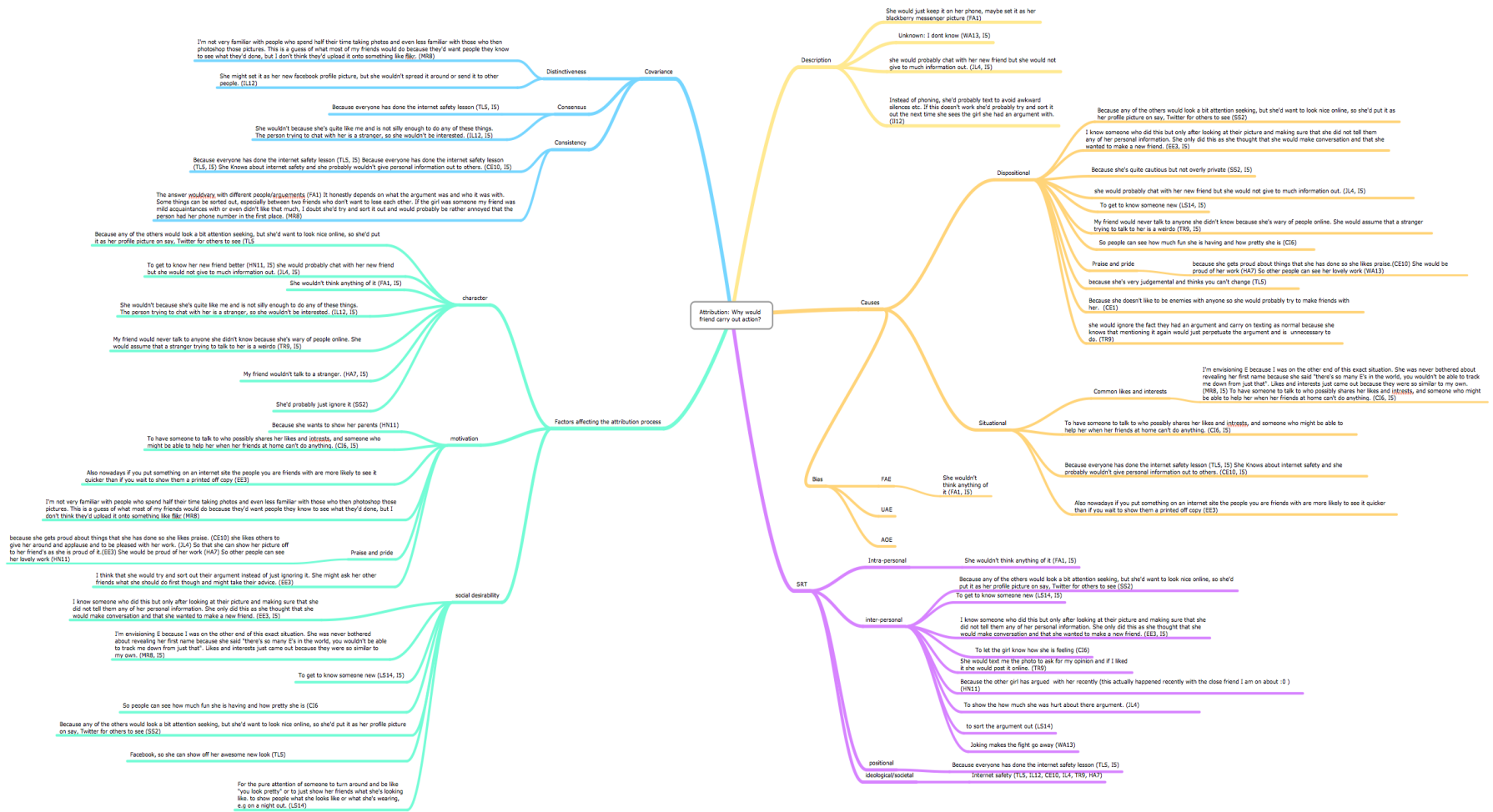
Nodes			
	Name	Sources	References
☐	Technology	76	472
●	Access	6	11
●	Competition	1	1
●	Criticality	6	9
●	Future	16	23
●	Location	3	3
●	Parallel activities	3	3
●	Permanence	2	2
●	Privacy	14	40
●	Safety	22	61
●	Variations between individuals	11	15
●	Volume of use	2	2
●	Wishes	5	6
●	Technology control	21	46

Nodes			
Name	Sources	References	
Technology use	60	376	
Ask.fm	1	1	
BBM	3	3	
Bebo	6	17	
Browsing	2	4	
Chat	8	17	
Clothing sites	2	2	
Computer	12	18	
Cyberbullying	4	6	
Email	4	8	
Facebook	22	52	
Fanfic	1	6	
Feelings about use	17	37	
Games	19	29	
Homework	26	48	
Hotmail	1	1	
Howrse	1	2	
Instagram	4	9	
Length of time used	17	40	
Mobile phone	32	62	
Music	9	15	
Photography	15	25	
Powerpoint	1	1	
Promotion	1	1	
Radio	1	1	
Revision	3	4	
Role play	1	2	
School VLE	1	1	
Sharing	8	22	

Nodes			
Name	Sources	References	
Skype	6	14	
Snapchat	1	1	
Social networking	6	11	
Subject specific site	3	3	
Tablet	2	2	
Television	9	12	
Tumblr	8	10	
Twitter	12	22	
Videos and DVDs	3	3	
Wattpad	1	1	
Webcam	1	1	
Wii	3	3	
Youtube	11	17	
The past	4	5	
Theory of Mind	16	53	
TL5	1	17	
Tolerance	1	2	
ToM	23	74	
Strange Stories 1	12	12	
Strange Stories 2	13	13	
Strange Stories 3	13	13	
TR9	2	11	
Travel	6	9	
Trust	7	9	
What I do with other people	28	84	
What others say about me	5	5	
What others think of me	6	9	
Work-life balance	5	7	
Worries	12	15	
Worthy of other's trust	4	4	
Writing	4	9	

Relationships						
From Name	From Folder	Type	To Name	To Folder	Direction	
CE10	Nodes	Sibling	IL12	Nodes	↔	
EE3	Nodes	Religious orient	Religion\Jewish	Nodes	→	
FA1	Nodes	Sibling	SS2	Nodes	↔	
FA1	Nodes	Religious orient	Religion\Christa	Nodes	→	
HA7	Nodes	Religious orient	Religion\Jewish	Nodes	→	
JL4	Nodes	Sibling	CE10	Nodes	↔	
JL4	Nodes	Sibling	IL12	Nodes	↔	
MR8	Nodes	Religious orient	Religion\Atheist	Nodes	→	
SS2	Nodes	Religious orient	Religion\Christa	Nodes	→	
TL5	Nodes	Religious orient	Religion\Churc	Nodes	→	
TL5	Nodes	Religious orient	Religion\Atheist	Nodes	→	
TR9	Nodes	Religious orient	Religion\Messia	Nodes	→	

Appendix 6: Mindmaps: attribution, ToM, attachment and relationships, self



Ruth feels that Maria is lying about it to get Maria to feel jealous, when Maria knows that Ruth loves horses (CE10) Ruth feels angry with Maria because she is jealous that Maria is getting a horse and she isn't. She feels that Maria doesn't deserve this horse as she hardly ever tells the truth. Also, she's angry because Maria put this up on Facebook and then she felt that she is jealous about it - especially because Maria knows that Ruth loves horses. The fact that the rest of Maria's online friends are sending Maria excited messages may also anger Ruth. She would be constantly reminded (due to Facebook notifications) and also annoyed that Maria is getting lots of attention. Ruth may also feel that she is the only person who knows that Maria is a liar, and that Maria doesn't deserve the attention (IL12, 14). Ruth is angry at Maria for three reasons. One is that she knows that her friend is lying to get Maria to feel jealous. Maria is also lying about something that she knows Ruth loves and would dream to have - which to Ruth feels like a personal attack on her. Three. Ruth is angry because she wants to tell everyone that Maria is lying about the horse, but if she did then the online friends would say that Ruth is just jealous of Maria (TR9) Because Ruth has always wanted to ride horses, she knows that Maria probably isn't getting a horse and feels like Maria is only saying these things to make her jealous. Maria also knows that Ruth loves horses and is probably making Ruth jealous. Ruth felt annoyed at Maria as she has lied about another thing, but it is a thing that she would love, so it may make it even worse for Ruth (C6) Ruth feels angry with Maria as she thinks that Maria is trying to get lots of attention and has said something which Ruth does not think it true but other people do think it is true. She is also annoyed as it is Maria's dream to have a horse and so it makes Ruth feel even more angry because she knows that Maria does not really have a horse and everyone else will think she does. However, it is online there is no way anyone can know whether she really does have horse or not therefore she is wondering whether it really is true or whether Maria is just trying to wind her up. (EE3) Ruth is angry as she feels like Maria is buying a horse on purpose, just to make her friend jealous of her. Also to tell her she is higher than Ruth. (FA1) Ruth is angry, not because Maria lied, but because she felt betrayed. Even though the horse Maria is a liar, she still hoped that just this time, she was telling the truth and that she would meet the new horse. Maria played on her emotions. That hurts more than being lied to. (MB8) Ruth is angry because she is jealous that other people would think that Maria was getting a horse - a horse of getting a horse would be a big thing to Ruth, and she knows that Maria knows this. She would love the idea of everybody thinking she was getting a horse, but instead they think that Maria is, and to add to the jealousy she may feel already, it's not even that she is getting a horse because Ruth lies the idea of people associating her with horses, because she is proud of her for them, but instead people will now associate horses with Maria and until everybody knows the truth, this will annoy Ruth. (SS2) Because she doesn't think Maria is telling the truth. (L4) Ruth feels angry with Maria because it seems like she is trying to make her jealous when she isn't. Maria wants to impress people on the internet and is probably feeling proud of her to others about it so, on the other hand, she could actually be getting a horse! (LS10H) Ruth feels angry because she feels jealous and would horse. Because it is on Facebook everyone knows. (HA7) To be honest I don't know why she's angry, obviously Ruth always wanted a horse and Maria got one so now she's jealous. (SS14)

She wants to know why she feels sad but she doesn't know why, so she makes up a reason and tries to convince herself that that is what is making her sad. (CE10) Davan is looking for support from her friends. Because she feels sad, she wants her friends' comfort and support. She is also wanting communication, as her friends could help cheer her up. (IL12, 14) Davan doesn't feel comfortable enough to simply ask her friends for a cheer up. She feels that asking for a bit of comfort, without a real reason, would come across as petty or insecure. (TR9) Because she wants people to feel for her and make her feel better. She couldn't just say to her friends "I'm feeling sad can you make me feel better?" if she has a reason she might think her friends are more likely to notice she is sad and make her feel better, when instead they might just want to make her feel better because she is their friend. (C6) Davan made upset because she is craving some kind of affection/attention off somebody, and deep down she knows that if she was getting attention/interest with people enjoying her she wouldn't feel sad. So she only says in her address, she can talk as a child way of getting some affection by telling her friends her pet has died. Although not true, she knows this will encourage people to send her sympathetic messages, which is maybe what she is needing at this point in time, and momentarily, her regaining some happiness is more important to her than the thought of lying her pet. Alternatively she may be some way she can't explain enjoy her address, and so she making up a situation like this in her head, she will often pretend to weep in address even more, just to add to the address she is already experiencing. Or she may be confused/embarassed as to why she is feeling this unexplained sadness, and so needs some kind of justification, any kind of explanation, as to why she's feeling down. So she is making up a silly explanation like this, so she can pretend not only to her friends, but also to herself that this is the reason, as a kind of justification for why she could be feeling low. (SS2) She wants people to realize that she is sad and comfort her. But sending text or being online with your friends means that often your friends cannot see that you are sad through your words, as you cannot see people's facial expressions for example, she had to use something drastic to make people think that she is in need of comfort. (EE3) Davan says this because she doesn't want people to ask why she is upset (H11) She needs sympathy. If she tells her friends that she was just feeling sad for no reason, they would probably tell her to just get over it. But by fabricating a story that others could relate to, she was guaranteed sympathy which would help cheer her up. (MB8) Davan is scared her friends will ask her the matter is so she thought that it might be better to be instead of telling the truth (L4) Davan is saying this because she's an attention seeker. I don't really know why she's said that our unless she's looking for sympathy or a boost. (SS14) Davan, says sympathy and want to feel cared for, therefore results to extreme measures. (FA1) Davan said this to everyone else to make her feel better, even though she doesn't know why she's upset (TL1) don't know (HA7)

Florie doesn't want to make Ruby feel bad about flora not liking her website so she lies to make her friend feel good (CE10) Florie cares a lot about Ruby and knows that Ruby is very proud of the website. Florie doesn't want to hurt Ruby's feelings, so she lies instead to make Ruby feel better. She is trying to be a good friend. It shows that Florie isn't telling the truth, as she hesitates with an 'or' at the start of the sentence and there is a decaying what she says. She also isn't enthusiastic about the website as there is no exclamation mark at the end of the sentence. However, Florie's 'I'm not to be very good, as if Ruby finds out Florie thinks her website is ugly fair or not, there will be a lack of trust and their friendship will suffer. Instead, Florie should have offered some helpful suggestions, although not these across media, e.g. I like that but I think this would look nicer like this. (IL12, 14) Florie doesn't want to hurt Ruby's feelings. Ruby has clearly put a lot of time and effort into the website, and she doesn't want to discourage her friend. (TR9) I think Florie says this because she doesn't want to hurt Ruby's feelings. Ruby has obviously spent a lot of time and effort on it and Florie doesn't want to say it is bad as that will put Ruby down, so as a friend she says it is good. Florie should have given the website some constructive criticism because that will have helped Ruby to make her website even better (C6) Florie does not want to hurt Ruby's feelings and she tries to be nice to her. However, it may backfire as a later date if other people say that it is ugly or it will hurt Ruby's feelings but Florie will agree. If she was to feel her own then it could eradicate any chance of Ruby being teased at a later date therefore it would be more useful and kind to criticize it now and help her change it so that it looks better. (EE3) She says it because Ruby is proud of her website and Florie doesn't want to hurt her feelings so she says what she thinks is right. (SS14) Florie is worried that if she says Ruby and make her think that she is wrong about her website then Ruby will feel under appreciated. If Florie's anything like me, she was probably scared of losing her best friend over something petty like this. That fair normally comes from past experiences so it is possible that Florie once had a friend who she lost over something ridiculous and she doesn't want that to happen again. (MB8) It would be because Florie obviously doesn't want to upset Ruby's feelings which she inevitably will be telling Ruby and she will be telling Ruby's feelings. What will she get out of it? Looking at the large scale of things, does it really matter if she tells a little white lie to keep her friend happy. This isn't a big life changing thing Florie is doing, it is if anything a small act of kindness, saying her friend happy for the sake of not telling the cold truth. Nobody is getting in trouble for Florie not saying what she thinks, nobody is getting harmed, all she is doing is keeping her friend happy, and making her feel like she has achieved something, which is what friends do all about, really. On the other hand, could Ruby be wrong to say what she thinks? Of course if Ruby then goes about thinking her website is the best, when in reality it isn't the best at all, and is only really considered to be good by Ruby's eyes. Ruby may appear a bit silly to her she has low standards for her website. You could say it'd have been better if Florie had instead offered a friendly word of advice, and told Ruby a way to improve her website instead of dismissing it as being 'so, really good'. But alternatively, who says Ruby's website is ugly anyway? Not everybody has the same definition of 'ugly' and just because Florie thinks the website is 'ugly' doesn't mean it really is. So maybe if Florie might as well tell Ruby what she would want to hear. (SS2) Florie says that to make her friend feel good about herself and the website, and to be kind to her instead of being mean but truthful. (FA1) Florie doesn't want to hurt Ruby's feelings. Ruby has clearly put a lot of time and effort into the website, and she doesn't want to discourage her friend. (TR9) Florie says this because she doesn't want to upset Ruby (L1) because Ruby's feelings (L4) She shouldn't lie. Ever if it is true. (HA7) Florie says this as she makes Ruby feel good about herself but the fact she said it was really good was an overstatement, but just saying it was ugly would be just mean (L1)

...but I think you can control it so that it doesn't affect you in that kind of way, but a lot of people don't feel like they can do that. (EE3, Interview)

Reasons for using technology I don't know if it's a need to be with people, but I mean there's definitely...I have a friend... But she's on, but she's on, like everything. So she's on Tumblr, she's on Twitter, she's on Facebook, she's on everything, but she's not on all the time. So she connected to her iPod and she will sit there on it, but she won't sit there while you're talking to her unless you're looking at something together. But again she's a weekly poster...and has family in Nigeria that she needs to keep in contact with...And then, I've got another friend who's always on social networks, but I don't know why. She is quite 'look at me' all the time. And you 'look and things, and she does like to have that constant people talking to her thing. (EE3, interview)

Actually, it looks like we've talked about a lot of things that are actually important to me. I do think that technology kind of helps, and I think that being a teenager and having these things around you growing up... like my generation has always had it - so it is probably not quite as scary as it is for, say, my grandma. (EE3, interview) Like, ideally, how can you be friends with 200 people? You try and explain you're not actual actual friends, but even if you have like 200 people on Facebook you only talk to five of them regularly, it is like friendship isn't black and white any more. There's lots of grey... I just avoid it mainly. They [grandparents] talk about it... not that it is wrong, but like you need to be careful. DTL: Is it a source of conflict? TR9: Not really, with my grandparents it's quite comical. Bless them, I think the world might be quite strange for old people. (TR9)

Reasons behind text control I'm fine saying hello to you in a corridor, I'm fine becoming friends with you, but because I'm NOT friends with you I don't see the point...I don't want you to see what I'm doing, and I don't particularly want to see what you're doing, so why have you added me kind of thing. (EE3 interview)

I think probably part of it is you want people to like the stuff that you do...Partly affirmation.

CE10: I think it is about our ages. IL12 I think it is about us as people. I think doing some exercise is more interesting than taking a car round a track. CE10: Yeah, a bit of both, because IL12 has reached an age when she really wants to be slim, like a model. IL12: I think I've got more self-conscious as I've gotten older. CE10: Yeah, and J4 and I are probably more childish. We kind of prefer things like being competitive with each other.

DTL: If you were in a similar position, and there was some kind of public disorder, how do you feel you might handle something like that? CE10: I've no clue. I've no experience of anything like that. I do get angry as well, but I don't like it being out there for everyone to see. But if other people make it like that then... (SS14, interview)

CYBERBULLYING I like to think so, it's hard to say because bullies when you're 11 and 12 are different from the bullies you'd have in your 20s, I like to think I'd be able to handle it better, partly because I've experienced it before, partly because I think it's stronger than I was then. I look back on myself and I was, I was smart and clever and liked to go outdoors but I was actually quite weak. (MB8, interview)

I think that was mainly Remy's (RP character) fault, because he's such a smart-arse. And, um, so I think that did help. (MB8, interview) DTL: So it isn't so to with the volume of the things you've been doing? (MB8) I don't think so much to do with that, but I think you're doing it well. DTL: In terms of characters? (MB8) Yeah, the characters, I know them better now than I did back then, which is good in some ways because you know I can play the better. But it is sad in a sense because you know I get into them better, to a sort of an obsessive thing. On the one hand it's great that I know how they react to certain things and all that kind of stuff. On the other hand it's probably easier for me to get lost in them. (MB8, interview)

Third person understanding context

Needed representations

TOM

First person understanding context

Allopoetic (independent of self-interv)

Fictional TOM?

Tech helps lying

I think it's easier to lie to strangers because they don't know who you are. But if you are talking to a real friend online then people lie less because it is recorded in the chat history, so you can't take back what you've said. (TR9)

Technology makes it easier to lie because the person you are talking to can not see your face unless you are on FaceTime or Skype. (CE3) I think technology makes it easier to lie because you can't look behind a screen. (IL12) I think technology makes it easier to lie because you can give yourself a different character. (L4)

See Attachment and Relationships mind map

affective or 'hot' mental states, in other words 'emotions'

Fear-Actually, it looks like we've talked about a lot of things that are actually important to me. I do think that technology kind of helps, and I think that being a teenager and having these things around you growing up... like my generation has always had it - so it is probably not quite as scary as it is for, say, my grandma. (EE3, interview)

Ruth feels angry with Maria because she is jealous that Maria is getting a horse and she isn't. She feels that Maria doesn't deserve this horse as she hardly ever tells the truth. Also, she's angry because Maria Facebook and Ruth may feel that she is boasting about it - especially because she knows it. The fact that the rest of Maria's online friends are sending Maria excited messages may also be constantly reminded (due to Facebook notifications) and also annoyed that Maria attention. Ruth may also feel that she is the only person who knows that Maria is a liar, and deserves the attention (IL12, 14)

Florie cares a lot about Ruby and knows that Ruby is very proud of the website. Florie dc so she lies instead to make Ruby feel better. She is trying to be a good friend. It shows th the hesitates with an 'or' at the start of the sentence when she is deciding what to say. Sh the website a Ruby, as there is no exclamation mark at the end of the sentence. However, as if Ruby finds out Florie thinks her website is ugly later on, there will be a lack of trust. Instead, Florie should have offered some helpful suggestions, although put them across i this would look more like this. (IL12, 14)

...like, someone made an indirect tweet. It happened the other week, my friend with her ex, there was like a post like going round and it got back, and then she said that she heard his voice and it was like 'Don't get happy... It's just pointless and silly, I don't see it point of that... So I like that really does annoy me. Like, I'll stand up for her, I don't care where it is, I'm not going to be mean about it, but I'll say 'You don't need to say that.' Ah... the shorter me. (SS14, interview)

cognitive or 'cold' mental states (e.g. beliefs and knowledge)

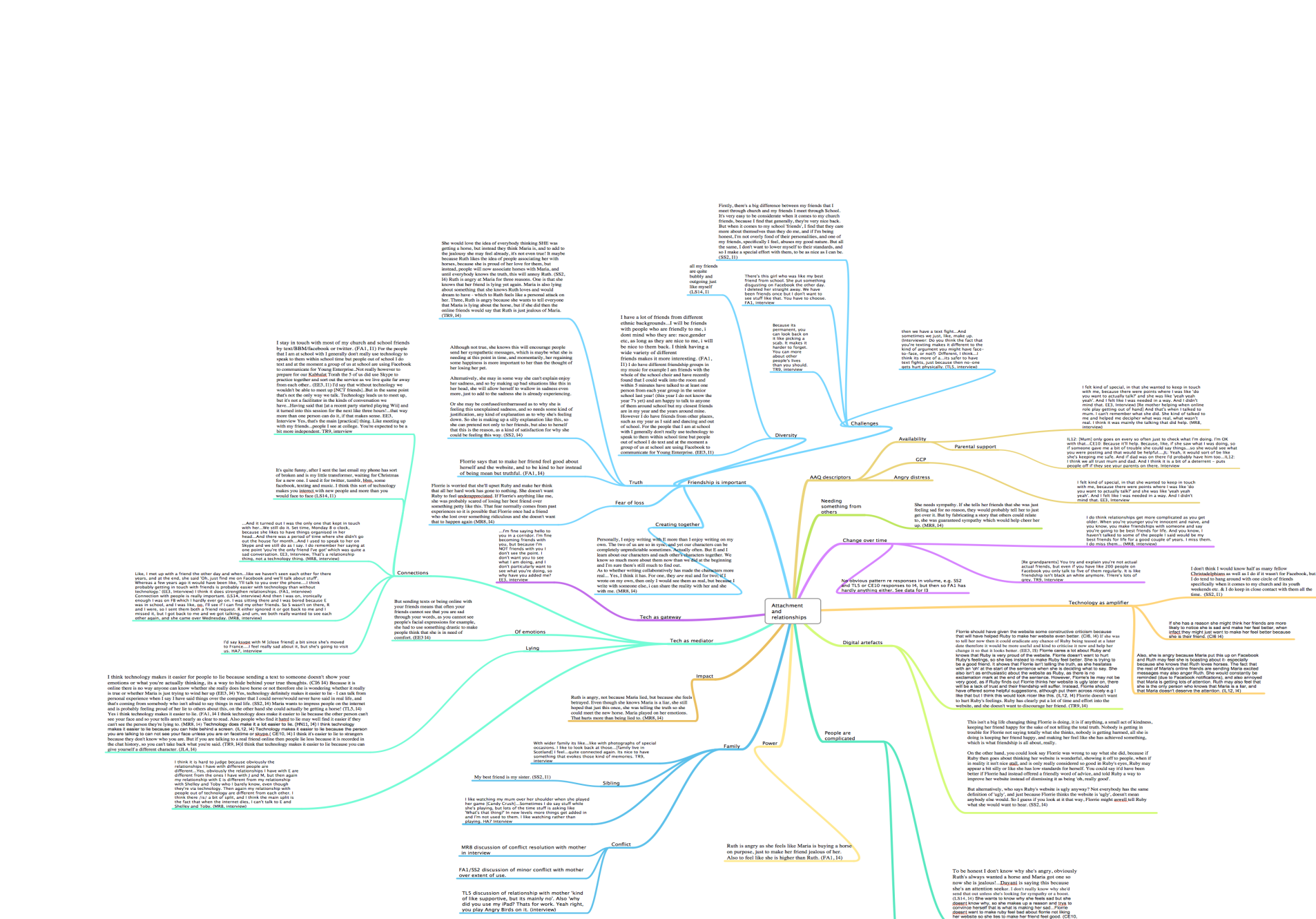
My Maths teacher hates... um... computers and technology and stuff... He just says it's too much, you know. Actually... (HA7, interview)

Egocentric (comparing mental states of others to our own)

...but I think you can control it so that it doesn't affect you in that kind of way, but a lot of people don't feel like they can do that. (EE3, interview)

And I've had photos on before, but I've never said like a status up or anything... But some of my friends they put something on every five minutes, but I don't check it that often. (EE3, interview)

I just don't see how anything could be simple, because, you know, even with people that you're closest to, there's always be arguments and rifts and days when you go round glaring and glaring each other, so I don't think you can talk about a simple relationship. I don't that really exists, either online or offline. (MB8, interview)



Finally, there's a big difference between my friends that I meet through church and my friends I meet through school. It's very easy to be considerate when it comes to my church friends, because I find that generally, they're very nice. But when it comes to my school 'friends', I find that they see more about themselves than they do me, and I'm being honest. I'm not overly fond of their personalities, and one of my friends, specifically I feel, shows my good nature. But all the same, I don't want to lower myself to their standards, and so I make a special effort with them so as to be as nice as I can be. (SS2, 11)

all my friends are quite bubbly and outgoing just like myself. (LS14, 11)

This is this girl who was like my best friend from school. She put something disappearing on Facebook, the other day. I deleted her straight away. We have been friends once but I don't want to be friends again. You have to choose. (FA1, interview)

Because it's permanent, you can't look back on it like the picture I said. It makes it hard to forget. You can't have another person's view. (TR8, interview)

then you have a best friend. And sometimes we just, like, make up interviews. Do you think that that's what you're wanting makes a difference to the kind of arguments you might have later on in your relationship? (FA1, interview)

I think it's more of a... it's safer to have best friends, just because there are some guys that do things that they don't want to see. (TS2, interview)

I felt kind of special, in that she wanted to know in touch with me, because there were points where I was like 'do you want to actually talk?' and she was like 'yeah, yeah, yeah'. And I felt like I needed to be away. And I didn't mind that. (TS2, interview)

TS2: Maria only goes on every so often just to help me. I'm OK with that. (TS2, interview)

I felt kind of special, in that she wanted to keep in touch with me, because there were points where I was like 'do you want to actually talk?' and she was like 'yeah, yeah, yeah'. And I felt like I needed to be away. And I didn't mind that. (TS2, interview)

the needs sympathy. If he tells her friends that she was just feeling sad for no reason, they would probably tell her to just get over it. Her by fabricating a story that others could relate to. (TS2, interview)

No obvious pattern re responses in volume, e.g. SS2 and TS2 or CS2 responses to SA, but there's SA and FA1 has nobody anything else. See data for SA.

The grandparents! But even you and explain why not actual actual friends. But try and you have the 200 people on Facebook you talk for for them regularly. It is a friendship sort of like as when anyone. There's size of SA, TR8, interview

I don't think I would know half as many friends. (TS2, interview)

Florie should have given her the website some constructive criticism because that will have helped Ruby to make her website even better. (CS16, 14)

Florie should have given her the website some constructive criticism because that will have helped Ruby to make her website even better. (CS16, 14)

if she has a reason she might think her friends are more likely to notice she is sad and make her feel better, when they might just want to make her feel better because she is the friend. (CS16, 14)

This isn't a big thing changing things. Florie is doing it, it is if anything, a small act of kindness, keeping her friend happy for the sake of not selling the sad truth. Nobody is getting in trouble for Florie not saying kindly what she thinks, nobody is getting harmed, all she is doing is keeping her friend happy, and making her feel like she has achieved something, which is what friendship is all about, really.

On the other hand, you could look say Florie was writing to say what she did, because if that's their game about thinking her website is wonderful, showing it only to people who would support her, then she's being really really considerate to send it to people who would support her. It's not like she has made for herself. You could say it'd be better if she had just said 'hey, I'm doing it, it's not good, but I'm trying to do it, and I'm really trying to improve her website instead of dithering it as being a really good.'

But alternatively, you says Ruby's website is ugly? Not everybody has the same definition of 'ugly', and just because Florie thinks the website is 'ugly', doesn't mean anybody else would. So I guess if you look at it that way, Florie might actually tell Ruby that she would want to see it. (CS16, 14)

To be honest I don't know why she's angry, obviously Ruby's always wanted a home and Maria got one so sure she is jealous... (FA1, interview)

There's no such thing as a simple relationship in my opinion. It's depending who the person is... I just don't see how anything could be simple, because you know, even with people that you're closest to, there's always arguments and life and days where you're going along and getting on really well, and I don't think you can talk about a simple relationship. (TR8, interview)

she would love the idea of everything being 100% was getting a home, but instead they think Maria is, as if to add to the jealousy she isn't actually thinking, it's not even more so maybe because Ruth likes the idea of people associating her with home, because she is proud of her love for her home. But instead, people will now associate homes with Maria, and used everbody knows the truth, this will annoy Ruth. (SS2, 14)

I have a lot of friends from different ethnic backgrounds... I will be friends with people who are friendly to me, I don't mind who they are: once gender, etc. as long as they are nice to me, I will be nice to them back. I think having a wide variety of different friends makes it more interesting. (FA1, 11)

Alternatively, she may in some way be able to explain enjoy her sadness, and so by making up bad situations like this her head, she will allow herself to have a sadness even more, just to add to the sadness she is already experiencing. (FA1, 11)

Florie says that to make her friend feel good about herself and the website, and to be kind to her instead of being mean but truthful. (FA1, 14)

Florie is worried that she'll upset Ruby and make her think that all her hard work has gone to nothing. She doesn't want Ruby to feel bad about it. (FA1, 14)

Personally, I enjoy writing with more than Ruby writing on my own. The two of us are in contact just yet our characters can be completely unpredictable sometimes. Actually often. But I find I learn about our characters and find out other characters together. We have so much more about them than we get at the beginning and I'm sure there's still much to find out. (TS2, interview)

With sending texts or being online with your friends, it means that you can see through your words, as you often see people facial expressions for example, she had her own feelings about it to make people think that she is in need of comfort. (TS13, 14)

With wider family in the like with photographs of special occasions... I like to look back at those. (TR8, interview)

Ruth is angry, not because Maria lied but because she feels betrayed. Even though she knows Maria is a liar, she still might not want to tell her. (FA1, 14)

I like watching my mum over her shoulder when she played her game Candy Crush... Sometimes it's a bit off, when she's playing, but part of the same stuff is asking 'What's that doing?' in one breath more things get added in and I'm like 'wow'. I like watching rather than playing. (TR8, interview)

I like watching my mum over her shoulder when she played her game Candy Crush... Sometimes it's a bit off, when she's playing, but part of the same stuff is asking 'What's that doing?' in one breath more things get added in and I'm like 'wow'. I like watching rather than playing. (TR8, interview)

M88 discussion of conflict resolution with mother in interview

FA1/SS2 discussion of minor conflict with mother over extent of use.

TS15 discussion of relationship with mother 'kind of like supportive, but it's mainly not. Also why did you use my iPad? Thank for work. Yeah right, you play Angry Birds on it. (interview)

Diversity

Availability

Parental support

CCP

Angry distress

AAQ descriptors

Needing something from others

Change over time

Attachment and relationships

Digital artefacts

Technology as amplifier

Tech as gateway

Tech as mediator

Impact

Family

Power

People are complicated

Sibling

Conflict

Conflict

Conflict

Conflict

Conflict

Conflict

Conflict

Conflict

My best friend is my sister. (SS2, 11)

I like watching my mum over her shoulder when she played her game Candy Crush... Sometimes it's a bit off, when she's playing, but part of the same stuff is asking 'What's that doing?' in one breath more things get added in and I'm like 'wow'. I like watching rather than playing. (TR8, interview)

M88 discussion of conflict resolution with mother in interview

FA1/SS2 discussion of minor conflict with mother over extent of use.

TS15 discussion of relationship with mother 'kind of like supportive, but it's mainly not. Also why did you use my iPad? Thank for work. Yeah right, you play Angry Birds on it. (interview)

Ruth is angry as she feels like Maria is spying a home on purpose, just to make her friend jealous. (FA1, 14)

Also to feel like she is higher than Ruth. (FA1, 14)

Ruth is angry as she feels like Maria is spying a home on purpose, just to make her friend jealous. (FA1, 14)

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Also to feel like she is higher than Ruth. (FA1, 14)

Appendix 7: Parent consent form, participant consent form, and ethical approval

Hi there,

I am hoping to explore with your daughter the ways in which she understands herself and the world around her, and in particular her use of technology. I explain more about this below and I hope I will give you enough information for you to sign the consent below, but if you have any queries please don't hesitate to get in touch with me at D.T.Levine@warwick.ac.uk.

About the researcher

I started my working life as a teacher after completing a degree in music and education, and a Masters degree on comparative education methods. After spending some time in the classroom, I worked in national government policy roles, including Programme Manager for the National Academy for Gifted and Talented Youth and as Head of Educational Research and Analysis for the government technology agency, Becta. Having just completed a Masters in Educational Research Methods, I am now undertaking a PhD at the University of Warwick under the supervision of Dr Michael Hammond. I have a full, clear Criminal Records Bureau check and can make a copy of the certificate available to you.

About the project

Technology is all around us. As it has become increasingly pervasive, the media, government, schools, software developers and families have begun to express concern about the impact technology can have on a young person's health and wellbeing. Much of the debate is based in fear, ignorance, or a lack of good evidence about the kinds of activities young people engage in online, and what those activities actually represent in terms of their development. This study aims

to provide useful, robust information to developers and families about the kinds of technologies that provide safe, healthy environments for girls and young women.

This study focuses on the ways technology use relates to a perspective from psychology called 'social cognition'. Broadly, social cognition is about understanding how we view ourselves, the world around us, and our relationships with the world. For the purposes of this study I am focusing on the technology-enabled world, including games, mobile phones and the internet.

I am particularly interested in the declining age of puberty among young women in the UK, and what changes in activity and attitudes we see as young women move through puberty.

What will your daughter be doing?

Your daughter will be engaging in the project over 2012 and 2013. This appears to be a long period of time, but our interactions will be spaced out and negotiated at your family's convenience. In particular, I am concerned to ensure the project does not impact on busy times such as exams or family holidays. I will undertake a number of activities with your daughter, including the following:

1. observe some of her online interaction and ask her to comment on some interactions.
2. Ask her for her views on a number of social cognition concepts, such as attachment (relationships), trust, self-concept and identity, safety and morality, technology and the differences between her online and offline lives.
3. Ask her to fill in short questionnaires about her relationships with others, and gather her views about whether the questionnaire makes sense.
4. Engage in a number of creative activities, designed to stimulate conversation, description and recall.

5. Ask her to rate her level of puberty using some line drawings that have been used in research many times (she does not have to participate in this part of the study if she feels uncomfortable doing so).

I may also request an interview with your daughter's main carer, but you are not obliged to participate if you would prefer not to.

All of my interactions with your daughter will be carried out online or face-to-face, and I will not contact her more than once a week via email. I can confirm that all the information I gather with your daughter will be kept securely and safely in line with the University of Warwick's Code of Conduct, and that all her data will be anonymised. This means that she will not be able to be identified by anyone other than myself.

Parent/guardian permission

In order for me to verify that you are the parent or carer, please email me at D.T.Levine@warwick.ac.uk and I will contact you to arrange an opportunity to do so. If you are willing for your daughter to participate in the project, please could you email me with the following text:

Option 1: I consent for my daughter (name) to participate in all elements of the project outlined above.

Option 2: I consent for my daughter (name) to participate in all elements of the project outlined above, except for providing information about her stage of puberty.

Hi

This will give you a bit more information about a research project that you might be interested in participating in. Hopefully it'll answer any questions you have, but if you want to know more, please get in touch with me at D.T.Levine@warwick.ac.uk.

About the researcher

My name is Di. I started my working life as a teacher. After spending some time in the classroom, I worked for the government for organisations including the National Academy for Gifted and Talented Youth and as Head of Educational Research at Becta. I'm now doing a research project at the University of Warwick (one of the UK's top ten universities). This means I'm finding out something new about the ways young people use technology. My supervisor - the person who makes sure I'm doing the right thing - is Dr Michael Hammond.

About the project

As you probably know, there is a lot of fuss in the media about the things that go on online, often about young people your age. I'm interested in exploring some of these things in more detail. It sometimes seems that the debate isn't based in real life experiences, what young people really do online or what they think about their online activities.

In this project I'm interested in getting a better understanding of your online interactions and the way you understand yourself and the world. How do you feel about your technology use? How do you develop your friendships and keep them going online? Are they different online compared to offline? How do they change as we get older? And does entering puberty make a difference to the ways we relate to others online?

Ideally by the end of the project I'd like to be able to say to web developers 'these are the kinds of things that help girls and young women to develop healthy relationships online'. And I'd like to be able to give parents some idea of the kinds of things that are OK about online relationships, and a sense of the things they need to look out for that aren't OK.

What will you be doing?

I will be working with you on and off over 2012 and 2013. This sounds like a long period of time, but I will not be doing any data gathering during busy times for you, like exam times or while you're on holidays. During that time I will work with you to get a sense of what you think how online relationships work. To do this I will be doing at least some of the following activities with you:

1. be observing some of your online interactions.
2. Ask for your views on the ways you interact with your friends and others online.
3. Give you short questionnaires, and ask for your views about whether they make sense to you.
4. Do activities with you, such as making diagrams (and other creations, if this is something you'd enjoy), as a way of making our conversations interesting.
5. Ask you to about whether you've entered puberty yet. Don't worry! It won't be embarrassing. I will send you some drawings to look at and ask you to tell me which picture you think you are most like. No one else will know what you've said. You don't have to participate in this bit of the project if you don't want to.

All of my interactions with you will be carried out online via email or face-to-face. Everything I find out will be kept securely and safely because the university I

work for has strict rules about this. Everything you tell me will be anonymised. This means that no one other than you and I will be able to identify you. In order to ask you about some of your online interactions I will need you to 'friend' me on the websites you use, or let me know your usernames. I will not interact with you on the site so that your participation in my project stays private. If you don't use websites, that's fine too.

If something comes up during the project that seriously worries me, for example I think there's someone treating you badly, or an adult behaving badly, I will first speak about it with you, then I will get advice from my university on what to do. I can't promise to keep a secret if it seems that you are in any danger.

Your consent

If you're willing to be part of the project, please email me at D.T.Levine@warwick.ac.uk with one of the following options:

Option 1: I (write your name here)... ..agree to be part of this project. I understand that everything I say or write will be anonymised to make sure I am kept safe.

Option 2: I (write your name here),agree to be part of this project, except I do not want to share any information about whether I've entered puberty. I understand that everything I say or write will be anonymised to make sure I am kept safe.

Not 1 year
Diane / Mail

**Application for Ethical Approval for Research Degrees
(MA by research, MPhil/PhD, EdD)**

Name of student Diane Thembekile Levine

MA By research	EdD	PhD X
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Project title: Social cognition, technology and adolescent women

Supervisor: Dr Michael Hammond

Funding Body (if relevant): ESRC

Please ensure you have read the Guidance for the Ethical Conduct of Research available in the handbook.

Methodology

I am planning to undertake the following data gathering activities:

- Observation of online activities. I am planning to observe each participant for half an hour each week, at a time agreed with the participant. I have ensured that the informed consent and parental permissions forms contain information about these observations, including a clear statement about the need for the participant to 'friend' me or make their online aliases known to me for the duration of the project. I am committed to ensure that my observation is not clandestine, and will not be interacting with the participants online during observation periods. I am aware that this may have an impact on the nature of the interactions I will be observing, but believe that to observe without the participant's knowledge would not comply with the ethical values in the project. I will use triangulation of methods to mitigate against the effects of participants amending their behaviours during observation periods. I will be asking participants to share with me interactions that *they* feel are particularly relevant to the project themes and research questions, and will make this request on a monthly basis throughout the data gathering period. I will also be using observations as a resource for stimulated recall activities.

- Stimulated recall: I will use data gathered in other strands of the project in two stimulated recall activities with each participant, one at the start, and one at the end of the project. These activities are intended to support participants' reflections on their social cognitive processes, and are timed to attempt to identify and capture any significant changes over the data-gathering period. Each SR interview will be carried out face-to-face at a location of the participant's choosing, and will take no longer than 45

Vulnerable

10 x girls/young women aged 8-16

Not vulnerable

Parents of participants (where parents wish to participate in an interview).
2 x software developers

Respect for participants' rights and dignity

How will the fundamental rights and dignity of participants be respected, e.g. confidentiality, respect of cultural and religious values?

- Data gathering activities will be timed to ensure religious festivals, family holidays and examination periods are avoided for all participants. Participants come from a range of socio-economic and religious backgrounds, and these perspectives will be respected. Contributions made to the data reflecting those perspectives will remain unadulterated, but I will ensure they are not vulnerable to sensationalization in reporting through methodological triangulation, and by ensuring that the limitations of the chosen methods and sample size are fully acknowledged.

- Participants' right to confidentiality will be ensured by anonymising all data and adhering to BERA guidelines and legal requirements (see below).

Privacy and confidentiality

How will confidentiality be assured? Please address all aspects of research including protection of data records, thesis, reports/papers that might arise from the study.

In accordance with BERA guidelines all personal names will be anonymised, and every effort will be made to ensure individuals cannot be identified.

- Safe and secure storage and transport of data via a secure server.
- No data will be transported via USB device or other device easily lost.
- All coding data will be kept separately to identification codes.
- Anonymisation of all data, including within the thesis and any ensuing publications.

All data will be collected and stored in line with Data Protection Act 1998.

Consent

- will prior informed consent be obtained? **Yes**
- from participants? **Yes/No** from others? **Yes/No**
- explain how this will be obtained. If prior informed consent is not to be obtained, give reason:

I will explain the study to the prospective participants in an age-appropriate manner and in accordance with BERA guidelines and effective practice (e.g. Lewis and Lindsay, 2000), clearly stating the confidentiality and commitment elements. This will take place face-to-face with a trusted adult present. I will then obtain their written informed consent (see attached informed consent form). I will agree with them at this early stage what I will do should any child safety or similar issues arise during the study, again following BERA disclosure guidelines. I will also ensure they know they can withdraw from any

element, or all, of the study at any stage throughout the process. It will be important to this study that this agreement is derived in a collaborative fashion, rather than imposed on the participants.

At the same meeting, parents will be asked to sign the parental permission (please see attached).

The software developers will also be asked to sign informed consent forms, reflecting their right to remain anonymous, to have their data stored securely and to withdraw from the study should they choose to do so.

- will participants be explicitly informed of the student's status?

Yes, please see attached informed consent and parental permission forms.

Competence

How will you ensure that all methods used are undertaken with the necessary competence?

As the sole researcher I have a Masters by Research, and a Masters in Educational Research Methods with distinction, and as such believe I have evidenced my commitment to robust and ethically sound research methods. I will avail myself of any training opportunities made available via the Doctoral Training Centre and partner universities where possible.

Protection of participants

How will participants' safety and well-being be safeguarded?

- All data will be anonymised and stored securely.
- Any photographs will not enable identification of individuals.
- Any risks to participants' safety will be referred to parents/guardians in line with the agreements in the informed consent/parental permission forms.

Child protection

Will a CRB check be needed? Yes/No (If yes, please attach a copy.)

Addressing dilemmas

Even well planned research can produce ethical dilemmas. How will you address any ethical dilemmas that may arise in your research?

There is a risk there will be some disclosure issues arising from discussions around relationships, online behaviours and puberty. However, it should be noted that there is no explicit *intention* to seek examples of abuse or any other disclosure issue as part of this study. The procedure for handling disclosure issues will be explicit and agreed with the participants at the outset of the research (see attached Informed Consent).

In addition, there is also a risk that participation in the project leads to detrimental use of technology in some way, for example by increasing levels of use to acceptable levels. Should such a situation arise I would arrange for a discussion with the participant and a parent/guardian, with the participant's full understanding of the need for the discussion, as reflected in the BERA guidelines.

If such a dilemma arises despite the above efforts, I will:

1. reflect the dilemma against a checklist to be devised at the start of the project reflecting the BERA and BPS guidelines.
2. Seek advice and assistance from supervisor.
3. Seek advice from University Ethics Committee if necessary.

Misuse of research

How will you seek to ensure that the research and the evidence resulting from it are not misused?

These data are unlikely to be of interest for the following possible misuses:

- Criminal or terrorist activity (all photographs will not include faces or vulnerable body parts of participants)
- Data mining or civil rights violations

Data will be anonymised in gathering, analytical and publication stages, ensuring that participants are not vulnerable to stigmatization or discrimination.

Support for research participants

What action is proposed if sensitive issues are raised or a participant becomes upset?

There is a risk there will be some disclosure issues arising from discussions around relationships, online behaviours and puberty. However, it should be noted that there is no explicit *intention* to seek examples of abuse or any other disclosure issue as part of this study. The procedure for handling disclosure issues will be explicit and agreed with the participants at the outset of the research (see attached Informed Consent).

Should a participant become upset, I will:

- cease data gathering if the participant wishes me to do so
- cease any activity causing upset
- ensure a trusted adult is present should the participant request it

Integrity

How will you ensure that your research and its reporting are honest, fair and respectful to others?

1. Draw on two external readers to reflect on instruments in development and relevant chapters of the thesis.
2. Refer to supervisor in any circumstances where I am unsure of the integrity of the process or outcomes.
3. Reflect findings back to participants and their parents to ensure the reporting is a fair reflection of their perspectives and experiences.

What agreement has been made for the attribution of authorship by yourself and your supervisor(s) of any reports or publications?

I anticipate that publications emerging from this study will be co-authored with my primary supervisor.

Other issues?

Please specify other issues not discussed above, if any, and how you will address them.

N/A

Signed

Research student

Date

Supervisor

Date

Action

Please submit to the Research Office (Louisa Hopkins, room WE132)

Action taken

Approved

Approved with modification or conditions – see below

Action deferred. Please supply additional information or clarification – see below



Name *Prof G Lindsey*

Date *1/6/12*

Signature



Stamped

Notes of Action

- ~~1. Unlikely to need URAC - my review~~
1. URAC not appropriate - HSSREC would be the body. BUT, not really the role unless exceptional cases

Appendix 8: Scores for AAQ for all participants who completed the instrument

Participant	Attachment target	Angry Distress	Availability	Goal-corrected partnership	Total
FA1	Mother	5	6	3	14
	Father	5	6	3	14
	Online Friend	9	10	7	26
	Offline friend	10	8	6	24
SS2	Mother	3	3	3	9
	Father	3	3	3	9
	Online Friend	7	12	4	23
	Offline friend	10	12	4	26
LS14	Mother	4	4	5	13
	Father	8	5	5	18
	Online Friend				
	Offline friend	3	3	3	9
CI6	Mother	8	5	4	17
	Father	9	5	4	18
	Online Friend	7	9	7	23
	Offline friend	7	5	4	16
TL5	Mother	6	6	11	23
	Father	6	6	11	23
	Online Friend				
	Offline friend	6	6	6	18
MR8	Mother	3	4	4	11
	Father	3	5	4	12
	Online Friend	3	5	3	11
	Offline friend	4	5	4	13
EE3	Mother	4	3	4	11
	Father	4	4	4	12
	Online Friend	3	5	3	11
	Offline friend	3	3	3	9
HN11	Mother	8	12	9	29
	Father	8	12	10	30
	Online Friend	6	6	6	18
	Offline friend	11	15	12	38
IL12	Mother	3	6	6	15
	Father	3	6	6	15

	Online Friend	4	9	7	20
	Offline friend	4	7	5	16
TR9	Mother	8	5	5	18
	Father	9	8	7	24
	Online Friend				
	Offline friend	8	6	5	19
WA13	Mother	5	6	3	14
	Father	5	6	3	14
	Online Friend	9	10	7	26
	Offline friend	10	7	6	23
CE10	Mother	3	4	5	12
	Father	3	4	5	12
	Online Friend	4	8	6	18
	Offline friend	3	7	6	16
JL4	Mother	3	4	4	11
	Father	3	5	4	12
	Online Friend				
	Offline friend	3	4	3	10