Risk eDecisions: Online Behaviour and Decision Making

from the iGeneration to the Silver Surfer

by

Claire May White

A thesis submitted to Plymouth University

in partial fulfilment for the degree of

DOCTOR OF PHILOSOPHY

School of Psychology

July, 2017

Abstract

Risk eDecisions: Online Behaviour and Decision Making from the iGeneration to the

Silver Surfer

Claire May White

Since the inception of the Internet there has been immense growth in the number of internet users worldwide, and the integration of social media in our daily lives has become commonplace for many. Yet, alongside the many benefits of this global connectivity come numerous risks. Research shows that individuals of all ages are exposed to, and engage in, risky activities online, despite numerous campaigns to highlight the perils of risky online behaviour. Although the rates of victimisation increase year-on-year, surprisingly little is known about the psychological mechanisms underlying online risk-taking. The work in this thesis aimed to address this gap in the psychological literature by conducting empirical research focussing on online risky behaviour and decision making across the lifespan.

Four studies, conducted with individuals ranging in age from 13- to 79-years-old, investigated two online risk-taking behaviours, personal information disclosure and friending strangers, within the framework of Fuzzy Trace Theory. A further study investigated the posting of risky and inappropriate content online in British and Italian students, examining the role of self-monitoring and impulsivity. The work in this thesis reveals that Fuzzy Trace Theory is able to predict risk-taking and risk-averse behavioural intentions, and that the retrieval of gist-based, intuitive beliefs and values about online risk reduces risk-taking behaviour and intentions, whereas representing risk in a quantitative-based, verbatim manner leads to increased risk-taking intentions. The ability to reason using gist representations increases with age. Additionally, high self-monitoring was found to predict risky posting behaviour across different cultures.

These findings offer a novel and important contribution to our theoretical and practical knowledge about risky online behaviour, and have the potential to inform the development of more effective online safety intervention programmes.

Table of Contents

Chapter 3: Framing of Online Risk: Young Adults' and Adolescents' Representations of Risky Gambles

Chapter 4: Internet Safety and the Silver Surfer: The Relationship Between Gist Reasoning and Adults' Risky Online Behaviour

List of Tables

List of Figures

List of Appendices

Acknowledgements

My heartfelt thanks to my supervisory team, Dr. Michaela Gummerum and Professor Yaniv Hanoch, whose expertise, enthusiasm, good-humour, encouragement, and confidence in me, was intrinsic to the completion of this thesis.

I would also like to thank the schools and colleges involved in this research, the teachers who gave their precious time during the data collection stages, and the interesting and enthusiastic students who took part in these studies.

My love and thanks to my husband who never doubted me and who constantly supported, encouraged and motivated me. It is because of him that I embarked on this crazy path, and why I never gave up. Finally, my thanks to my two beautiful daughters who, without complaint, have tolerated years of my dedication to this project, often at the expense of family fun. I dedicate this work to them in the hope that they will always remember to dream big and believe that, with the support of your family, anything is possible.

Author's Declaration

At no time during the registration for the degree of Doctor of Philosophy has the author been registered for any other University award without prior agreement of the Graduate Sub-Committee

Work submitted for this research degree at Plymouth University has not formed part of any other degree either at Plymouth University or at another establishment

A programme of advanced study was undertaken. Relevant scientific seminars and conferences were regularly attended at which work was often presented and several papers were prepared for publication

Publications arising from this thesis:

White, C. M., Gummerum, M., & Hanoch, Y. (2015). Adolescents' and Young Adults' Online Risk Taking: The Role of Gist & Verbatim Representations. *Risk Analysis, 35*(8), 1407-1422.

White, C. M., Gummerum, M., & Hanoch, Y. (2016). Framing of Online Risk: Adolescents' and Young Adults' Representations of Risky Gambles. *Decision*. DOI: 10.1037dec0000066.

White, C. M., Gummerum, M., Wood, S., Hanoch, Y. (2017). Internet safety and the Silver Surfer: The relationship between gist reasoning and adults' risky online behaviour. *Journal of Behavioral Decision Making, 30*(4), 819-827.

White, C. M., Cutello, C. A., Gummerum, M., & Hanoch, Y. (2017). A cross-cultural study of risky online self-presentation. *Cyberpsychology, Behavior, & Social Networking.* DOI: 10.1089/cyber.2016.0660

White, C. M., Gummerum, M., & Hanoch, Y. (in preparation). Will you be my friend? Developmental differences in the 'friending' of strangers on Facebook.

Presentations and Conferences Attended:

White, C. M., Gummerum, M., & Hanoch, Y. (April, 2017). Do you want to be my friend?: Developmental Differences in Facebook Friending Behavior and Friend Preference. Biennial meeting of Society for Research in Child Development, Austin, TX.

White, C. M., Gummerum, M., & Hanoch, Y. (June, 2016). Older adults in the cyber world. VOYAGE Ageing Research Conference, Plymouth.

White, C. M. (June, 2015). Cyberpsychology: Risk Taking Behaviour in Cyberspace. School of Psychology 7th Annual Conference, Plymouth University.

White, C. M. (2013). Forensic psychology and cyberpsychology: Psychology careers and the future of psychological investigations. Invited speaker, PETROC college North Devon.

White, C. M., Gummerum, M., & Hanoch, Y. (July, 2016). Will you be my friend? Developmental differences in Facebook 'friending' behaviour. Poster presentation. Cognition Institute Conference, Plymouth University.

White, C. M., Gummerum, M., & Hanoch, Y. (Sept, 2015). Adolescents' and Young Adults' Online Risk Taking: The Role of Gist & Verbatim Representations. Poster presentation. EMoTICON and Digital Parenthood Networks conference, Leeds.

White, C. M., Gummerum, M., & Hanoch, Y. (June, 2013). Adolescents' and Young Adults' Risk Taking Perceptions, Behaviours, and Intentions: Predictions using Fuzzy Trace Theory. Poster presentation. School of Psychology 5th Annual Conference, Plymouth University.

Word count of main body of the thesis: 49, 954

Signed ……………………………………………..

Date ………………………………………….

Chapter 1

Introduction

1.1. The Growth of Social Media

Twenty-seven years after Tim Berners-Lee and CERN launched the World-Wide-Web on a royalty free basis, it is hard to imagine a world where we were unable to contact another person instantly using text and voice technologies virtually anywhere across the globe, search repositories of information to answer any question at the touch of a button, download music, movies and games whenever the mood took us, and do all this while on the go using a host of mobile devices. And this is the tip of the digital iceberg, the everyday basic activities that we engage in now, often without even thinking about it.

According to the Office for National Statistics (ONS: 2016) 87.9% of adults in the U.K. used the internet in the preceding three months. General online activity involved sending emails (81%), searching for information (72%), looking at products to purchase (70%), using Social Network Sites (SNS; 59%), banking (58%), streaming music, TV programmes and movies (34%, 32% and 28% respectively), and online gaming (18%). Children's internet use is also prolific with youngsters aged 5-15 years spending 15 hours a week online, and even 3-4 year olds involved in an average of 8 hours a week of online activity (Ofcom, 2016). Young people also have increased opportunities to use the internet with a third of 3- to 4-year-olds owning their own tablet or games console, and 33% of 8- to 11-year-olds and 80% of 12- to 15-year-olds owning their own smartphone. Children mainly use the internet to play games and video clips but 54% of young adolescents' online time is spent social networking (Ofcom, 2016).

The most notable area of exponential growth online has been that of social media; "Websites and applications that enable users to create and share content or to participate in social networking" (*Oxforddictionaries.com*, 2017). Indeed, even before the 'web' as we know it, tech-savvy individuals were able to use services, such as email, and specialised forums to communicate in code and share information. It was not until Sixdegrees.com was launched in 1997 that the average computer user was introduced to the concept of being able to search for, and virtually interact with, other people with a view to pursuing an online social relationship (Boyd & Ellison, 2008). Today, social media encompass email, instant messaging, Social Networking Sites (SNS), and video and photo sharing sites (Ofcom, 2016). While the popularity of some sites has waned (e.g., Friendster and MySpace) others continue to grow with new users signing up daily. Facebook still dominates the market with over 1.9 billion registered users closely followed by WhatsApp (1.2 billion), and YouTube (1 billion). Gaining in popularity are microblogging sites such as Tumblr (550 million users), and Twitter continues to expand its 319 million current users. While, historically, online social media use was limited to desktop and laptop computers, the development of mobile technologies and associated apps has given rise to the popularity of Instagram, currently the seventh most popular SNS worldwide, and SnapChat with 300 million users. Mobile technology affords users the ability to communicate by instantaneously using methods other than text, further layering the sociability of these networks through images and (live) video.

Currently, the online world is replete with SNSs appealing to individuals for a variety of reasons, be it staying connected with family and friends, interacting with unknown individuals who might share common interests, viewpoints, careers, and activities, searching for others for a romantic or sexual relationship, or simply playing games. Social media is integrated in our lives, personally (Greenwood, Perrin & Duggan, 2016; Office for National Statistics, 2016) and commercially (Kaplan & Haenlein, 2010).

How people use the internet and social media and the effect that this has on people's lives has garnered growing attention by the scientific community. The Encyclopedia of Cyber Behavior (Yan, 2012) was compiled from 30 years of research activity, including 100 chapters produced by 200 scholars. At the time of publishing there were 30 academic journals in circulation dedicated to the topic producing over 1,000 articles per year. Additionally, the American Psychological Association's Society for Media Psychology & Technology division, as well as the forthcoming British Psychological Society's Cyberpsychology division, focus on this important aspect of human existence. Consequently, there has been a sharp increase in research on the topic, not least on the pros and cons of prolific internet use.

1.2. The Benefits and Risks of Internet Use

The practical benefits of using the internet may seem obvious; access to information at your fingertips to facilitate both educational and business needs, global connectivity, shopping from home, teaching and instructional aids, career networking and finding employment opportunities. One of the key benefits is the ability to not only keep contact with friends and family who may not live locally, but also to reconnect with old friends and acquaintances. Young people experience added educational benefit by being exposed to limitless resources, which can easily be tailored to enable teaching delivery focussed on individuals' preferred learning styles (e.g., textual, visual, demonstrative etc.). Social media also provides interpersonal benefits by increasing social capital (Ellison, Steinfield & Lampe, 2007), as well as enabling young people to form even more connected and cohesive online relationships with their offline friends (Lee, 2009). Research has also shown that self-presentation on Facebook can increase self-esteem in college students who are living away from home for the first time (Yang & Brown, 2016). In the domain of health communication,

Moorhead, Hazlett, Harrison, Carroll, Irwin and Hovig (2013) identified six benefits of using social media, including creating more freely available and bespoke health information, more interaction among individuals facilitating more social and emotional support from peers and others, and the possibility of influencing policy. Valkenburg and Peter (2011) also stressed that online communication was important for young people's enhanced self-esteem, building relationships, and exploring their sexuality.

But while the younger generation are more ubiquitous users of social media (i.e., digital natives), the benefits of this technology extend to late adulthood. The use of the internet by all adult age groups has increased at a higher rate than the young adult population from 2011-2016 (Office for National Statistics, 2016), and the sharpest increase was seen for 65- to 74-year-old females (80% increase) and the over 75s (80% males and 169% females). These increases are largely driven by the emerging knowledge concerning the benefits of social media by (older) adults. Chopik (2016) found that older adults who had higher engagement with social technology (such as email and SNS) showed fewer health problems, increased feelings of general well-being, and fewer depressive symptoms. These beneficial outcomes appeared to be mediated by reduced loneliness. Additionally, a large-scale, longitudinal study of over 3,000 retired adults in the U.S. over a 6-year period showed positive correlations between internet use and mental well-being (Cotten, Ford, Ford & Hale, 2014). Individuals who had higher rates of internet engagement facilitated relationships via technology, reducing social isolation and loneliness and resulting in a one-third reduction in feelings of depression. Furthermore, digital inclusion can benefit adults of all ages who experience disability, low-education, low income, and unemployment (Chadwick, Wesson & Fullwood, 2013; Helsper, 2008). Consequently, the U.K. Government Digital Inclusion Strategy aims to provide skills and training to ensure 90% of the adult U.K. population are online by 2020 (Cabinet Office, 2014).

That said, the cyber world is also replete with potential risks of victimisation, as highlighted in a myriad of large-scale survey findings (e.g., Federal Bureau of Investigation [FBI], 2015; Livingstone, Mascheroni, Olafsson & Haddon, 2014; Office for National Statistics [ONS], 2017). Victimisation can come in a number of forms and affect individuals from a range of backgrounds and ages. According to FBI (2015) statistics, during 2015 over 288,000 Americans were victims of cybercrime, with around half experiencing financial losses over $1 billion. Many of these crimes concerned identity and information theft perpetrated via scams using government department impersonation or phishing emails. Phishing is a fraudulent way to extract sensitive information (e.g., passwords, usernames, etc.) from individuals under the guise of a trustworthy source. This type of online fraud is often successful because individuals are attracted to respond to these emails based on the promise of specific rewards and the apparent official authority of the sender (Fischer, Lea, & Evans, 2013; Wang, Herath, Chen, Vishwanath, & Rao, 2012), for example lottery wins, entry into prize draws, or financial rebates from government offices such as Inland Revenue. However, aside from corporate cyberfraud, the highest financial losses (over $2 million) are experienced by victims of confidence/romance fraud (FBI, 2015). An American mother and daughter team were recently jailed for 27 years after being found guilty of defrauding 374 individuals of over $1.1 million. The women trawled social networking and dating websites to find potential victims, then posed as U.S military servicemen posted abroad who were looking for romance. Once relationships were formed they asked their victims to send them money, and were never heard of again ("Million Dollar Dating Scam", 2013). Older adults are also at increasing threat of cyber fraud and victimisation. Rates of victimisation are increasing year on year for older age groups (Age U.K., 2015; FBI, 2015) and often older adults are disproportionately financial affected by this form of victimisation. Age U.K. (2015) reported that for the year 2013-14 older adults suffered double the financial losses

from fraud compared to younger adults. The FBI (2015) also report that the over 50-year-olds experience the greatest financial losses. Additionally, since older adults are often retired or unable to work, there is much less opportunity for them to recoup the financial damages they have suffered, severely impacting on their future security (Age U.K., 2015).

Children and young people also experience a range of potential risks (OECD, 2010), such as content and contact risks (including bullying, grooming, and pornography), consumer risks (e.g., fraud), and privacy and security risks (including theft of personal information which may be available from SNSs, and oversharing of information which may have future consequences). Ofcom (2016) reported that two out of three 16- to 24-year-olds surveyed had experienced a "negative online event" in the prior 12 months, while according to the latest EU Kids Online project report (Livingstone et al., 2014), half of 11- to 16-year-olds have encountered risks online. These risks included online contact with individuals they did not know offline (22%), viewing sexual images (20%), encountering 'hate' websites (20%), receiving sexual messages (12%), cyberbullying (12%), and viewing sites promoting eating disorders (13%), self-harm (11%), drug use (10%), and suicide (6%). There has also been a notable increase in the number of sites promoting harmful behaviour such as anorexia (known as Pro-Ana sites) and websites endorsing hatred against specific groups such as ethnic or religious minorities, LGBTQ communities, and immigrants and refugees (Livingstone et al., 2014). In other countries, Byrne, Kardefelt-Winther, Livingstone and Stoilova (2016) found that 20% of children in South Africa and 75% of children in Argentina, surveyed as part of the Global Kids Online project, had seen nasty comments, racism, violence, and had received sexual solicitations. U.S. research reveals that 34% of 12- to 17-year-olds have been victims of cyberbullying (Hinduja & Patchin, 2016), and 9% have received unwanted sexual solicitations, 11% have been harassed, 23% were exposed to unwanted sexual material, and 7% have received nude or nearly-nude (sexted) images

(Mitchell, Jones, Finklehor & Wolak, 2014). Sexual contact between adults and minors online is reportedly rare (OECD, 2010) but the Child Exploitation and Online Protection service (CEOP, 2010) report that of all grooming incidents reported to them in 2009-10, 28% involved an adult enticing a child to perform a sexual act, and 12% for a child to watch a sexual act, involving more than 600 incidents overall.

While potentially a contentious subject, it is undeniable that individuals can sometimes put themselves at risk online, either through lack of education, ignorance or naivety, and sometimes deliberately. Many young people have experienced some form of online safety training (Byron, 2010) however risky online behaviour is still widespread. There are a number of activities that can increase the chance of victimisation (Bryce & Klang, 2009; Livingstone et al., 2014; Wolak, Mitchell & Finklehor, 2007) including disclosing personal information, 'friending' strangers online and even eventually meeting them face-to-face, posting or sending material of a sexual nature, and engaging in mean behaviour against others.

Research from the U.S. Pew Research Center shows an increase in risky behaviour by adolescents since 2006 (Madden, Lenhart, Duggan, Cortesi & Gasser, 2013) with widespread posting of personal information by young people of: full name (92%), photo (91%), list of interests (84%), birth date (82%), school name (71%), hometown (71%), relationship status (62%), email address (53%), video of themselves (24%), and phone number (20%). Further still, 16% say that their social media posts automatically include their GPS location at the time of posting (Madden et al., 2013). In Europe, 29% have a fully public profile on SNSs which reveal a great deal of personal information and 23% say they talk to others online about private matters (Livingstone et al., 2014).

Thirty-four percent of young Americans report having 'friends' who they do not know offline and 15% have sent personal information to these contacts, while 14% have shared photos or video of themselves (Madden et al., 2013). Perhaps the most alarming statistics concern minors who have had face-to-face meetings with their online only 'friends'. Survey results highlight these figures to be 24% of 14 year-olds and 15% of 8- to 12-year-olds in the U.K. (Spielhofer, 2010) and 13% across Europe (Livingstone et al., 2014). When considering those young people who have online only friends on SNSs, these figures increase even more in developing countries such as the Philippines (14%), Serbia (30%), Argentina (38%), and South Africa (54%) (Byrne et al., 2016).

Further research in the U.S. has revealed that 35% of young people have cyberbullied another individual online (Hinduja & Patchin, 2016) and 12% of children surveyed in Europe say they have bullied others online (Livingstone et al., 2014) with this figure ranging from 11-16% across Argentina, Serbia, South Africa, and the Philippines (Byrne et al., 2016). In terms of sexual materials, 2.5% of young people in the U.S. have created or appeared in nude or nearly nude images which have been shared via social media (Mitchell et al., 2014) and 3% in Europe have sent or posted sexual messages or images (Livingstone et al., 2014).

Various materials aimed at online safety education are freely available online for parents, teachers and carers to access from organisations such as CEOP, the National Society for Prevention of Cruelty to Children (NSPCC), Internetmatters.org, getsafeonline.org, parentinfo.org, and kidsafe.org, to download and disseminate to young people. But while the U.K. government implemented compulsory internet safety training in schools in 2015, and has launched plans to improve online education (Department for Education, 2016) these statistics remain alarmingly high. Although many schools feel as though they are effectively delivering this training, there is much inconsistency in the knowledge and commitment of individual teachers (Ofsted, 2015). In their 2010-11 annual review, CEOP highlighted their

concern at young people's online behaviour putting themselves at risk of harm, but the internet can also be a very confusing place for young people. To highlight this, the U.K. Office for the Children's Commissioner (2017) presented the terms and conditions of Instagram (an app used by around half of all 8- to 15-year-old social media users) to youngsters, to see how well they understood this information. These terms and conditions underline how account holders waive their rights to privacy, that Instagram has the right to sell their personal information, and that the app may track their geographical location. The account holders could not make sense of the legal terminology in order to fully grasp their rights. When given a child-friendly version which made them aware of these clauses, a number of children stated that they would close their accounts (Office for the Children's Commissioner England, 2017). Research by the children's charity Barnardo's has stressed that some young people are more vulnerable than others because of their need to connect and build relationships online, which they feel unable to do offline, for example those with mental health issues or learning difficulties and LGBTQ young people (Palmer, 2015).

Very little is known about adults' online behaviour, and in particular their engagement in risky online activities. However, given the prevalence of adult victimisation by online scammers further research is vital. Additionally, within the current research literature there is a dearth of knowledge concerning online decision making and, more specifically, the psychological mechanisms underlying risky online behaviour. This information is fundamental to developing appropriate and successful interventions which are effective with different age groups. As no online-specific theories of risky decision making currently exist, the following section reviews the main theories related to offline decision making to assess possible mechanisms underlying online risk-taking.

1.3. The Development of Risky (offline) Decision-Making

Research on judgement and decision making recognises that there are developmental differences in cognition and behaviour which affect risky decision making. It is often a stereotype of adolescence that this age involves greater risk-taking and impulsive behaviour. Indeed, these conceptions of youth are supported by research concerning risky health behaviours showing that adolescence is a time which involves experimenting with alcohol, drugs and cigarettes, and engaging in risky sexual behaviours (Kann et al., 2016). Rates of dangerous driving and involvement in crime are also higher in adolescence than adulthood (Ministry of Justice, 2017). Typically, as individuals mature, the rates of involvement in risky activities reduce. A number of theories tried to explain this sudden increase in risky behaviour between childhood and adolescence and the reduction of risk-taking in adulthood.

It has been argued that increased risk-taking is an inescapable part of adolescence driven largely by biology (Sunstein, 2008). Much of the contemporary work concerning such neurobiological explanations suggests that changes in brain structure, some occurring around the time of puberty, affect decision making. Steinberg (2008), for instance, suggests that synaptic re-organisation affects two brain systems, a socio-emotional system and a cognitive control system. Around the time of puberty, the socio-emotional system, comprising the pre-frontal cortex and striatum, dramatically, and quickly, changes. This has direct effects on reward seeking, as many of the areas of the brain involved in social information processing overlap with areas involved in reward sensitivity. In these brain areas, doperminergic activity increases significantly in young adolescents which may result in a reward-deficiency syndrome inducing the need for even more environmental (and possibly chemical) stimulation. An alternative explanation is that inhibitory control may be reduced with these changing dopermine levels making rewards feel even more rewarding. During the early stages of adolescence, individuals also experience an increase in neural oxytocin receptors

which affect emotional and behavioural responses to social stimuli. The socio-emotional system peaks at around 15 years old and can be stimulated even further during intensified risk-taking behaviour (Steinberg, Albert, Cauffman, Bernich, Graham & Woolard, 2008). Steinberg (2008) argues that the propensity to take risks can be attenuated or heightened by various mediating and moderating factors including opportunity and temperament.

The second system, the cognitive-control system, develops much more slowly, however, and does not begin to moderate risk-taking behaviour until late adolescence and young adulthood (Steinberg, 2008). The cognitive-control system matures through a process of synaptic pruning, improving the neural pathways between the prefrontal cortex and the limbic system. These areas experience an increase in synaptic myelination resulting in more efficient connectivity, and additionally improve connections between various cortical and subcortical brain regions responsible for higher cognition and affective responses to stimuli, resulting in improved emotion regulation (Steinberg, 2008). More advanced reasoning abilities therefore reduce risk-taking behaviour. Steinberg et al. (2008) provided evidence for this reduction in risk-taking by administering self-report and behavioural measures of sensation seeking and impulsivity to a large sample of participants who ranged from 10- to 30-years-old. Scores obtained from these measures supported the differential maturational trajectories of the socio-emotional and cognitive-control systems.

Casey, Getz and Galvan (2008) also argue that it is the differing maturity rates of brain regions that powerfully influence risky behaviour, with a strong and quickly developing limbic reward system and slow developing control system. Casey et al. muse that if risk-taking behaviour were simply due to a lack of cognitive control, then children would display even greater risky behaviour than adolescents because this system is even more underdeveloped in childhood. Shulman et al.'s (2016) review of this dual-systems model asserts that these neurobiological explanations for adolescent risk taking are more accurate

than purely cognitive accounts relating to analytical deficits in young people's decision making abilities.

Traditional theories of decision making posit that reasoning becomes more rational with development and that, with maturity, individuals are able to more coherently and comprehensively analyse a situation in order to make a 'good' decision. According to Rational Choice Theory (RCT), people assess a choice based on the possible outcomes, and the probability of these outcomes occurring, and then make their choice with a view to the optimal outcome, that is the outcome with the greatest utility (Levin, 2004). This 'utility' element is introduced into the decision process as a numerical ranking of possible choices; the highest ranking equates to the choice with the highest possible utility (Levin, 2004). Therefore, decision making is essentially based on a numerical function, a calculation of choices and outcomes, and the probability of each outcome, where people are driven by the best rewards or the avoidance of losses or punishment (Scott, 2000).

Research investigating RTC usually assumes that individuals have a specific preference and then incorporates this preference into the numerical function to predict their decision choice. Alternatively, by knowing their choice, researchers can rationalise these choices and try to understand the decision rules used to maximise the individuals' preferences. As such RCT assumes that an individual is never indifferent to choices, and that their preferences remain fairly stable and are not dependent on context (Levin, 2004).

One main limitation to RCT is the un-falsifiability of the utility function. Because utility is subjective (I may value chocolate, for example, far more than you do) the theory can be made to fit any behaviour, and interpersonal comparisons cannot be made (Hodgson, 2012). So, while it may not be possible to ascertain an individual's specific subjective value of an outcome, the utility function can incorporate 'curves' that reflect a relative value (Scott,

2000). For instance, an adolescent having unprotected sex may experience pleasure (reward) but could also get an STD (punishment), that person could also receive praise from their partner (reward) but be shamed by their parents (loss); 'curves' in the function still allow for these relative values (Scott, 2000).

Prospect Theory (Kahneman & Tversky, 1979) incorporates these relative values (or subjective utilities) stating that individuals use reference points to ascertain the truly important information in a choice decision. These reference points influence the utility function. The framing of the choice, whether there is something to be gained or something to be lost, is a vital part of the decision and aids the realisation of individuals' preferences. Whether a choice, and the situational context, are framed as gains or losses makes a big difference to the individuals' preferences and the ultimate choice (Kahneman, 2003). Studies of Framing Effects (Tversky & Kahneman, 1981), an individual's propensity to be risk seeking when faced with potential loses but risk averse when faced with potential gains, highlights this concept perfectly and is covered in depth in Chapter 3.

There is little evidence, however, as to what age people acquire the ability to reason rationally (Toplak, West, & Stanovich, 2014). Given that adolescence is a time of greater risk-taking it may seem logical that this ability would develop sometime in late adolescence. However, the literature does not support this view. Kwak, Payne, Cohen and Huettel (2015) used eye-tracking procedures during a decision making task and found that adolescents were more comprehensive in their acquisition of information regarding choices and outcomes compared to adults, seemingly weighing up the information available to ultimately make less risky choices. In addition, Harbough, Krause and Berry (2001) discovered that when children and young adults were asked to make economic choices, violations of transitivity reduced significantly from 7- to 11-years-old but not between 11- and 21-years, highlighting the rationality of children's decisions. Harbough et al. also indicated that 11-year old children

with below-average mathematical ability were as rational in their decision making as highly intelligent college students. However, research comparing young children (5- to 7-year-olds), older children (8- to 11-year-olds), and their parents, found that risk-taking decreased with age alongside increased consideration for the expected value of a choice in addition to the probability of an outcome occurring (Levin, Weller, Pederson, & Harshman, 2007). Levin et al. (2007) concluded that the younger children were less able to differentiate advantageous from disadvantageous future outcomes and that the ability to consider expected value and probability were likely to mature at different rates for potential gains and potential losses. Nevertheless, young children were able to reason rationally in many cases. Conversely, additional research considering risky decision making and violations of rationality have concluded that adults are more rational in their reasoning compared to children and are also more sensitive to the expected value of the choice outcome (Halpern-Fisher & Cauffman, 2001; Rakow & Rahim, 2010). When comparing rational decision making across the adult lifespan, the literature available also points to reasoning abilities that are more task-specific than age-specific (Kovalchik, Camerer, Grether, Plott, & Allmann, 2005; Mata, Josef, Samanez-Larkin, & Hertwig, 2011; Wiesiolek, Foss, & Beserra Diniz, 2014). So many facets influence the development of the ability to reason rationally that much work needs to be carried out to understand them more clearly (Toplak, West, & Stanovich, 2014). Overall though, RCT does not seem able to explain the differences in risky behaviour across different age groups.

But, of course, individuals do not always make choices that appear self-interested (altruistic behaviours, for example) or 'rational', because they are limited by psychological and social restraints (Burns & Roszkowska, 2016). For instance, an adolescent who drives recklessly appears irrational, yet if their aim is to impress friends or they are under pressure from peers to engage in this behaviour, then actually their actions may be deemed rational

(Reyna & Farley, 2006). RCT assumes that people are fully informed on the choices available and all the outcomes and alternative outcomes, good and bad. Individuals are then able to draw upon their preferences to rank these choices in order of utility, with each utility comparable such that a rational choice with the most beneficial outcome can be made (Burns & Roszkowska, 2016). But individuals are constrained by cognitive capacity (Levin, 2004), and by their social context involving norms, rules and laws, and cannot see into the future to ascertain every possible consequence of a choice outcome (Burns & Roszkowska, 2016). Consequently, Simon (1955, 1979) introduced the concept of Bounded Rationality to explain individual's acceptance of outcomes that did not always reflect the highest utility, due to lack of knowledge, cognitive ability or time.

The theory of Bounded Rationality asserts that because individuals must operate under these conditions of cognitive and temporal constraint, they must have additional decision making processes that do not rely on time and effort consuming analytic processing of information. Therefore, decision making under uncertainty incorporates intuition which lies "between automatic operations of perception and deliberate operations of reasoning" (Kahneman, 2003, pg.697). In light of this insight, researchers have introduced the idea of dual-process theories of decision-making.

Two different processes have been defined that can be used in decision making, often termed System 1 and System 2 (Stanovich & West, 2000). System 1 is intuitive, effortless, often unconscious, and rapid. System 2 is a deliberative and conscious process to form a judgement, which is effortful and takes time, consistent with decision making as outlined by RCT. Previous research has supported that the two systems operate on different levels and require more or less effort. The effort needed for deliberative tasks, for instance remembering a sequence of numbers, can be disrupted by other deliberative tasks, whereas, effortless tasks controlled by System 1 are rarely affected by interference (Kahneman, 2003).

In summing up the extant work in this area, Kahneman (2003) stated that people avoid time- and effort-consuming reasoning where possible and often are content to accept the first response to a stimulus, if it seems reasonable. But these rapidly formed choices and solutions are often based on elements such as accessibility, similarity and emotion, and such rules of thumb or basic decision rules are termed heuristics (see Gilovich, Griffin & Kahneman, 2002). While heuristics are useful tools that lead to quick, and often accurate, judgements, much research has highlighted the contradictory and counterintuitive judgements which can also stem from these decision processes (Tversky & Kahneman, 1974). Basing decisions on how easily a concept comes to mind (Availability Heuristic), how well a concept fits with or is similar to our mental prototype of that concept (Representativeness Heuristic), or using some information we have already to make subsequent judgements (Anchoring) can all lead to reasoning and decision-making biases (Tversky & Kahneman, 1974). One example for such a bias is the conjunction fallacy (Tversky & Kahneman, 1983) using the well-known Linda task. Participants are given a brief account of an individual called Linda, highlighting her character and interests, and asked to decide between two descriptions; a) Linda is a bank-teller, and b) Linda is a bank-teller and active in the feminist movement. Participants consistently violate logical reasoning by choosing the conjunction (being a feminist and a bank-teller) as more likely than the constituent. According to Tversky and Kahnemann (1983), the conjunction fallacy is based on the representativeness heuristic, such that the conclusion that Linda is a feminist bank-teller is more representative of the character description. Individuals also often make judgements driven by the core emotion elicited by a stimulus, known as the Affect Heuristic (Slovic, Finucane, Peters, & McGregor, 2002). For instance, we are more likely to engage in behaviour that makes us feel happy or comforted, or to choose clothes, jobs or partners that we find attractive. Equally, we will typically avoid

behaviour that invokes feelings of shame or disgust, and we make these choices easily and quickly and devoid of deliberation (Slovic et al., 2002).

Developmental differences in this style of reasoning have been supported by Kwak et al. (2015) whose findings that younger participants reasoned more deliberatively also revealed that heuristic, simplified reasoning increased with age. Strough, Karns, and Schlosnagle (2001) also support more heuristic reasoning across the lifespan, showing increases in cognitive biases such as framing effects and the Sunk-Cost fallacy (the value that we assign to something is also influenced by our emotional investment and the more time/energy etc. we invest the more valuable it becomes and the harder to give up). Further research indicates that throughout adulthood the ability for deliberative reasoning declines but affective processes increase (Bruine de Bruin, Parker, & Fischoff, 2012). Toplak, West and Stanovich's (2014) overview of research investigating violations of rational choice, however, brings to light the complexity of establishing the developmental trajectory of heuristic reasoning. Some heuristic processes increase in childhood but then decline, for example the representativeness heuristic (Klaczynski & Felmban, 2014), while the conjunction fallacy seems to decline between the age of 7- and 10-years-old but then increase again into adulthood (Chiesi, Gronchi, & Primi, 2008). This pattern of reasoning, which results in bias, is also apparent in the framing effect where rational violations change from childhood to adolescence to adulthood (Reyna & Ellis, 1994). These changes are termed 'developmental reversals' and highlight that children's reasoning strategies can sometimes appear more rational than those of adults (Klaczynski & Falmban, 2014).

Consequently, some researchers argue that intuitive and heuristic decision making is counterproductive and should be avoided in most situations (Sunstein, 2008). Others, however, provide an alternative viewpoint, arguing that intuitive reasoning is beneficial particularly in situations of uncertainty where risky outcomes are possible. One such

viewpoint is advocated by Fuzzy-Trace Theory (FTT; e.g., Brainerd & Reyna, 1990). Based on memory research, Brainerd and Reyna (1990) discovered that the inaccurate recall of information was often based on how the representation of that memory had been encoded, revealing two different kinds of representation, verbatim and gist. Verbatim representations were precise, quantitative representations whereas gist representations were based on 'fuzzy' meaning. These representations were then linked to decision making processes; verbatim reasoning using specific information regarding choices and outcomes (much like System 2 processing) and gist reasoning using intuition (much like System 1 processing). FTT is based on four overriding principles (see Rivers, Reyna & Mills, 2008, for a detailed description). (1) individuals encode information in multiple ways, from very vague representations of the meaning and feelings associated with an experience (gist) to the precise detail associated with that experience (verbatim); (2) gist and verbatim representations are encoded in parallel, they are stored separately, and can be retrieved independently; (3) adults show a preference for reliance on the most basic, or simple, representation of an experience to form judgements and make choices, preferring to using intuitive, gist processes in the first instance; and (4) contrary to traditional models of decision making which argue that it is the development of deliberative reasoning which results in more rational and accurate decision making, FTT contends that intuitive decision making is a higher cognitive ability which develops with age and experience and results in an even greater reliance on gist processing, reducing risk-taking behaviour and intentions. These principles are discussed and considered in greater depth throughout this thesis in Chapters 2, 3 and 4.

One further note of importance in this introductory section of the thesis regarding FTT, is the ability of the theory to explain different approaches to decision-making across development. Reyna, Estrada, DeMarinis, Myers, Stanisz and Mills (2011) provided evidence for the notion that intuitive reasoning develops with age, and that this preference is supported

by research outlined in literature concerning heuristics and biases, such as those considering framing effects where young children have been shown to display this bias far less than adolescents and adults (Reyna & Ellis, 1994). Reyna and Brainerd (2011) have also argued that FTT can explain framing effects with far more accuracy than traditional theories such as Prospect Theory (see also Kuhberger & Tanner, 2010). The developmental differences in risky decision making, as outlined by FTT, are also highly dependent on neurobiological changes occurring throughout childhood, adolescence and young adulthood which relate to reward sensitivity and inhibition control (e.g., Steinberg, 2008).

FTT has also provided explanations for, and been predictive of, real-life risk-taking and, subsequently, the principles of gist and verbatim reasoning have been successfully incorporated into intervention programmes. Reyna et al. (2011) assessed adolescents' and young adults' risky sexual behaviours and found that the tenets of FTT were predictive of past risky behaviour and future intentions to engage in risky sexual behaviour. By integrating training methods that improve gist reasoning strategies concerning risky sexual behaviour to an existing intervention, Reyna and Mills (2014) were able to increase awareness of sexual risks while reducing intentions to engage in risky behaviour by a sample of American high school students. Web-based tutoring programmes have also increased gist understanding of BRCA genetic risk and the importance and applicability of breast cancer screening (Wolfe, Reyna, & Widmer, 2014). Furthermore, distributing a gist-focussed leaflet to middle-aged adults in the U.K. has shown promise in increasing intentions to engage in colorectal cancer screening (Smith, Raine, Obichere, Wolf, Wardle, & von Wagner, 2015) and Brust-Renck et al.'s (2016) 'GistFIT' web programme increased gist knowledge and comprehension of obesity, resulting in more knowledge regarding nutrition, improved healthy behaviours, and higher intentions to engage in healthy behaviours. Taken together, these studies highlight the effectiveness of FTT to simplify complex information in order to enhance understanding and

to promote reduced risk-taking in a range of health behaviours. Applying this theory to other risky behaviours may, therefore, also prove to have beneficial outcomes.

1.4. An Overview of Experimental Chapters and Their Findings

The main aim of this work was to understand the psychological mechanisms underlying online decision making, and more specifically, risky decision making in different age groups. As already highlighted, individuals of all ages engage in some risky behaviour online despite education and warning messages to the contrary (Madden et al., 2013). My work focussed on two behaviours in particular that are known to increase the risk of victimisation: disclosing personal information and 'friending' strangers (Livingstone et al., 2014; Wolak et al., 2007). While previous research and surveys (e.g. Livingstone et al., 2014; Madden et al., 2013) have identified the scope and prevalence of people's online risk-taking, most of this work is descriptive and has not answered the question as to why people take these risks and whether the mechanisms underlying online risk-taking differentially affect people of different ages. This thesis applies established theories, specifically FTT (Reyna & Brainerd, 1995), developed to explain (developmental differences in) offline risk-taking to the online world. Ultimately, the aim of this thesis is to understand the "hows" and "whys" of online risk-taking across development and, based on this, to make suggestions on how to decrease some of the risks associated with people's online activities.

The remainder of this thesis consists of six chapters. Chapters 2 – 5 report on four empirical studies on adolescents' and adults' online risk-taking. Chapter 2 considers the applicability of gist and verbatim reasoning to online risky decision making, concluding that gist reasoning about online risk does, indeed, increase with age from adolescence to young adulthood. Furthermore, Chapter 2 highlights that gist reasoning can be protective and reduce

online risky behaviours, such as personal information disclosure and 'friending' strangers, which can increase victimisation, whereas verbatim reasoning about these behaviours can predict risk-taking.

Chapter 3 continues the work of Reyna et al. (2011) by applying the concepts behind framing effects to online gambling scenarios. The findings here reveal that the framing bias does also increase with age when adolescents and young adults consider online gambling, showing increased risk-aversion for gains and risk-seeking for loses. Again, an increasing reliance on gist predicts reduced risk-taking.

Chapter 4 investigates the influence of gist and verbatim reasoning on online risk-taking across the adult life-span. This chapter contributes to our knowledge concerning adults' online risky behaviour by highlighting that older individuals also disclose personal information and friend strangers at a comparable rate to adolescents, and that gist reasoning continues to protect against risky online behaviour into older adulthood.

Chapter 5 more closely considers the friending of strangers online, using a unique approach to identify the decision making processes involved in adolescents' and young adults' decisions to accept friend requests from strangers on Facebook. Not only do the results reveal that young people are highly willing to accept Facebook friend requests from strangers, but by also focussing on the criteria used to make decisions, as well as using eye-tracking data, the findings show subtle age differences in the choices made. Specifically, young adolescents give greatest attention to the profile picture, but this attention is not significantly greater than consideration of the number of mutual friends they share with the friend requester. Where the friend requester lives, receives the least attention. Older adolescents and young adults, however, also focus most on the profile picture, but then give significantly less attention to information concerning mutual friends and hometown. As age

increases so does the speed at which decisions are made, particularly when the friend request is rejected, highlighting the likelihood that deliberative decision making in the younger age-group is replaced by heuristic-based decisions in the older participants.

Chapter 6 considers a different risky online activity, investigating the online posting of inappropriate material by young adults in different cultures. The results in this chapter highlight some important new findings. Firstly, the posting of content related to alcohol and drug use was more prevalent in the British sample, whereas posting offensive material and personal information was more prevalent in the Italian sample. Secondly, posting this kind of material online was not only more commonplace in individuals with high impulsivity scores, but also those with high self-monitoring scores, regardless of nationality. These findings point to a pervasive online culture that may be driven to some extent by the norms of that culture.

Finally, Chapter 7 reviews the findings of this thesis, highlighting theoretical implications and providing suggestions for the development of future interventions to tackle online risk-taking.

Each of the chapters within this thesis offer a unique contribution to the literature, firstly by enhancing our understanding of the applicability of offline decision making theories to online environments, secondly by empirically testing the applicability of these theories, thirdly by increasing our knowledge about the online behaviour of individuals from young adolescence to older adulthood, and fourthly by suggesting ways in which this knowledge and understanding can be applied to more successful education and interventions.

Chapter 2

Adolescents' and Young Adults' Online Risk Taking:

The Role of Gist and Verbatim Representations

This chapter is strongly based on a published paper (White, Gummerum, & Hanoch, 2015)

2.1. Abstract

Young people are exposed to and engage in online risky activities, such as disclosing personal information and making unknown friends online. Little research has examined the psychological mechanisms underlying young people's online risk taking. Drawing on Fuzzy Trace Theory, this study examined developmental differences in adolescents' and young adults' online risk taking and assessed whether differential reliance on gist representations (based on vague, intuitive knowledge) or verbatim representations (based on specific, factual knowledge) could explain online risk taking. One hundred and twenty-two adolescents (ages 13-17) and 172 young adults (ages 18-24) were asked about their past online risk taking behaviour, intentions to engage in future risky online behaviour, and gist and verbatim representations. Adolescents had significantly higher intentions to take online risks than young adults. Past risky online behaviours were positively associated with future intentions to take online risks for adolescents and negatively for young adults. Gist representations about risk negatively correlated with intentions to take risks online in both age groups, while verbatim representations positively correlated with online risk intentions, particularly among adolescents. These results provide novel insights about the underlying mechanisms involved

in adolescent and young adults' online risk taking, suggesting the need to tailor the representation of online risk information to different age groups.

2.2. Introduction

At the age of 12 years old Shevaun Pennington disappeared with 31-year-old Toby Studabaker, who had befriended her online. The case sparked a Europe-wide man hunt and highlighted the potential dangers of internet predators (Weathers, 2008). Thankfully, this case ended happily with Shevaun's safe return home. Sixteen-year-old Sasha Marsden was less fortunate. Lured to a hotel on the promise of employment by a man she had met on Facebook, she was brutally sexually assaulted and murdered (Evans, 2013). Despite these high profile cases and increased endeavours to provide online safety education in schools, extensive survey data suggest that adolescents are still taking, and are experiencing, online risks. Livingstone and Helsper (2007) describe how young people, in particular, can be exposed to content risks (commercial, violent, or pornographic content), become victims of cyber-bullying or harassment (Livingstone & Bober, 2004), and/or receive unwanted sexual solicitations (Ybarra, Mitchell, Finklehor & Wolak, 2007). Surprisingly little research has investigated the psychological mechanisms that underlie adolescent's involvement in risky online activities. The current study aimed to fill this gap.

Thankfully, Shevaun Pennington and Sasha Martin's tragic stories are rare and there are undeniably numerous benefits of using the internet for young people, both educationally and socially (e.g., Valkenberg & Peter, 2011). A number of studies, however, reveal that young people are exposed to and engage in a range of risky activities online. Livingstone and Bober (2004) analysed data revealing the online behaviour of more than 1,500 9- to 19-year-olds. Over 30% of participants had received unwanted sexual solicitations or bullying

comments via email or instant messaging. Up to half of the sample had also been involved in activities identified as risky. Other studies illustrate the ease by which personal information can be obtained from teenagers. Surveys conducted in different European countries, the United States, and Singapore have shown that between 13-91% of teenagers (depending on country of origin) supply their personal information to strangers online. Possibly more worrisome, between 9-20% have met online "acquaintances" in person (Livingstone, Haddon, Gorzig, & Olafsson, 2011; Ybarra et al., 2007). Of these, 9% had gone to the meeting expecting to meet another teenager only to find that the person they had been communicating with online was actually an adult (Liau, Khoo & Ang, 2005). Involvement in these risky online activities can increase young people's chance of victimisation (Liu, Ang & Lwin, 2013). Ybarra et al.'s (2007) work has identified nine risky online activities: posting personal information, sending personal information, making rude/nasty comments to others, harassing/embarrassing someone else, meeting someone online, having unknown people on social networking friends lists, deliberately visiting porn sites, talking about sex with those known only online, and downloading from file sharing sites. Seventy-five percent of 10- to 17-year-olds had carried out at least one of those nine activities and 28% did four or more. Those engaging in four or more of these behaviours were 11 times more likely to experience victimisation than those who did none, and seven times more likely than those who partook in one to three of these activities. Given the very real negative consequences of risky online behaviour (Byron, 2010) it is vital to have a better understanding of the factors underlying young people's online risk-taking. Investigating online risk-taking in more detail also nicely chimes with government policy.

2.2.1. Risk-Taking Across Development

Some researchers have argued that there is little distinction between offline and online behaviour, in terms of communication, building social relationships, and risk-taking (Livingstone & Helsper, 2007). Others suggest that young people are more likely to take risks online than offline due to the extent and nature of the world-wide-web (Baumgartner, Valkenberg & Peter, 2010a) and the fact that their online activities are not as strictly monitored as offline behaviour (Livingstone & Helsper, 2008). To date, scant attention has been paid to the psychological mechanisms that might contribute to adolescents' online risk-taking, and few of the models and theories on young people's offline risk-taking have been tested in, and applied to, the online environment (Baumgartner, Valkenberg & Peter, 2010a).

Traditionally, theories of judgement and decision-making suggested that rational and analytical reasoning processes increased throughout childhood and into adulthood aided by increased experience, intelligence, and memory capacity (Evans, 2008). Yet, a host of empirical studies have shown that risk-taking is particularly prevalent in adolescence compared to childhood and adulthood, especially with regards to behaviours such as smoking, alcohol and drug use, reckless driving, risky sexual behaviour, and criminal activity (Blum & Nelson-Mmari, 2004; Centers for Disease Control & Prevention, 2012; Currie et al., 2012; Quinn & Fromme, 2011; Zweig, Durbenstein-Lindberg & McGinley, 2001).

As indicated in the Introduction Chapter 1, several theories have tried to explain the increase in risk-taking in adolescence by referring to processes such as sensation seeking and impulsivity (Donohew , Zimmerman, Cupp, Novak, Colon & Abell, 2000; Reyna, Estrada, DeMarinis, Myres, Stanisz & Mills, 2011; Steinberg, 2008), and neurobiological changes taking place around puberty (Steinberg, 2008; Steinberg, Albert, Cauffman, Bernich, Graham & Woolard, 2008). Other lines of research propose that risk-taking in adolescence can be

perceived as rational when individuals believe that the benefits of a risky action outweigh its costs (Reyna & Farley, 2006). Consider an adolescent deciding whether to engage in unprotected sex. If the potential risks of the action (e.g., the probability of contracting a sexually transmitted disease) are perceived as relatively small and the potential rewards (e.g., having a thoroughly good time) outweigh these costs, the individual is likely to engage in the risky action (Fromme, Katz & Rivet, 1997).

Many of the objective risks associated with young people's online activities are rather small (e.g., making unknown friends online; Ybarra et al., 2007). However, research suggests that adolescents engage in risky online behaviours despite the fact that they perceive these actions as highly risky with minimal benefits (Liau et al., 2005; Livingstone et al., 2011). For example, in relation to online sexual behaviours, such as talking to strangers about sex or sending sexual/naked photos of oneself, adolescent's perceptions of the risks and benefits associated with these behaviours were not predictive of actual behaviour (Baumgartner et al., 2010a; Baumgartner, Valkenberg, & Peter, 2010b). Baumgartner et al. (2010b) suggested that this paradox could potentially be explained by Fuzzy Trace Theory due to the theory's focus on non-normative behaviour driven by intuition.

2.2.2. Fuzzy Trace Theory

Fuzzy Trace Theory (FTT; Reyna & Brainerd, 1995; Reyna & Brainerd, 2011) has emerged as one of the major alternative paradigms to successfully explain adolescents' and adults' risk-taking in domains such as health (Reyna, 2008) and sexual behaviours (Mills, Reyna & Estrada, 2008; Reyna & Adam, 2003). FTT proposes that people use two different forms of mental representation when making (risky) decisions. Verbatim representations are based on the bottom-line details for events or judgements using exact, quantitative

27

information. Gist representations are based on the meaning of events in light of an individual's values and beliefs which create intuitive, qualitative representations. Individual's memories of people, events, and experiences are formed, stored and retrieved such that the essence (or gist representation) of an experience is not extracted from the precise details (or verbatim representation) of an experience (Reyna & Brainerd, 1995). These gist and verbatim, qualitative and quantitative, representations are created in parallel and can also be retrieved independently, often depending on context driven cues (Reyna & Farley, 2006). Verbatim representations are said to fade more rapidly from memory, and therefore people's gist representations tend to be more readily retrieved from memory after an event (Reyna & Farley, 2006). Retrieval of gist and verbatim representations can also depend on additional factors, such as affect (Rivers, Reyna, & Mills, 2008), experience (Reyna, Chick, Corbin, & Hsia, 2014), expertise (Reyna & Lloyd, 2006), and neurobiological developments affecting sensation-seeking and inhibition control (Reyna et al., 2011).

Studies in the FTT paradigm have shown developmental differences in children's, adolescents', and adults' reliance on gist and verbatim representations. Reyna and Ellis (1994) and Reyna et al. (2011) found that children relied more on verbatim reasoning, weighing up costs and benefits when making risky decisions, whereas adults relied more on gist, but not verbatim, reasoning (Rivers et al., 2008). Reliance on gist reasoning was still developing in adolescence. Thus, compared to adults, adolescents were more likely to utilise both gist and verbatim reasoning and were therefore also more likely to take risks compared to adults (Reyna et al., 2011).

Reyna and Farley (2006) argue that adults intuitively get the gist of situations when forming judgements by retrieving risk avoidant values and principles from memory that have often been influenced by past behaviours and experiences. When making a risky decision, adults prefer to draw upon a hierarchy of gist representations and start any decision making

process at the most basic categorical level: Is the action risky or not? (Reyna & Brainerd, 1995). At this basic level the exact (verbatim) numerical values are ignored. For example, the prevalence rate of HIV infection in the UK is around 0.13% (Health Protection Agency, 2008), but individuals rarely consider this figure when deciding whether to have unprotected sexual intercourse. Instead they simply rely on the gist representations that unprotected sex is risky, that HIV/AIDS is a rather catastrophic consequence, and that therefore the risky action should be avoided (Reyna et al., 2011; Rivers et al., 2008). While adolescents may also get the gist of the risky situation, driven by higher sensation seeking and lower impulse control (Reyna et al., 2011), they continue to more systematically consider the pros and cons of the risky action. Have I had unprotected sex before that did not result in any bad consequences? Do I have any friends that have had unprotected sex and yet not contracted HIV? Do I know anyone with HIV? Essentially, adolescents are caught between considerations of mainly weighing the pros and cons of a risky action (or relying on verbatim representations), and mainly relying on gist representations to simply avoid risks (Rivers et al., 2008).

Previous studies (Mills et al., 2008; Reyna et al., 2011) have demonstrated that representing information in a verbatim way or engaging in the systematic consideration of cost/benefit trade-off analysis can actually result in higher rates of risk-taking. This is particularly true in situations where the perceived likelihood of a risky event taking place is low (Reyna & Brainerd, 1995). Conversely, relying on categorical gist reasoning (such as "Avoid Risk") reduces risk-taking behaviour (Reyna & Brainerd, 1995; Reyna & Farley, 2006). Thus, stronger reliance on verbatim representations in adolescence can, paradoxically, result in increased risk-taking compared to adults, while reliance on categorical gist reasoning ultimately reduces risk-taking behaviour in adulthood (Reyna & Brainerd, 1995; Reyna & Farley, 2006).

Following this line of reasoning, one important question is whether FTT could help explain adolescents' and young adults' online risk-taking. To this end, this study used and adapted measures developed by Mills et al. (2008) in the context of sexual risk-taking. Based on psycholinguistics and memory research (Reyna & Brainerd, 1995) these measures aimed at eliciting either gist or verbatim representations in adolescents as an explanation for the contradictory findings that sometimes risk perceptions were positively correlated with risk taking behaviours and sometimes negatively correlated. Participants were presented with questions or statements about a risky behaviour that were specifically worded to cue exact (verbatim) memories of that particular risk behaviour. For example, asking someone to consider the likelihood that they would have a sexually transmitted disease (STD) by the age of 25 would induce that individual to consider their past sexual risk-taking behaviour. If they recalled high incidents of risk-taking, such as unprotected sex, then their estimates of the probability of getting an STD would be equally high. Likewise, low risk-takers would report low estimates of personal risk from STDs. Such verbatim cues resulted in positive correlations with both risk perceptions and risk-taking behaviours. Conversely, presenting participants with cues designed to elicit global (gist) representations resulted in negative correlations between risk perceptions and risk-taking behaviours because categorical, gist representations are generally risk avoidant. Gist statements which included the word "you" as a grammatically objective, indirect object prompted individuals not to think about their own behaviour but to globally and generally reason about specific risky activities by drawing on intuition and personal beliefs and values. Mills et al. were able to show that verbatim cues were indeed positively related to, and reflective of, risk-taking behaviour in adolescents, with true memories guiding risk perceptions which in turn influenced risk-taking. However, adolescents who were more likely to endorse simple gist risk-avoidant principles, such as "If you keep having unprotected sex, risks will add up and you WILL get an STD", perceived

more risk associated with certain sexual activities and therefore displayed less risk-taking behaviour.

2.2.3. The Present Study

The present study had two main aims: firstly to investigate developmental differences in online risk-taking in adolescents and young adults and secondly to assess whether reliance on gist or verbatim representations could explain adolescents' and young adults' online risk-taking. The research focused on two major online risk-taking behaviours identified by previous research: disclosing personal information online, and making 'friends' on social networking sites with unknown people (Livingstone et al., 2011; Ybarra et al., 2007). These risky online behaviours are particularly suited to the FTT framework, as the associated risks are low while the potential benefits (e.g., increasing one's group of friends) are more obvious. It was predicted that adolescents would exhibit higher online risk-taking than young adults (Hypothesis 1).

The current study adapted gist and verbatim measures previously used to investigate adolescents' sexual risk-taking behaviour (Mills et al., 2008; Reyna et al., 2011) to cue verbatim or gist representations of online risk-taking behaviour. In line with previous research in the FTT paradigm, it was expected that gist representations of online risk-taking would correlate with each other and that verbatim representations would correlate with each other, but that there would be no relationship between gist and verbatim representations (Hypothesis 2).

Drawing on previous studies of FTT in the domain of sexual risk-taking (Mills et al., 2008), there was an expectation that adolescents' past online risk-taking behaviour would be associated with their endorsement of gist and verbatim questions and statements. Specifically,

higher endorsement of gist statements should be associated with lower past risk-taking, while higher endorsement of verbatim statements should correlate positively with past risk-taking. Since past research has not investigated this phenomenon in young adults the research enabled exploration of the relationship between past risk-taking and the endorsement of gist and verbatim statements among young adults (Hypothesis 3).

Past research has shown that young adults rely more on gist representations when deciding whether to make risky decisions, whereas adolescents rely on both gist and verbatim representations. It was therefore expected that among adolescents both gist and verbatim representations would correlate with future intentions to take online risks, while among young adults only gist representations would correlate with future online risk-taking intentions (Hypothesis 4).

2.3. Pilot Study

A pilot study was conducted to test the appropriateness of newly-designed measures to assess reliance on gist and verbatim representations in online risk-taking. Specifically, measures by Mills et al. (2008) were adapted to fit with the domain of online risk-taking. These new measures were administered alongside questions aimed at assessing individuals' past online risk taking behaviour and intentions regarding future internet use.

It was predicted that the three new measures to induce gist representations for online risk-taking would correlate positively with each other in the same way as those developed by Mills et al. Moreover, the online gist measure should correlate negatively with online risk taking behaviour and future intentions. Finally, relationships were expected between the measures of online risk perceptions, actual risk taking, and intentions to engage in certain online behaviours to assess if the questions were tapping into equivalent online behaviours

(i.e. perceptions of personal information theft linked to actual behaviour sharing information and future intentions to engage in that behaviour).

2.3.1. Pilot Study Method

2.3.1.1. Participants

Forty-one adult participants (28 female; $M_{age} = 36.44$ years; $SD = 13.11$) were recruited online via a link posted on Facebook and the website Psychological Research on the Net. The latter website is sponsored by Hanover College, Indiana, and can be used free of charge in order to recruit participants via the internet to participate in ethically approved psychological studies. Participants were offered no compensation for their involvement and participation was entirely voluntary. Aside from age and sex, no other demographic information was collected.

2.3.1.2. Materials

Gist reasoning. In this section of the questionnaire participants were presented with three individual measures to assess their use of gist reasoning in relation to risky behaviours online; the *Categorical Risk* measure, the *Gist Principles* measure, and *Global Risk Perceptions.* Each measure is explained in more detail below (also see Appendix 1).

Each scale was adapted from previously validated measures assessing sexual health risk taking (see Mills et al., 2008; Reyna et al., 2011). With specific reference to the two areas of interest in this study, divulging personal information online and making friends with people not known offline, items were adapted by substituting references to sexual risk with references to online risk. For example, "If you keep having unprotected sex risks will add up

and you WILL get pregnant or get someone else pregnant", became "If you keep giving out your personal details online to people you don't know, risks will add up and you WILL have your details stolen and abused". Similarly, "Better not to have sex than risk getting HIV/AIDS", became "Better not to give out personal information online than risk having my identity stolen". Statements and questions were global and generally worded, and presented in such a way as to tap into participants reasoning about risk aiming to induce gist reasoning.

The *Categorical risk* category included nine questions to measure gist reasoning, e.g., "If you keep giving out your personal details online to people you don't know, risks will add up and you WILL have your details stolen". Participants indicated their agreement with the statements on a 5-point Likert scale from 0 (*strongly disagree*) to 4 (*strongly agree*) and scores across the nine items were averaged ($\alpha = .83$). Strongly agreeing to these statements indicated participants perceived higher risk compared to those participants who strongly disagreed.

The *Gist principles* measure, to induce gist reasoning, contained 14 statements (e.g., "Better to not accept unknown "friends" online than risk being bullied or harassed") presenting global statements relating to online risk. Participants were asked to tick the statements they endorsed and leave blank those they did not endorse. A higher number of endorsements again reflected higher risk perceptions. Four items were reverse scored and the number of endorsements summed ($\alpha = .70$).

Global risk perception measures included two questions aimed at assessing gist-based perceptions of risks ("Overall for YOU which best describes the risks of giving out your personal details online?" and "Overall for YOU which best describes the risks of making friends online with people you do not already know offline?"), and two questions assessing perceptions of benefits ("Overall for YOU which best describes the benefits of giving out

your personal details online?" and "Overall for YOU which best describes the benefits of making friends online with people you do not already know offline?"). Global risk perception was measured on a four-point scale of *none* (0)*, low* (1)*, medium* (2)*,* and *high* (3).

The Categorical Risk scale measured individual's preference for categorical reasoning about risk, with more mature decision makers expected to show greater agreement with these statements rather than quantitatively weighing up the degrees of risk (Mills, et al., 2008). In other words, being the victim of identity theft is categorically bad, so when drawing upon categorical gist reasoning the act that may lead to that outcome will be avoided. The Gist Principles scale measured individual's principles, values and beliefs about risk (Mills, et al, 2008), therefore the participants who reason about risk in more gist-terms would be expected to endorse more of these principles.

Online Risk Taking and Future Intentions. Two questions assessed previous behaviour, "Have you ever given out your personal information online?" and "Have you ever made friends with someone you know only online?" Responses were scored (1) *Yes* or (0) *No*. Participants who answered "Yes" were then asked to quantify this: "How many times would you guess you have given out personal information online in the past year" and/or "How many friends would you say you have made in the past year that you know only online?"

Three questions measured future intentions assessing whether participants intended to give out their personal information, make unknown friends, or communicate with unknown people in chat rooms in the coming year. Participants answered on a 5-point Likert scale scored from 0 (*very unlikely*) to 4 (*very likely*) with a Cronbach's alpha of $\alpha = .72$.

2.3.1.3. Procedure

The study received ethical clearance from the university's behavioural ethics committee. A link to the survey was posted on Facebook and on the website Psychological Research on the Net (http://www.psych.hanover.edu). Respondents were invited to participate in the research study and instructed to click on the link for more information. An initial introduction briefly explained the main aims of the study and asked for consent by ticking a check box. Participants were instructed only to consent and continue if they were 18 years old or over. The participant was then guided through the questionnaire pages completing each individual measure. At the end of the survey a more detailed description of the aims of the research were given to participants as well as details of online gambling and personal security advisory bodies.

2.3.2. Pilot Study Results

2.3.2.1. Relationships of Gist and Verbatim Measures, Online Risk-Taking, and Future Intentions

A number of similarities were discovered between the findings of Mills, Reyna, and Estrada (2008) and those obtained in this pilot study. Detailed comparisons can be seen in Table 1. Statistically significant correlations were observed between the Categorical Risk and Gist Principles measures (both designed to measure gist reasoning), $r(41) = .47$, $p = .002$, and the Categorical Risk and Global Risk Perception measures (for both personal information, $r(41) = .34$, $p = .032$, and unknown friends, $r(41) = .31$, $p = .049$). The r values obtained for the relationship between Gist Principles and Global Risk Perceptions were greater than those found in Mills et al. however failed to reach significance.

Table 1. *Correlations Between the Three Gist Measures of Reasoning, and Comparisons Between the Findings of Previous Research to the Findings of the Current Pilot Study.*

| | Mills, Reyna & Estrada (2008) | Pilot Study |
	Sexual Health Risk Behaviours	Online Risk Behaviours
Correlated Variables	*r*	*r*
Categorical Risk & Gist Principles	.38**	.47**
Categorical Risk & Global Risk Perceptions	.22**	Personal Information .34* Unknown Friends .31*
Gist Principles & Global Risk Perceptions	.29**	Personal Information .25 (ns) Unknown Friends .30 (ns)

N.B: *$p < .05$, **$p < .01$.

As predicted by FTT, and found in previous research, significant, negative correlations were observed in the following relationships; Gist Principles and unknown friend risk behaviour, $r(41) =- .40$, $p = .01$; Gist Principles and intentions (to give out personal information $r(41) = -.36$, to make unknown friends $r(41) = -.32$, to communicate with strangers, $r(41) = -.34$, all $p < .05$); Global Risk Perceptions about unknown friends and intentions to make unknown friends, $r(41) = -.37$, $p = .02$; and Global Risk perceptions about unknown friends and intentions to communicate with strangers, $r(41) = -.39$, $p = .01$. All other correlations failed to reach significance, however all displayed negative relationships as predicted by theory (see Table 2).

Table 2. *Correlations Between Gist Measures and Measures of Online Risk-Taking and Intentions, and Comparisons Between the Findings of Previous Research and Those of the Current Pilot Study*

	Mills, Reyna & Estrada (2008) Sexual Health Risk Behaviours	Pilot Study Online Risk Behaviours
Correlated Variables	*r*	*r*
Categorical Risk & Risk Behaviour	-.18**	PI -.28 (ns)
		UF -.30 (ns)
Categorical Risk & Intentions	-.30**	PI -.26 (ns)
		UF -.19 (ns)
		Com -.17 (ns)
Gist Principles & Risk Behaviour	-.40**	PI -.25 (ns)
		UF -.40**
Gist Principles & Intentions	-.60**	PI -.36*
		UF -.32*
		Com -.34*
Global Risk Perceptions & Risk Behaviour	-.30**	PI x PI -.18 (ns)
		PI x UF -.12 (ns)
		UF x PI -.21 (ns)
		UF x UF -.29 (ns)
Global Risk Perceptions & Intentions	-.35**	PI x PI -.12 (ns)
		PI x UF -.20 (ns)
		PI x Com -.18 (ns)
		UF x PI -.10 (ns)
		UF x UF -.37*
		UF x Com -.39**

N.B: *p < .05, **p < .01

PI = Disclosing personal information online; UF = Making friends with unknown people online;

Com = Communicating in chat rooms with unknown people online

2.3.2.2. Online Risk Perception and Risk-Taking

Using the adapted measures, strong relationships were found when comparing various facets of online risk taking and risk perceptions. Participants displayed consistent perceptions of risk across risk behaviours with significant results found for relationships between Global Risks of disclosing personal information and Global Risks of making unknown friends, $r(41) = .64, p < .001$, and Global Benefits of disclosing personal information and Global Benefits of making unknown friends, $r(41) = .57, p < .001$.

Participants who held greater perceptions of the risks associated with making unknown friends also showed less intention to make unknown friends, $r(41) = -.37, p = .02$. In support of this finding, those who saw increased benefits associated with making unknown friends also showed greater intention to make unknown friends, $r(41) = .64, p < .001$. The Global Benefits perceived from making unknown friends was also correlated with intentions to communicate with strangers in chat rooms, $r(41) = .49, p = .001$.

Risk taking behaviour was also related to future intentions to engage in that behaviour for both disclosing personal information, $r(41) = .60, p < .001$, and for making unknown friends online, $r(41) = .50, p = .001$. The mean number of times participants shared personal information was also correlated with the mean number of unknown friends that individual had accepted online, $r(41) = .53, p < .001$, suggesting that people who take gambles with their information are also more likely to risk accepting unknown friends on their social networking sites.

2.4. Main Study

2.4.1. Method

2.4.1.1. Participants

Participants were students from three educational establishments in the South West of England: one secondary school covering the age range 13-18 years old, one further education (FE) college with an age range of 16-19 years old, and one university with students ranging in age from 18-24 years old, all undergraduate students in Psychology. As Facebook use was a primary component of this study, and Facebook users must be 13 years or over, this was the minimum age stipulated for participant involvement. Informed consent was obtained from the parents of all participants under 18 years old. Those with parental consent, or those over 18 years old, were then invited to participate. No incentives or compensation for involvement was offered to students at the secondary school or FE college. Undergraduate students participated for course credit. Following previous investigations of FTT in the domain of sexual risk taking behaviour, participants were grouped into two age groups, adolescents (13-17 years, $N = 122$; 82 Females; $M_{age} = 15.04$ years, SD=1.44) and young adults (18-24 years, N=172; 142 Females; $M_{age} = 19.15$ years, $SD = 1.10$) for analysis. Aside from age and gender, no other demographic information was collected.

2.4.1.2. Materials

Participants completed paper booklets containing the questionnaire items designed to examine past online risk taking behaviour, intentions to engage in future risky online behaviour, and gist and verbatim representations. Each participant was given a detailed brief

and a consent form to sign. A full list of the gist and verbatim questions and statements can be found in Appendix 1.

Using the materials designed and tested in the pilot study, participants were presented with the three individual measures to assess their use of gist representations in relation to risky behaviours online; the *Categorical Risk* measure, the *Gist Principles* measure, and *Global Risk Perception* measure. The *Categorical risk* measure included nine questions to measure gist reasoning and participants indicated their agreement with the statements on a 5-point Likert scale from 0 (*strongly disagree*) to 4 (*strongly agree*) and scores across the nine items were averaged ($\alpha = .75$). Strongly agreeing to these statements indicated participants perceived higher risk compared to those participants who strongly disagreed.

The *Gist principles* measure contained 14 statements presenting global statements relating to online risk. Participants were asked to tick the statements they endorsed and leave blank those they did not endorse. A higher number of endorsements reflected higher risk perceptions. Four items were reverse scored and the number of endorsements summed ($\alpha = .64$).

Global risk perception measures included two questions aimed at assessing gist-based perceptions of risks measured on a four-point scale of *none* (0), *low* (1), *medium* (2), and *high* (3). These two questions were found to be significantly correlated, $r(292) = .47, p < .001$, and therefore scores were combined and averaged to create one *Global Risk Perception* variable.

Participants were presented with two measures aimed at assessing their use of verbatim representations. *Specific risk* involved two verbatim-focused questions which were specifically worded to assess participant's perceptions of their own future risk from using the internet. Participants were asked to rate, on a 5-point Likert scale scored from 0 (*very*

unlikely) to 4 (*very likely*), the statements "I am likely to have my personal details stolen and used against me in the next 6 months", and "I am likely to be bullied or harassed online in the next 6 months by a person I do not know offline" ($\alpha = .81$). As these two measures significantly correlated, $r(295) = .68$, $p < .001$, they were summed and averaged to create one *Specific Risk* variable ($\alpha = .81$). For the *Quantitative risk* scale participants were asked "What are the chances that your personal information has been stolen?" and then indicated their answer on a scale ranging from 0% - 100%.

To measure *Past online risk taking and intentions to take online risks,* participants were asked to indicate whether or not they had ever given out personal information online, or made friends with someone they knew only online in the past 12 months. Two variables were created: "Past online risk taking: Disclosed personal information" and "Past online risk taking: Made unknown friends" both coded as 0 ("no") and 1 ("yes").

Four questions measured participants' intentions to take online risks, assessing whether they intended to disclose their personal information, make unknown friends, communicate with unknown people in chat rooms, or share personal information with people they only knew online in the coming year. Participants answered on a 5-point Likert scale scored from 0 (*very unlikely*) to 4 (*very likely*). These four intentions measures were found to correlate significantly with each other. Therefore, scores were summed and averaged to create an *Online Risk Intentions* variable ($\alpha = .72$). For full details of the Past Online Risk Taking and Online Risk Intentions measures see Appendix 2.

2.4.1.3. Design

A between-subjects design considered differences in past risk-taking with personal information and making unknown friends (dependent variables) by the two age groups (independent variable). Regression analysis investigated the outcome variable, Online Risk

Intentions, using the predictor variables of Age, Past Risk-Taking – Disclosed Personal Information, Past Risk-Taking – Made Unknown Friends, Gist Reasoning, and Verbatim Reasoning.

2.4.1.4. Procedure

The study received ethical clearance from the university's behavioural ethics committee. Students from the secondary school and the FE college were tested in groups during morning registration periods. After students personally gave consent to participate they were seated at separate tables and asked to complete the questionnaire in silence. Once questionnaires were completed each participant was provided with a debrief document. One difficulty identified with this method of data collection was the volume of questionnaires which could not be used for analysis due to the large number of missing answers. Of 155 participants across years 9, 11 and 12, only 122 questionnaires were sufficiently completed, leading to 21.3% being dropped from analysis.

For the undergraduate students, the questionnaire was converted into a web based survey which could be accessed through the university's participant recruitment scheme. Respondents were invited to participate in the research study by clicking on a web link. The participant information sheet was presented on screen and students were asked for consent by ticking a check box. Participants were instructed only to consent and continue if they were between 18- to 24 years old. The participant was then guided through the questionnaire pages completing each individual measure. At the end of the survey a debrief with a more detailed description of the aims of the research was given to participants. Two different modes of data collection (i.e. paper and online) were utilised in order to accommodate the resources available to the participants; students in the secondary schools and colleges did not all have access to computers to complete online surveys, nor were undergraduate students able to

complete pencil-and-paper questionnaires easily in person. Consequently, the mode of delivery enabled the most effective data collection techniques, yet did not compromise the quality of the data (Bowling, 2005; Fouladi, McCarthy, & Moller, 2002; Prisacari & Danielson, 2017).

2.4.2. Results

2.4.2.1. Adolescents' and Young Adult's Online Risk-Taking

Table 3 shows the percentage of participants in each age group who had taken online risks in the past by disclosing personal information or making unknown friends. Chi-squared tests revealed that adolescents were significantly more likely than young adults to have disclosed personal information online in the past 12 months, $\chi^2 (1) = 27.57$, $p < .001$. However, adolescents and young adults were equally likely to have made unknown friends in the preceding year, $\chi^2 (1) = 1.68$, $p = .195$ (see Table 3). An independent samples *t*-test revealed that adolescents had significantly higher intentions to take online risks in the future compared to young adults, $t(294) = 2.43$, $p = .016$, $d = 0.28$.

Fuzzy Trace Theory predicts that the two verbatim measures of risk perception (Specific Risk and Quantitative Risk) should positively correlate with each other as should the three gist measures of risk perception (Categorical Risk, Gist Principles, and Global Risk Perception). However, gist and verbatim measures should not correlate with each other. Table 4 shows the intercorrelations between all verbatim and gist measures. Both the Specific Risk and Quantitative Risk verbatim measures were significantly and positively correlated. All three gist measures were also significantly and positively correlated. However, while neither the Categorical Risk nor Gist Principles gist measures were correlated with either of

44

the verbatim measures, the gist variable Global Risk Perception showed a significant relationship with both verbatim measures.

Table 3. *Frequency (and %) of Past Online Risk-Taking and Mean Online Risk Intentions by Age Group*

	Age group	
Variable	Adolescents ($N = 123$)	Young adults ($N = 172$)
Past online risk-taking: Disclosed personal information	81 (66%)	60 (35%)
Past online risk-taking: Made unknown friends	80 (65%)	99 (58%)
Online risk intentions	1.58 (.93)	1.33 (.84)

2.4.2.2. Relationships of Gist and Verbatim Measures

Due to the intercorrelations of the gist and verbatim measures, a principal component analysis on all five (three gist and two verbatim) measures with orthogonal rotation (varimax) was conducted. Two components, incorporating all five items, had eigenvalues over 1 and together accounted for 62.90% of the variance. Table 5 shows the factor loadings after rotation suggesting that all three gist measures loaded onto component 1 (gist component) and both verbatim measures loaded onto component 2 (verbatim component).

Table 4. *Intercorrelations of Gist Measures (Categorical Risk, Gist Principles, Global Risk Perceptions) and Verbatim Measures (Specific Risk Perceptions, Quantitative Risk) for Online Risk-Taking*

	Categorical Risk	Gist Principles	Global Risk Perceptions	Specific Risk Perceptions
Categorical Risk				
Gist Principles	.44**			
Global Risk Perceptions	.26**	.18**		
Specific Risk Perceptions	.07	.01	.15**	
Quantitative Risk Perceptions	.08	.04	.17**	.51**

*p < .05. **p < .01.

Table 5. *Results of Principle Component Analysis for the Gist and Verbatim Measures (N =*
292)

	Rotated Factor Loading	
Item	Gist Component	Verbatim Component
Categorical Risk (Gist)	.83	.02
Gist Principles (Gist)	.80	-.07
Global Risk Perception (Gist)	.51	.31
Specific Risk Perception (Verbatim)	.03	.85
Quantitative Risk (Verbatim)	.06	.85
Eigenvalue	1.76	1.38
% of variance	35.24	27.66

Table 6. *Intercorrelations of Gist and Verbatim Components, Past Online Risk-Taking and Future Online Risk Intentions for Adolescents and Young Adults.*

Variable	1	2	3[a]	4[a]	5
			Adolescents		
1. Gist component	--				
2. Verbatim component	-.14	--			
3. Past online risk-taking: Disclosed personal information[a]	-.24**	.19*	--		
4. Past online risk-taking: Made unknown friends[a]	-.12	.23*	.08	--	
5. Online risk intentions	-.38**	.34**	.28**	.52**	--
			Young adults		
1. Gist component	--				
2. Verbatim component	.12	--			
3. Past online risk-taking: Disclosed personal information[a]	.07	-.05	--		
4. Past online risk-taking: Made unknown friends[a]	.07	-.003	.01	--	
5. Online risk intentions	-.38**	.15	-.27**	-.26**	--

[a] Spearman correlations $*p < .05.$ $** p < .001.$

2.4.2.3. Future Intentions to Take Online Risks

Table 6 shows the intercorrelations between the gist component, verbatim component, past online risk-taking: disclosed personal information, past online risk-taking: made unknown friends, and future intentions to take online risks, separately for adolescents and young adults. Among adolescents, the gist component correlated significantly negatively with online risk intentions, and the verbatim component correlated significantly positively with online risk intentions. Both past online risk taking measures correlated positively and significantly with online risk intentions. Past online risk taking also correlated positively and significantly with verbatim representations, but tended to correlate negatively with gist representations.

Among young adults, gist representations correlated negatively and significantly with online risk intentions. Both past online risk taking measures also correlated significantly and negatively with online risk intentions. Importantly, there was no significant correlation between verbatim representations and online risk intentions for young adults.

To assess the roles of age group, past online risk taking behaviour, and gist and verbatim representations on future intentions to take online risks, hierarchical linear regressions were conducted. In Step 1 the independent variables of age, past risk taking: disclosed personal information and past risk taking: made unknown friends were entered. In Step 2 the gist component and verbatim component were additionally entered. Step 3 additionally included the interaction terms of Disclosed Personal Information x Age, Made Unknown Friends x Age, Gist Component x Age, and Verbatim Component x Age. Results can be found in Table 7.

The first regression model showed that age and past risk taking behaviours significantly predicted intentions to take online risks, $\Delta R^2 = .03$, $\Delta F (3,287) = 2.82$, $p = .039$.

Age negatively predicted intentions to take online risk; that is adolescents showed stronger intentions to take online risks than young adults. Past risky behaviours (both in terms of disclosing personal information and making unknown friends online) did not significantly predict future intentions to take risk online.

The results of the second regression model showed that the gist and verbatim components additionally predicted online risk intentions, $\Delta R^2 = .21$, $\Delta F(2, 285) = 38.65$, $p < .001$. Gist reasoning negatively predicted intentions to take risks online while verbatim reasoning about risk positively predicted online risk intentions. The results of the third regression model showed that the interactions between the Past Risk Taking: Sharing Personal Information x Age and Past Risk Taking: Making of Unknown Friends x Age additionally predicted online risk intentions, $\Delta R^2 = .13$, $\Delta F(4, 281) = 13.69$, $p < .001$ (see

Table 7. *Results of Hierarchical Regression Analysis Predicting Online Risk Intentions.*

Independent Variables	Online Risk Intentions	
	β	R^2, F, df1, df2, p
Step 1		
Age	-.15*	.03, 2.82, 3, 287, .039
Disclosed personal information	-.02	
Made unknown friends	.07	

	β	R^2, F, df1, df2, p
Step 2		.24, 38.65, 5, 285, .001
Age	-.19**	
Disclosed personal information	-.06	
Made unknown friends	.04	
Gist Component	-.38**	
Verbatim Component	.25**	
Step 3		.36, 13.69, 9, 281, .001
Age	-.09	
Disclosed personal information	-.02	
Made unknown friends	.12*	
Gist Component	-.27**	
Verbatim Component	.20**	
Disclosed personal information x Age	-.16**	
Made unknown friends x Age	-.33**	
Gist Component x Age	-.07	
Verbatim Component x Age	.01	

* $p < .05$ ** $p < .01$

Table 7). As shown in Figure 1, those adolescents who disclosed personal information in the past were more likely to intend to take online risks in the future. However, among young adults, those who had disclosed personal information showed lower online risk intentions than those who had not shared personal information. A similar pattern emerged for past risk taking: made unknown friends. Among adolescents, those who had engaged in past online risks showed higher online risk intentions, whereas among young adults those who had engaged in past online risk taking exhibited lower online risk intentions (see Figure 2).
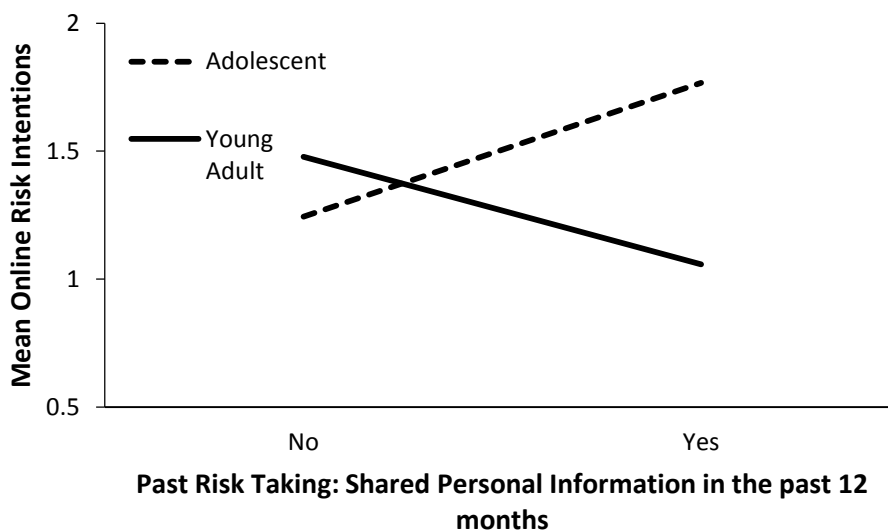
Figure. 1. *Interaction of Past Risk-Taking: Shared Personal Information online in the past 12 months and age predicting online risk intentions for adolescents and young adults*
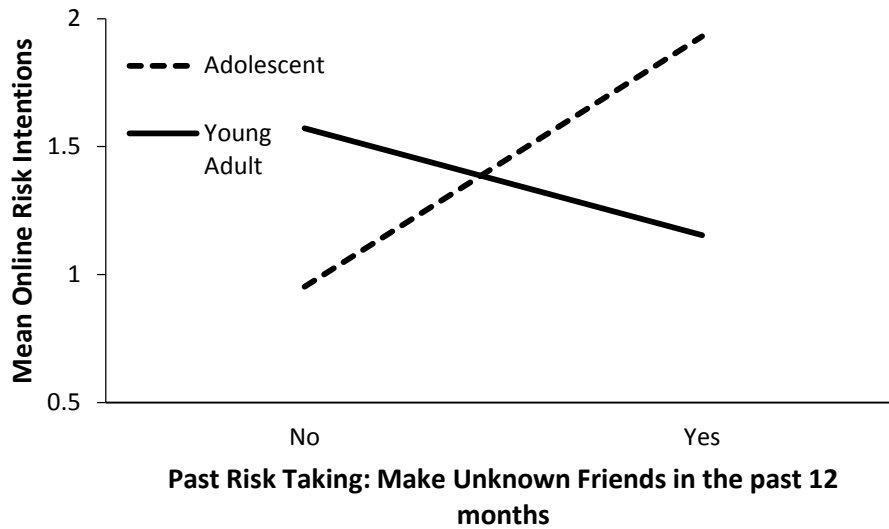
Figure. 2. *Interaction of Past Risk-Taking: Made Unknown Friends online in the past 12 months and age predicting online risk intentions for adolescents and young adults*

2.5. Discussion

Online relationships that result in the abduction and murder of teenagers, like Shavaun Pennington (Weathers, 2008) and Sasha Martin (Evans, 2013), are rare. Yet, media reports are rife with stories of young people taking their own lives due to cyber-bullying (Topping & Coyne, 2013) or being blackmailed by abusers into performing sexual acts and self-harming on live webcam links (CEOP, 2013), highlighting how online exposure can potentially be harmful to young people. Although a growing body of research has turned its attention towards this rather novel domain, there is a dearth of empirical studies examining psychological factors influencing adolescents' and young adults' online risky behaviours. This study examined how representations of risk affect adolescents' and young adults' online risk-taking behaviour.

Previous research has shown that adolescents are generally more likely to engage in offline risky behaviour compared to young adults. The first objective of this research was to

evaluate whether a similar age effect could be found for online risk-taking. Results indicated, first, that adolescents took significantly more online risks in the past with the disclosure and sharing of personal information, and showed stronger intentions to take online risks in the future compared to young adults. Although both age groups were equally as likely to have made unknown friends in the past 12 months, adolescents had made ten times more unknown friends online, on average, compared to young adults. Adolescents also stated that they were more likely to engage in future online risky activities including making unknown friends, disclosing personal information, communicating in chat rooms with strangers, and sharing personal information with strangers, compared to young adults. This data, thus, provides further evidence that adolescence might represent a precarious period with regard to risk-taking behaviour, whether it is offline or online.

The relatively equal propensity of both age groups to make unknown friends online is certainly worth further investigation, since domain-specific risk-taking research has alluded to the fact that some aspects of social risk-taking continue to increase into adulthood and only subside in middle age (Rolison, Hanoch, Wood, & Liu, 2014). Additionally, the young adults in this study may have been responding to their social environment, such that the novelty of going to university opened up new social networking opportunities to link with individuals and interest groups. Further research could investigate whether non-university students of the same age are as likely to make unknown friends online.

Building on Fuzzy Trace Theory (FTT; Mills et al., 2008; Reyna et al., 2011), the present study was designed to assess whether adolescents' and young adult's mental representations of risk, exemplified by gist or verbatim statements, were related to past and intended online risk-taking behaviour. As argued by FTT, verbatim representations are quantitative and are based on precise details for events or judgements. Gist representations, on the other hand, are qualitative and intuitively draw on the essence or meaning of events.

Following Mills et al.'s earlier work, reliance on verbatim or gist representations was manipulated by wording questions and statements to either cue precise memories of online risk-taking (verbatim representations) or to cue global principles associated with online risk-taking (gist representations).

Findings were concordant with the prediction and previous research of adolescent risk perceptions and risk-taking (Mills et al., 2008), such that 13- to 17-year-olds who were more likely to reason about online risk by drawing on gist representations were less likely to have engaged in online risk-taking in the previous 12-months. In contrast, adolescents who reasoned by drawing on verbatim representations of online risk were more likely to have engaged in risky activities online in the previous 12-months. These results highlighted that this was not the case for the young adult group; there were no significant associations between reasoning style and past behaviours. While no predictions were made in this respect for the young adult group it would be reasonable to expect that, given young adult's increased dependence on gist reasoning, as proposed by FTT, that some association would be found. Potentially, however, for this age group, a change in reasoning style during the period which past risk-taking behaviour was measured (i.e. the past 12 months) could make any specific relationships difficult to identify. For example, a decision to disclose personal information 12 months ago which was made by drawing on verbatim representations would not necessarily be in-keeping with current decision making if the individual(s) had moved to a more gist based reasoning process.

Another unexpected finding was that while past risk-taking behaviour showed a positive relationship with future risk-taking intentions for adolescents, there was a negative relationship between past risk-taking and future intentions for the young adult group. These findings could potentially be explained by the experience individuals had with the online environment. Research suggests that young people perceive some online behaviours as high

risk (Liau et al., 2005) even though objective risks are low (Ybarra et al., 2007). However, Hertwig and Erev (2009) proposed that when making decisions based on experience, people tend to underestimate the risks associated with rare events. Therefore, when induced to draw specifically on one's own personal experiences of making unknown friends or giving out personal information online (that is using verbatim representations) adolescents may have had very few (if any) past negative experiences with making unknown friends online on which to base their risk estimations. It would therefore seem reasonable that young people who had had very little experience of bad outcomes associated with making unknown friends online would underestimate risk and consequently show stronger intentions to engage in risky behaviours in the future. The opposite may have been true for the young people who had gained potentially more experience in the online environment. Future research should therefore explore the importance of past experience for online risk-taking in more depth.

Mills et al. argued that gist representations are meant to be prospective and "guide real-life decision making" (p. 433) in that simple values and decision rules concerning a specific risky behaviour will deter individuals from engaging in that behaviour. The present findings lend support to their assertion: Individuals who were more likely to endorse simple global statements such as "Avoid Risk", or "Better to never give out personal information online than risk having my identity stolen", were less likely to intend to engage in these activities in the future. The opposite was found for verbatim representations: Individuals who were more likely to endorse verbatim representations showed greater proclivities to intend to engage in future online risky behaviour.

With this in mind, it could be argued that it is past behaviour that drives the preference for gist or verbatim reasoning. That is, individuals who are more risk taking will subsequently reason in a verbatim style, while those who are more risk averse will tend to reason in a gist style. However, if this was the case then the same pattern of correlations

between past risk-taking and gist reasoning (negative correlation) and past risk-taking and verbatim reasoning (positive correlation) should be observed for both adolescents and young adults. Indeed, on the basis that young adults would be expected to have a potentially longer history of risk-taking behaviour on which to draw upon, the relationship with verbatim reasoning should be stronger. The opposite was found to be true highlighting that it is the differential recall of past behaviour (induced by the verbatim statements) and values and beliefs about the same behaviour (induced by gist statements) which drive risk perceptions and future risk-taking behaviour. Therefore, two individuals with the same rate of past risk taking behaviour can have different risk perceptions and future risk-taking intentions depending on whether they consider that risky behaviour utilising verbatim or gist reasoning.

Following developmental research in the FTT paradigm it was predicted that young adults' intentions to take online risks would be mainly based on gist representations, whereas adolescents would rely on both gist and verbatim representations. In line with FTT, adolescents' online risk-taking was based both on gist and verbatim representations, while the influence of verbatim representations on risk-taking decreased for young adults. Consequently, increased gist reasoning was protective of risk-taking for all participants, but a stronger reliance on verbatim reasoning, as displayed by adolescents, predicted increased intentions to take risks online.

This study is not without limitations. As has been highlighted in previous research (Baumgartner et al., 2010a), the novelty of investigating online risky behaviour, particularly with young people, necessarily utilises measures either adapted from paradigms used in offline environments or newly created ones. As such, further improvement through additional testing is needed. This could potentially affect the findings of this study in terms of its measure of FTT but also its applicability to the online environment. For example, the current study adapted the gist and verbatim measures developed by Mills et al. to examine

adolescents' sexual risk taking. While similar correlations were found between the gist and verbatim measures as Mills et al. (i.e. all gist measures significantly correlated with each other, all verbatim measures significantly correlated with each other, no relationship between gist and verbatim measures), the gist measure Global Risk Perceptions showed significant positive correlations with the other gist, as well as verbatim, measures. The specific wording of this question states "for YOU which best describes the risks of giving out your personal information/making unknown friends online?" which could possibly induce individuals to think more about their own past behaviour rather than about global representations. Mills et al. suggest that this question should elicit a gist response, but they also add that it is possible that verbatim cues can be retrieved from this type of questioning. Certainly, the categorising of the global risk perceptions question as a purely gist-cue is not supported and should be further investigated. This could be done by assessing whether more global responses to this question are produced if the word "you" is removed from the sentence. As with other studies (e.g. Mills et al., 2008), this investigation was hypothetical by nature and did not measure actual behaviour. It would be extremely useful to examine adolescents' and young adults' actual online behaviour and assess whether gist or verbatim representation of information helps modify their online activities.

Despite these limitations, these findings have a number of important implications. First, in line with previous results (Ybarra et al., 2007), a large percentage of young people (over 50% of all age groups) admitted taking online risks such as disclosing their personal information to strangers, and making friends with people on social networking sites whom they did not already know offline. The data also reveal that the main facets of FTT, namely the utility of gist-based intuition and verbatim-based analysis of risk-taking judgements, can be applied to the online environment. Certainly, the gist measures of online risk-taking showed protective properties when related to future intentions to engage in risky online

behaviour for both age groups, and the use of increased verbatim reasoning was predictive of increased online risk intentions in adolescents. These may serve as important factors in online training and education for both preventative and protective measures.

Concordant with the findings that participants who endorsed simple gist values were also more risk-averse, previous research into flood risk-perception and risk-communication has highlighted that individuals displaying high prevention-focussed beliefs are more highly motivated by prevention-focussed risk communications (De Boer, Botzen, & Terpstra, 2014). Furthermore, in the same way that FTT has been supported through investigations into the framing bias (Reyna et al., 2011; Tversky & Kahneman, 1981) Terpstra, Zaalberg, de Boer and Botzen (2014) have shown that negatively framed risk communication messages are more informative and influential than positively framed messages. Risk communication messages are more effective when processed heuristically than systematically (Visschers, Meertens, Passchier, & de Vries, 2009). Recent risk prevention interventions, specifically based on FTT, have been successful in the reduction of sexual risk-taking in a large sample of U.S. high school students (Reyna & Mills, 2014). Specifically, Reyna and Mills (2014) enhanced an existing risk-reduction programme (RTR programme) in order to incorporate facets of gist reasoning that could be more easily memorised (RTR+ programme), incorporated into individual's personal values and beliefs, and also be more easily retrieved, compared to verbatim knowledge. The emphasis of the risks involved in engaging in sexual behaviour was moved from a quantitative focus on the probability of under-age pregnancy or sexually-transmitted infection, to a qualitative focus on the essential meaning of risk and understanding of risk-avoidant attitudes. A one-year follow up of participants revealed that those who had participated in the RTR+ programme were significantly less likely to have engaged in risky sexual behaviour, or intending to engage in this behaviour, compared to those on the RTR and control programme. Certainly, since risk prevention messages have

been shown to be effectively communicated via social networking sites (Verruen, Gutteling & de Vries, 2013) communication of risk in an online environment about online risk is an area warranting further investigation.

Developing and imparting more gist based knowledge, in order to engage more intuitive thinking about online risk-taking, may well help to protect young people against some of the dangers involved in certain online activities. Currently internet safety education has become far more widespread, not only for young people in schools but also for teachers in training and parents, but requires wider implementation and effectiveness (Byron, 2010). Further research on young people's online risk-taking will not only help identify the decision making processes involved when making risky decisions about online activities, but also help develop more effective education strategies that can encourage young people to reap the benefits of the virtual world while also protecting them against potential threat.

Not only do these results highlight that adolescent internet users appear to display riskier online behaviour compared to adult users, they also indicate that different reasoning strategies exist for different age groups. Focussing on these developmental differences, I further investigate decision making strategies in Chapter 3 using a novel adaptation of the classic framing task.

Chapter 3

Framing of Online Risk: Young Adults' and Adolescents' Representations of Risky Gambles

This chapter is strongly based on a published paper (White, Gummerum & Hanoch, 2016)

3.1. Abstract

Young people can be particularly vulnerable to victimization online. Despite widespread Internet safety training, data reveal that risky online behaviours are commonplace among young people. To date, there has been little research investigating the psychological mechanisms underpinning these risky online behaviours. Drawing on fuzzy trace theory, this study examined if adolescents' risky online behaviours were based on both gist/intuitive and verbatim/quantitative representations of risks while adults' risky online behaviours were based mainly on gist representations. In total, 124 adolescents (aged 13–17 years) and 172 young adults (aged 18–24 years) indicated their risky choice preferences for divulging personal information online (using an adaptation of the Asian disease problem). Overall gambling behaviour was linked to sensation seeking. However, as predicted, adolescents were more likely to choose the risky options, but adults were more likely to exhibit framing biases, independent of sensation seeking. These results support the conclusion that young adults rely more on gist representations, whereas adolescents rely more on verbatim (and gist) representations. These findings provide important and novel insights into ways in which online safety training and risk communication could be effectively tailored to different age groups

3.2. Introduction

The behavioural data obtained in Chapter 2 indicated that young people frequently engaged in some risky online behaviour, such as disclosing personal information and 'friending' strangers. Although the majority of young Internet users enjoy positive experiences online (EU Kids Online, 2014), surveys carried out across Europe (Livingstone & Bober, 2004; Livingstone, Haddon, Görzig, & Ólafsson, 2011) reveal that children and adolescents are exposed to various online risks (Livingstone, Mascheroni, Ólafsson, & Haddon, 2014). In light of this, the U.K. Council for Child Internet Safety developed a range of training materials, made available to teachers, parents and carers, in order to help educate children over 5 years of age (Byron, 2010). Nevertheless, these materials are not yet incorporated into the U.K.'s school curriculum. Consequently, the focus on, and quality of, internet safety training within schools varies widely, with many young people continuing to engage in risky online behaviours (Livingstone et al., 2011). Given the importance of gaining a better insight into online risk-taking as discussed earlier, this study drew on Fuzzy Trace Theory (FTT) to investigate young people's risky online tendencies. Creating a novel method of assessing the role of gist and verbatim reasoning in online decision making, the study in this chapter focussed on framing effects.

While FTT was described in some detail in Chapter 2, here I briefly recap some of the main principles. At the heart of FTT lies the idea that people use two forms of mental representation when making risky decisions. Verbatim representations are based on specific details of events or judgements using exact quantitative information. Gist representations, on the other hand, come from the meaning associated with events that create intuitive, qualitative representations influenced by an individual's culture, emotional state, experience, and knowledge (Reyna & Farley, 2006). Adults prefer to draw on the simplest level of representation (i.e., gist representations) by default, starting by considering risk categorically

(some risk vs. no risk) when making risky decisions. If catastrophic risks (e.g., loss of life) are non-negligible, then typically the action is avoided (Reyna, Wilhelms, McCormick, & Weldon, 2015): possibility, rather than degrees of probability, governs action. The ability to extract simple gist representations, and use these representations as default strategies, develops between adolescence and adulthood. Therefore, combined with increased sensation seeking or sensitivity to rewards compared to adults, adolescents tend to weigh up the pros and cons of an action (i.e., verbatim representations) rather than relying on gist to simply avoid risks (Reyna et al., 2015). As I have already demonstrated in Chapter 2, adolescents' stronger reliance on verbatim over gist representations can lead to them taking greater risks compared to adults, particularly when the potential benefits of the activity are weighed against objectively low potential risk (Reyna, Estrada, DeMarinis, Myers, Stanisz & Mills, 2011).

Research on FTT has used the classic framing task (Tversky & Kahneman, 1981) to capture the role of gist and verbatim representations in risky decision making. Participants are presented with several scenarios—framed as either a loss or a gain of human life—where an outbreak of a deadly disease is expected to kill 600 people. Participants are able to choose between options that could limit the number of casualties. In the gain frame, if they choose option A, 400 lives will be saved (the sure option) and 200 will die. If they choose option B, however, (the risky choice), there is a 1/3 probability that 600 lives will be saved, and a 2/3 probability that no lives will be saved. In the loss frame, participants are informed that if they choose option C, 400 people will die (the sure option). In contrast, if they pick option D (the risky choice), there is a 1/3 probability that no one will die, and a 2/3 probability that 600 people will die.

Rationally speaking, participants who choose option A in the gain frame (the sure option) should also choose option C in the loss frame (sure option) sustaining a risk averse

attitude. Likewise, participants choosing option B in the gain frame (the risky or gamble option) should also choose option D in the loss frame (gamble option), sustaining a risk-seeking attitude, since these options share equal expected value in terms of lives saved or lost. However, studies have repeatedly shown that people prefer option A over B in the gain frame and option D over C in the loss frame, displaying risk aversion for gains and risk seeking for losses (Kühberger, 1998; Reyna & Brainerd, 1991; Tversky & Kahneman, 1986).

FTT proposes that the framing effect is based on simple gist representations of options and simple principles (e.g., saving lives is good) applied to those representations. In the gain frame, saving some lives for sure is better than potentially saving no lives, and in the loss frame potentially nobody dying is better than some people dying for sure (Rivers, Reyna, & Mills, 2008). Because people rely on the gist of the options, and they intuitively seek to save lives (gist), they chose the option of saving lives (rather than the possibility of saving none in the gamble) even if they fully consider the quantitative (verbatim) information that would lead to an elimination of the framing effect (Broniatowski & Reyna, 2015; Reyna et al., 2011). Indeed, studies using adaptations of the Asian disease problem, replacing numerical information with the statements 'some' and 'none' (Kühberger & Tanner, 2010; Reyna & Brainerd, 1991), have consistently shown framing effects. When participants are asked to focus specifically on the numerical information (Reyna, 2012), think for a prolonged period of time about their choice (Takemura, 1994), or provide a justification for their decisions (Fagley & Miller, 1987), the framing effect disappears altogether.

Reyna et al. (2011) adapted the Asian disease problem to explore developmental differences in the framing task. For adolescents (14-17 years) and young adults (18-22 years) risk taking decreased as the levels of risk increased, and both age groups were also sensitive to the levels of reward choosing to gamble less as the potential stakes (rewards or 'losses') in the gamble option increased. However, age differences emerged with regard to the framing

effect. When small and medium levels of rewards ($5 and $20) were at stake, both adolescents and young adults displayed risk aversion tendencies in the gain frame but increased risk seeking in the loss frame. However, when the reward was highest ($150) the young adult group displayed a reduction in framing effects while the adolescent group displayed an extreme version of this reduction in framing effects, termed reverse-framing, and chose to gamble more often in the gain frame. This developmental increase in cognitive bias is predicted by FTT (Broniatowski & Reyna, 2015; Reyna, et al., 2015). Although both gist and verbatim representations of risk are encoded, adults relied more heavily on gist-influenced reasoning drawing upon the some-none (categorical) gist to avoid sure losses for the possibility of no losses, or choosing to gain something to avoid the possibility of gaining nothing. Adolescents' still-developing gist reasoning strategies, however, resulted in them using both intuitive and analytic forms of reasoning, while also showing higher sensitivity to rewards (Reyna et al., 2011). This was particularly evident as the quantitative difference between the sure and gamble outcomes increased (differences of $5 at the lowest level compared to differences of $75 at the highest level). A stronger reliance on verbatim compared to gist representations therefore resulted in a decrease in, and eventual reversal of, the framing effect in adolescents. While sensation seeking was significantly correlated with gambling in the framing task, Reyna et al. (2011) found that sensation seeking was independent of the framing effect; that is, young adults displayed increased framing bias because of an increase in gist reasoning and not because of a decrease in sensation seeking.

The present study investigated (1) if the framing effect could be observed in scenarios reflecting risky online gambling situations, and (2) if developmental differences existed in adolescents' and young adults' framing and reliance on gist and verbatim representations. Adolescents and young adults were presented with framing tasks similar in structure and design to those developed by Reyna et al. (2011) but in the context of risky online behaviour.

Reyna et al. (2011) highlighted how gambling behaviour in the framing task was related to real-life risk taking behaviour. Therefore, individual's gambling behaviour in the present study could be indicative of increased risk of online victimisation linked to risky behaviours such as online personal information disclosure (Ybarra, Mitchell, Finklehor, & Wolak, 2007) as outlined in Chapter 2.

A number of specific predictions were made. First, young adults should display the typical framing effect showing risk aversion in gain frames and risk seeking in loss frames. This pattern of behaviour would reveal young adults' preference for gist reasoning about online risk. It was also predicted that the framing effect would be significantly diminished in adolescents, suggesting their greater reliance on verbatim compared to gist reasoning about risk. Additionally, as the stakes (the potential rewards or losses) and the level of risk increased it was expected the rate of gambling behaviour to decrease, reflected by a smaller framing effect for both age groups. While sensation seeking might be related to overall risk taking/gambling, the framing bias should be unaffected by sensation seeking, differentiating between risk-taking tendencies and developmental differences in mental representations of risk.

3.3. Pilot Study

To assess whether a scenario reflecting online risk taking could be used in a study of framing effects a pilot study was carried out to compare a new online risk taking measure to the Asian Disease Problem scenarios and the gambling scenarios used by Reyna et al. (2011).

3.3.1. Pilot Study Method

3.3.1.1. Participants

The same sample of adults used in the pilot study outlined in Chapter 2 also engaged in pilot testing for this framing study. Forty-one adult participants (28 female; $M_{Age} = 36.44$ years; $SD = 13.11$) were recruited online via a link posted on Facebook and the website Psychological Research on the Net. Participants were offered no compensation for their involvement and participation was entirely voluntary. Aside from age and sex, no other demographic information was collected.

3.3.1.2. Materials

Framing task. Participants were presented with three variations of the framing task (the Asian Disease Problem, a Gambling Task, and an Online Risk Taking Task) containing 38 scenarios in total.

The Asian Disease problem. Designed to symbolise individuals' departure from rationality when making decisions about risk (Tversky & Kahneman, 1986), the Asian Disease problem presents participants with two scenarios which relate to potential solutions to an outbreak of disease which is expected to kill 600 people. Both scenarios offer participants equivalent outcome alternatives, however the framing of the scenario, in terms of gains or losses, compels people to respond in different ways. The wording in the gain frame focusses on saving lives, a sure option of saving 400 lives or a risky option of one-third chance of saving 600 lives compared to a two-thirds chance of saving none. Wording in the loss frame focusses on the loss of life, a sure option of 400 deaths, or a risky option of one-third chance of no deaths compared to a two-thirds chance of all 600 people dying.

Gambling task. The second variation of the framing task utilised the measures devised by Reyna et al. (2011; see also Reyna & Ellis, 1994) containing 18 scenarios describing a

gambling problem (see Table 8). Half of the scenarios were presented in terms of potential

gains, whereby participants won a hypothetical value of money and could choose to take the

sure option and keep that value of money (option A), or take the gamble option (option B)

and spin a spinner. The result of the spin could double the participant's winnings or result in

them winning nothing (see Table 8 for scenario examples). The other nine scenarios were

presented in terms of potential losses. In these cases, participants were given a hypothetical

monetary endowment from which value could be lost. Choosing the sure option (option A)

would result in the participant losing half of their winnings. Choosing the gamble option

(option B) would again involve a spinner, the outcome of which could result in the

participant retaining the full value of their winnings, or losing it all (see Table 8). In both gain

and loss framed scenarios the net value that could be won or lost was the same.

The risks of winning nothing in the gain frame, or losing everything in the loss frame,

were one-half, two-thirds, or three-quarters. To display this visually each scenario was

accompanied by a picture of a spinner with an arrow at its centre, and red and blue sections

representing the relevant risk levels (see Figure 3). In both gain and loss frames potential

rewards could be small (£5), medium (£20), or large (£150). The combination of type of

frame (2: gain, loss), level of risk (3: one-half, two-thirds, three-quarters), and level of reward

(3: small, medium, large) resulted in 18 different scenarios.

Table 8. *Gambling Scenarios Used in the Gain and Loss Frames of the Framing Task for the Spinner and Online Conditions.*

	Spinner Scenario	Online Scenario
Gain Frame	Imagine you are in a gambling situation and you have a choice. If you chose option A you will win £5 for sure. If you chose option B you will have a chance to spin this spinner (visual of spinner). If the spinner lands on red you win £10, if the spinner lands on blue you win nothing.	Imagine you take an online music quiz one day and get all the answers correct. A pop-up informs you that you have won a £5 online music voucher. However, if you fill out a form with your full name, address, email, date of birth, and mobile phone number you will be entered into a draw to win a £10 music voucher. You now have a choice. If you chose option A you will win £5 for sure. If you chose option B you have a ½ chance of winning a £10 voucher but a ½ chance of winning nothing.
Loss Frame	Imagine you are in a gambling situation where you start with £10. You now have a choice. If you take option A you will lose £5 for sure. If you chose option B you will have the chance to spin this spinner (visual of spinner). If the spinner lands on blue you lose £10. If the spinner lands on red you lose nothing.	Imagine you take an online music quiz one day and get all the answers correct. At the end of the quiz you have £10 worth of 'virtual' winnings, half of which can be exchanged for real cash. However, if you fill out a form with your full name, address, date of birth, email, and mobile phone number you will be entered into a draw to win a bigger prize. You now have a choice. If you chose option A you will lose £5 of virtual money for sure. If you chose option B you have a ½ chance of losing all £10 but a ½ chance of losing nothing.

One-half Risk   Two-thirds Risk   Three-quarters Risk
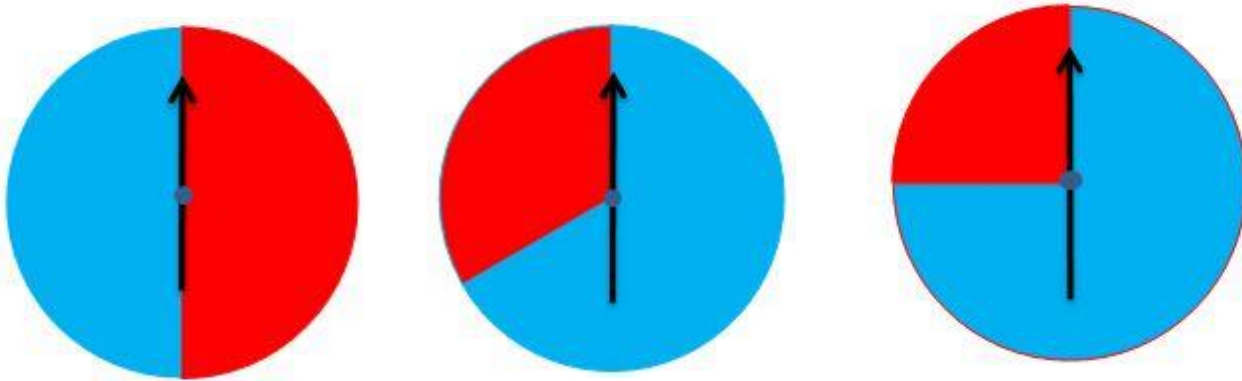
Figure 3. *Spinner images used in the Gambling Scenarios to pictorially depict one-half, two-thirds, and three-quarters risk in the framing scenarios*

Online risk taking. Eighteen newly created scenarios (see Appendix 3) were adapted from those used by Reyna et al. (2011) in order to assess online risk taking, portraying a situation where potential financial gains and losses could be encountered on the internet. This took the form of an online music quiz where a music voucher could be won for sure or a gamble taken by providing some brief personal information in order to be entered into a draw (see Table 8 for scenario examples). While the context of the scenarios differed, the model was the same as the gambling scenarios. Half of the scenarios were presented as gains and half as losses; risk levels were one-half, two-thirds, and three-quarters; and potential rewards were £5, £20, and £150. Once again these values were hypothetical and participants did not actually win any vouchers.

3.3.1.3. Procedure

A link to the survey was posted on Facebook and on the website Psychological Research on the Net (http://www.psych.hanover.edu). Invited respondents participated in the research study by following a web link. After providing consent, participants were shown the Asian Disease problem, all of the spinner scenarios, and all of the online gambling scenarios in random order and asked to either choose option A or option B in each scenario. A full debrief was given following completion.

3.3.2. Pilot Study Results

For each task the number of gambles made were summed in the loss frame and the gain frame. A framing score was calculated by subtracting the number of gambles in the gain frame from the number of gambles in the loss frame to create a score ranging from +9 to -9. A negative score indicated reverse framing and a positive score indicated standard framing The results suggested that the framing bias manifested itself differently depending on the type of gambling scenario. By observing the frequency of scores it was clear most participants in the Spinner gambling task displayed standard framing, with 62% of participants scoring between 1-9. In the Spinner scenarios only 19% of the sample scored 0 indicating that they selected option A in both the gain and loss frames. In contrast over half (57%) of the participants scored 0 in the Online gambling scenarios and only 33% scored between 1 and 9 (19% of participants scored 1). Additionally, only three participants displayed standard framing in answer to the Asian disease problem, all other participants answered option A for the gain and loss frames.

Framing Effects in the Spinner Scenarios. In this scenario participants mean scores for gambles in the gain frame were 2.30 ($SD = 2.47$) and in the loss frame were 3.81 ($SD = 3.12$). The mean framing score was 1.51 ($SD = 2.59$). A distribution of framing scores can be seen in figure 4. A repeated measures ANOVA using the factors of frame (gain, loss), risk (low, medium, high) and reward (small, mid, large), and the dependent variable of total gambles, revealed results consistent with those of previous studies (Reyna et al., 2011). There was a significant main effect of frame, $F(1,40) = 13.98$, $p = .001$; risk, $F(2,80) = 16.85$, $p < .001$; and reward, $F(2,80) = 13.89$, $p < .001$. Participants gambled more often the loss frame and were also more likely to gamble when the risks were low, and when the reward was small. A two-way interaction between risk and reward revealed that participants were more likely to gamble when low risks were combined with small rewards, $F(4,160) = 4.16$, $p = .003$. A significant three-way interaction between frame, risk and reward showed this tendency to gamble when stakes and rewards were low was further enhanced in the loss frame, $F(4,160) = 7.21$, $p < .001$.
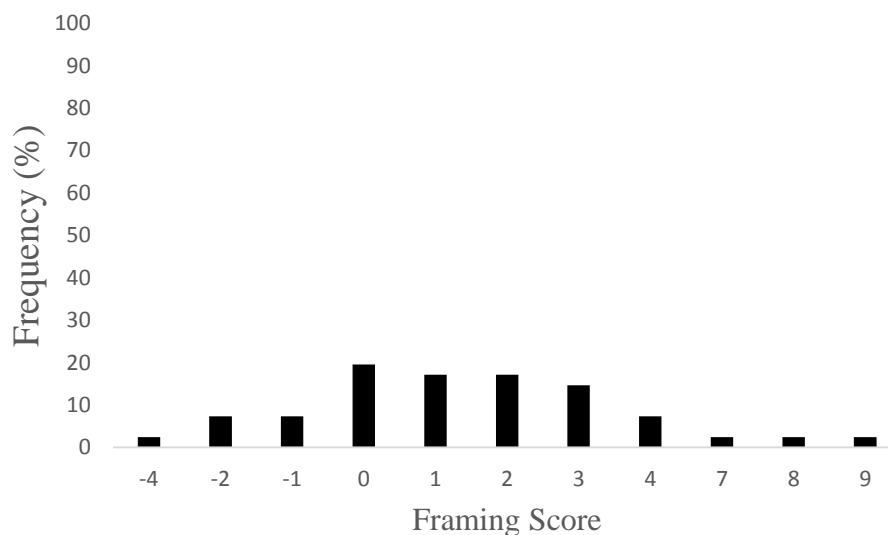
Figure 4. *Histogram representing the frequency of scores (%) in the Framing Task using the Spinner gambling scenarios*

Framing Effects in the Online scenarios. The mean number of gambles in the gain frame was 0.98 (SD = 1.71) and in the loss frame was 1.68 (SD = 2.81). The mean framing score was 0.71 (SD = 2.02). A distribution of the framing scores in this scenario can be seen in figure 5. A repeated measures ANOVA using the factors of frame (gain, loss), risk (low, medium, high) and reward (small, mid, large), and the dependent measure of Total Gambles revealed predominantly non-significant results. However, there was a main effect of frame, $F(1,40)$ = 5.05, p = .03, with participants choosing to gamble more often in the loss frame. There was also a main effect of reward (adjusted for violations of sphericity), $F(1.6,62.3)$ = 3.90, p = .035, where participants preferred gambles when only small rewards were present. Higher expected values, or potential losses, resulted in more risk aversion.
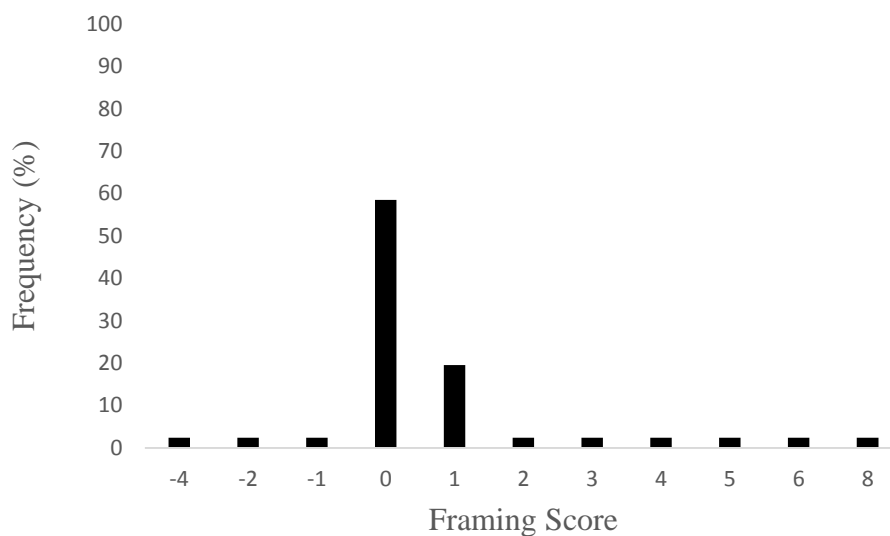
Figure 5. *Histogram representing the frequency of scores (%) in the Framing Task using the Online gambling scenarios*

Relationships between the Spinner and Online scenarios. Pearson's Product Moment Correlations revealed a number of significant relationships between scores on the

spinner and online scenarios. This was evident for the total number of gambles in the loss frames, $r(41) = .57$, $p < .01$; total gambles overall, $r(41) = .36$, $p = .02$; and framing score, $r(41) = .50$, $p = .001$. However, repeated measures t-tests revealed there was a significant difference between the mean number of gambles taken in the spinner and online scenarios. This was evident for the gain frames, $t(40) = 2.82$, $p = .008$, the loss frames, $t(40) = 4.91$, $p < .001$, the overall framing score, $t(40) = 2.20$, $p = .034$, and the total number of gambles taken, $t(40) = 4.18$, $p < .001$. In each instance participants were significantly more risk averse in the online scenarios.

3.4. Main Study

3.4.1. Method

3.4.1.1. Participants

Participants from one secondary school ($N = 89$; 62 females; $M_{age} = 14.52$ years; $SD = 1.4$; age range 13 to 18 years), one further education (FE) college ($N = 52$; 34 females; $M_{age} = 17.02$ years, $SD = 1.09$; age range 16 to19 years), and one university ($N = 155$; 129 females; $M_{age} = 19.23$ years; $SD = 1.10$; age range 18 to 24 years) in England took part in the study. The secondary school and college students received no incentives or compensation for their involvement. Undergraduate students participated for course credit. For age group comparisons, participants were designated as either adolescents (13 to 17 years) or young adults (18 to 24 years). Aside from age and sex, no other demographic information was collected.

3.4.1.2. Materials

In order to limit the number of tasks for these young participants to adhere to time limits applied by the school, the two-thirds risk level used in the pilot study was omitted. This resulted in 12 scenarios describing an online gambling problem in the form of an online music quiz, as tested in the pilot study (see Appendix 3). Six of the scenarios were presented in terms of potential gains and the other six scenarios were presented in terms of potential losses. In both gain- and loss-framed scenarios the net value to be won or lost was the same.

For option B, the risk of winning nothing in the gain frame or losing everything in the loss frame was one-half or three-quarters. In both gain and loss frames potential rewards could be small (£5), medium (£20), or large (£150). The combination of type of frame (2: gain, loss), level of risk (2: one-half, three-quarters), and level of reward (3: small, medium, large) resulted in 12 different scenarios. The potential gains (and losses) were hypothetical. Participants scored 0 for choosing the sure option and 1 for choosing the gamble option. Following Reyna, Chick, Corbin, and Hsia (2014), the overall framing bias score was calculated by subtracting the proportion of risky choices in the gain frame from the proportion of risky choices in the loss frame. Scores could range from -1.0 (all risky choices in the gain frame, none in the loss frame) to 1.0 (all risky choices in the loss frame, none in the gain frame). A positive score indicated standard framing whereas a negative score indicated reverse framing.

Participants also completed theBrief Sensation Seeking Scale for adolescents (BSSS-8; Hoyle, Stephenson, Palmgreen, Lorch & Donohue, 2002) using a 5-point Likert scale scored from 1 (*strongly disagree*) to 5 (*strongly agree*) to indicate their agreement with eight statements such as "I would like to try bungee-jumping" and "I get restless when I spend too much time at home" (see Appendix 4). Scores were averaged (α = .78).

3.4.1.3. Design

A mixed design was used. Total number of gambles and framing score were the dependent variables. Age (adolescent; young adult) was the between-subjects factor, level of risk (high; low) and level of reward (small; medium; large) were the within-subjects factors. The measure of sensation-seeking was used as a covariate.

3.4.1.4. Procedure

The study received ethical clearance from the university's ethics committee. Parental consent was obtained from the parents of all students under 18 years old. Those with parental consent and those over 18 years old were then invited to participate.

Students from the secondary school and the FE college completed paper copies of the questionnaire in their tutor groups during morning registration periods lasting 20 minutes. An information sheet was provided to each student after which students personally gave consent to participate. Afterward participants were debriefed verbally and in written form. All students in Years 9 and 11 at the secondary school, and all students at the FE college were invited to participate. Data collection ceased when all volunteers had been included in the study. For the undergraduate students, the questionnaire was converted into a web-based survey. Respondents were invited to participate in the research study and provided consent by ticking a check box. Once again, data collection continued until data from all volunteers had been collected. Data from the paper questionnaire responses were manually entered into an excel spreadsheet and combined with the electronically collated data from the undergraduate sample. All data were then analysed using IBM SPSS statistical analysis package.

3.4.2. Results

Table 9 displays the mean number of gamble choices made (option B in the gain frame and the loss frame) and mean sensation seeking by age (raw frequency scores can be obtained from Appendix 5 for supplemental information. This appendix also includes the probability scores for gambling in the gain and loss frames, the indifference points, and the frame size, for each age group, calculated in logarithmic units). Adolescents gambled more than the young adults overall but there was only a statistically significant difference in the gain frame, $t(294) = 2.65$, $p = .008$, $d = 0.30$. Mean sensation seeking scores did not differ by age, $t(294) = .69$, $p = .49$. An Analysis of Covariance (ANCOVA) with age (adolescent; young adults) as between-subjects factor, mean sensation seeking score as the covariate, and mean number of gambles as the dependent variable found a significant effect of sensation seeking, $F(1, 295) = 5.88$, $p = .016$, $\eta_p^2 = .02$. Participants higher in sensation seeking gambled more. No significant effect of age was found.

The mean framing score was positive and significantly different from 0 in both age groups [adolescents: $M = .11$, $SD = .28$, $t(123) = 4.36$, $p < .001$, $d = 0.39$; young adults: $M = .20$, $SD = .29$, $t(171) = 9.06$, $p < .001$, $d = 69$]. An ANCOVA with age (adolescent; young adult) as the between-subjects factor, risk (low; high), reward (small; medium; large) as within-subject factors, and sensation seeking as covariate revealed significant main effects of reward, $F(1, 277) = 6.97$, $p = .001$, $\eta_p^2 = .03$, age, $F(1, 277) = 6.16$, $p = .014$, $\eta_p^2 = .02$, and a marginally significant interaction of risk X age, $F(1, 277) = 3.43$, $p = .06$, $\eta_p^2 = .01$. Sensation seeking and risk were not significant.

Table 9. *Mean Number of Gamble Choices Made in the Gain Frame, in the Loss Frame, and in Total, and Mean Framing Scores (Standard Deviation in Parenthesis) for the Adolescent and Young Adult Age Groups*

Measure	Adolescents	Young adults
Gain frame gambles	1.11 (1.64)	0.69 (1.07)
Loss frame gambles	1.78 (1.84)	1.90 (1.82)
Mean gambles	2.89 (3.03)	2.59 (2.41)
Framing score	0.11 (.28)	.20 (0.29)
Mean BSSS	3.56 (0.74)	3.51 (0.71)

Adolescents' framing score was significantly lower than that of adults. Post-hoc Bonferroni analyses revealed that the main effect of reward was only statistically different between the small and large levels ($p = .001$). The effect of level of risk on framing was investigated with a paired-samples t-test comparing framing score in the low-risk and high-risk scenarios for each age group. Young adults' framing score was significantly higher in the low-risk scenarios compared to the high-risk scenarios, $t(172) = 2.92$, $p = .004$, but no differences were found for the adolescent group (see Figure 4).
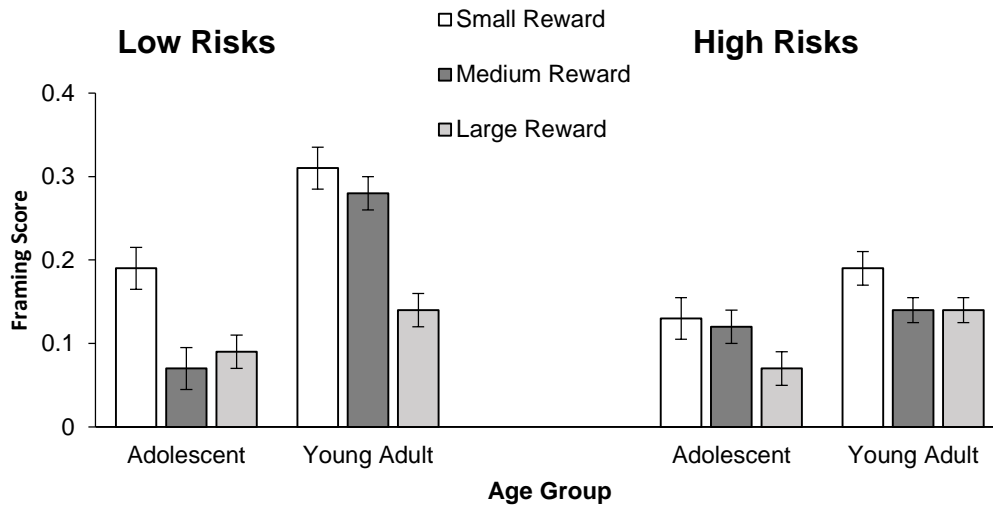
Figure 6. *Framing score of adolescents and young adults for low and high risks and for small, medium, and large rewards (error bars show standard errors).*

3.5. Discussion

Despite huge investment to enhance online safety awareness for children and families (European Commission, 2016), young people continue to take risks online (Livingstone et al., 2011; Liau et al., 2005; Madden et al., 2013). Indeed, the young people in these studies were often willing to give up extensive personal information. For educational programmes to work effectively it is vital to understand not only the psychological processes that contribute to online risk taking, but also how best to communicate online safety messages to individuals of different ages to ensure maximum impact and success.

This study investigated the psychological mechanisms underlying young people's risky online behaviour by drawing on FTT. FTT suggests that individuals increasingly employ gist-based intuition as they age and gain experience, preferring to rely on categorical (gist) representations of risky choices than to rely on close analysis of the probabilities of

potential risks and rewards (i.e., verbatim representations; Reyna et al., 2011). By tailoring the Asian disease problem to fit an online risk-taking dilemma, this novel study assessed if age differences exist in the preference for gist and verbatim representations when facing online risk scenarios.

Previous FTT research utilising the framing task found that adults predominantly relied on gist representations when making risky choices and showed standard framing effects, that is, displayed risk-averse behaviour for gains and risk-seeking behaviour for losses. However, adolescents, who rely on both gist and verbatim representations when making risky choices, showed a reduced or no framing effect (Reyna et al., 2011). In the current study both adolescents and young adults preferred to choose the sure option in the gain frame but the gamble option in the loss frame, displaying the standard framing effect. However, this framing effect was significantly reduced in adolescents, in line with FTT's and this study's predictions. Thus, young adults showed an increased reliance on the gist of risk-taking in online environments, drawing on intuition and experience to avoid risk. Reductions in the framing effect have been observed when participants are instructed to analyse the Asian disease scenario quantitatively (e.g., Fagley & Miller, 1987; Reyna & Brainerd, 1991; Takemura, 1994). The results of the present study suggest that the reduced framing effect for adolescents was due to their lower cognitive ability to gistify, resulting in increased reliance on verbatim reasoning, which led to more analytical consideration of the risky online choice scenarios. It was also found that this effect was independent of sensation seeking. Specifically, these findings highlight that while higher rates of gambling are linked to higher sensation seeking, regardless of age, the increased framing effect in young adults is driven by a developmental change in mental representations about risk.

Although statistically significant, the framing effect in both age groups was small. These results, however, mirror previous research where adaptations of the Asian disease

problem used money or property as opposed to human lives (Kühberger, 1998; Ronnlund, Karlsson, Laggnas, Larsson, & Lindstrom, 2005; Wang, 1996). Wang (1996) attributes this increasing likelihood to gamble in risky choices concerning human lives to individuals' higher aspirations for lives than for money or property. Another explanation for the reduction in framing bias can be attributed to the within-subjects design which has been found to produce smaller effects (Broniatowski & Reyna, 2015) potentially linked to the individual's attentiveness to the quality and consistency of their responses, or need for cognition (NFC: Broniatowski & Reyna, 2015; Corbin, Reyna, Weldon, & Brainerd, 2015). Individuals with higher NFC are able to monitor the consistency of their responses to the gain and loss scenarios in within-subjects designs, producing a smaller framing effect.

Adolescents chose to gamble more often than young adults overall (and significantly more often in the gain frame). This increase in gambling behaviour was linked to increased sensation seeking, however it was not evident that adolescents scored higher on sensation seeking compared to young adults. In line with previous work (Reyna et al., 2011) gambling behaviour decreased as the potential gains/losses and the magnitude of risk increased. However, adolescent's gambling tendencies were less influenced by the level of risk or the size of the potential reward. It seems adolescents were more objective in their assessment of the magnitude of risk and potential reward using verbatim reasoning and chose to gamble or not according to this assessment. Although frames shared equal expected value, adolescent's judgements were less influenced by the framing of the scenario compared to young adults'. Therefore, adolescents' gambling decisions were fairly consistent across frames, risk levels, and rewards. In contrast, not only was the behaviour of young adults more influenced by the frame, but they also gambled significantly less as the risks and the stakes (either potential losses or gains) increased.

Overall, the rate of gambling in these online scenarios was rather low, revealing findings more akin to an extreme bias in risk preferences (i.e., always choosing the risky option or always choosing the safe option) regardless of the frame, known as bidirectional framing (Wang, 1996). The participants did appear particularly risk averse and showed a higher reluctance to choose the gamble option. Crucially, the gamble option in the risky choice scenario also required individuals to provide personal details to be entered into the "prize draw". This outcome could also be an explanation for the differences in gambling behaviour and risk aversion evident in the pilot study, where gambling rates were lower in this online scenario using a music voucher compared to the method used by Reyna et al. (2011) which incorporated monetary gains/losses. Whether the high rate of sure option choices was a result of general risk aversion (i.e., unwillingness to gamble regardless of the stakes/potential rewards) based on the components of the situation that were at stake (i.e. money, music vouchers, or lives), or due to the requirement to disclose personal information as part of the gamble cannot be disentangled in this study and certainly requires further investigation.

This relatively low rate of risk-taking may also be the result of using a scenario that is more reflective of real-life decision making. As opposed to making life-saving decisions, deciding whether to disclose personal information online—in order to gamble, communicate with another person, or purchase goods or services—is a rather daily occurrence that should be familiar to individuals of most age groups. Future research should take individuals' online experiences of victimisation into account as those who have experienced victimisation online may display more risk averse online behaviour as a result (e.g., Levin, Bossard, Gaeth, & Yan, 2014).

Overall, this study provides an important contribution to the corpus of research that investigates young people's online behaviour. Taken together, the results from this study, and

the previous study in Chapter 2, demonstrated that young people are often willing to divulge a range of private, personal information online to unknown entities, which could potentially result in online privacy risks of various kinds. The results also showed developmental differences in online risk representation with young adults preferring to rely on gist representations and adolescents relying both on gist and verbatim representations. Contrary to theories outlined in Chapter 1 (e.g., Rational Choice Theory) which posit that 'good' decision making is a product of enhanced analytical consideration of choices and outcomes, these two studies of FTT support that intuitive (gist) reasoning of risk results in less risky behaviour, whereas analytical reasoning (verbatim) can increase risk-taking. This finding was demonstrated using both a classic laboratory task (framing) as well as behavioural measures to assess the influences of gist and verbatim representations. This has clear implications for improving the effectiveness of online safety training programmes for young people. Therefore, similar interventions to those developed by Reyna and Mills (2014) could prove useful in targeting and modifying young people's online risk-taking behaviours, to ensure that young people reap the full benefits of all the Internet has to offer without the potential negative consequences.

Yet, as already described in Chapter 1, there are a growing number of adults utilising social media and rates of adult online victimisation continue to rise (Cifas, 2017). Could FTT also offer an explanation for adult online risk-taking behaviour potentially informing online safety education incorporating FTT that could be valuable across the lifespan? I address this question in the following chapter, applying the gist and verbatim measures used in Chapter 2 to a large sample of adult internet users.

Chapter 4

Internet Safety and the Silver Surfer: The Relationship Between Gist Reasoning and Adults' Risky Online Behaviour

This chapter is strongly based on a published paper (White, Gummerum, Wood, & Hanoch, 2017)

4.1. Abstract

Currently, fewer older adults are online compared to younger generations. However, with many new initiatives aiming to significantly increase the number of older internet users, they will increasingly be exposed to potential victimisation from internet fraud, a fundamental issue affecting all adult internet users. Despite this, little research has examined online risk-taking across the adult lifespan or adults' reasoning about risky online behaviours. Using fuzzy trace theory (FTT), this study investigated adults' online risk-taking behaviour and intentions, and whether these behaviours were related to different ways of reasoning about risk, namely, gist reasoning (using qualitative, intuitive knowledge) and verbatim reasoning (using quantitative, specific knowledge). Participants (326 adults, 18–79 years old, $M_{age} = 49.54$ years) reported their past risk-taking behaviour, future online risk intentions, gist and verbatim reasoning about online risk, sensation seeking, and time spent online. Age was negatively correlated with past risk-taking, time online, future risk intentions, and sensation seeking. However, time spent online was positively related to future risk intentions, suggesting that spending more time using the internet could lead individuals to take more

risks. Increased verbatim reasoning predicted increased intentions to take online risks, while gist reasoning predicted reduced intentions to take risks online. These findings extend online risk research applying FTT to adolescents and young adults and suggests that online safety training incorporating gist-based reasoning strategies could benefit all adults and, in particular, older generations.

4.2. Introduction

As already described in Chapters 2 and 3, young people engage in behaviour online that has been identified as risky. Not only have these behaviours been defined in prior research in the U.S. (e.g., Ybarra, Mitchell, Wolak, & Finkelhor, 2007), the aforementioned empirical work described in this thesis supports that these behaviours are often carried out by young people in the U.K. However, it is not only children, adolescents and young adults who can become victimised online. As widely reported (e.g., Federal Bureau of Investigation [FBI], 2015; Home Instead, 2013) adults of all ages can also fall victim to online criminals. Currently, though, little is known about how and why adults may find themselves in harm's way, especially considering the stereotypical belief that adults are less risk-taking than younger generations.

Older adults use the Internet substantially less than younger adults. Throughout Europe, 90% of 16– to 24-year-olds go online at least weekly compared to 37% of those over 55 (Eurostat, 2012). The majority (69%) of older adults, furthermore, lack basic digital skills (Age U.K., 2015). The U.K. government's Digital Inclusion Strategy aims to have more than 90% of the U.K. adult population online by 2020 (Cabinet Office, 2014) driven, to some degree, by the beneficial role the Internet plays in the lives of older adults (Coyle & Duggan, 2012; Steptoe, Shankar, Demakaos, & Wardle, 2013; York Cornwell & Waite, 2009). For example, older adults can keep in touch with family and friends, and find information about

health, finances, and leisure activities (Milligan & Passey, 2011) potentially reducing social isolation and loneliness (Blaschke, Freddolino, & Mullen, 2009; Cotten, Ford, Ford, & Hale, 2014). However, according to some estimates, online fraud costs the global economy more than $100 billion (McDonald, 2013) with many older adults victimised both in the U.K. (Home Instead, 2013) and the U.S. (FBI, 2015).

Whether older adults are at heightened risk of consumer fraud victimisation is highly debated. On the one hand, there is research indicating that older adults are more likely to fall victim to telemarketing scams, possibly linked to their state of loneliness (Alves & Wilson, 2008; Langenderfer & Shrimp, 2001), and more likely to experience financial exploitation in general because of cognitive impairment, bereavement, financial pressures (Age U.K., 2015), and low numeracy skills (Wood, Liu, Hanoch, & Estevez-Cores 2015). On the other hand is the argument that ignorance and stereotyping of older adults is responsible for the popular notion that this age group are more commonly targeted and victimised than younger age groups, despite statistics failing to support these beliefs (Ross, Grossman, & Schryer, 2014). The National Institute of Aging (2014) has called for a focus on research that can enhance our understanding of older adults' cognitive strengths in order to promote effective decision making and reduce financial exploitation. Yet, to date, studies have mainly focussed on fraud associated with telemarketing and mail scams with very little empirical data on older adults' online behaviour and risk-taking tendencies, resulting in little knowledge about this age group's possible vulnerabilities in online environments.

Simply having an online presence can itself be a risk factor, with mere exposure to online fraudsters sufficient to increases a person's vulnerability (Holt & Bossler, 2008; Newman & Clarke, 2003; Pratt, Holtfreter, & Reisig, 2010; van Wilsem, 2011). Offenders require ways to identify potential victims online (Pratt et al., 2010) often gathering information in chat rooms, or using dating or social networking websites, for example.

Lifestyle-routine activities theory highlights that cybercrime is most likely to occur "when individuals are in high risk situations, are in close proximity to motivated offenders, appear attractive targets for criminals, and lack capable guardians" (Holt & Bossler, 2008, p. 3). As such, research has unveiled that time spent online is a significant predictor of victimisation likelihood (Holt & Bossler, 2008; van Wilsem, 2011). Consequently, one of the fears is that the increased use of the Internet by older adults will allow fraudsters to target a larger pool of individuals with greater ease.

Adults' perceptions regarding the risks associated with online behaviour have previously been found to act as protective factors against risk-taking, resulting in them implementing stricter Facebook privacy controls (Christofides, Muise, & DeMernis, 2010) and reducing online credit card use (Reisig, Pratt, & Holtfreter, 2009). However, the online risk perceptions of older adults appear mixed. Some reports suggest that older adults are fearful of technology and the negative consequences that stem from its use (Kurniawana, 2008) while others indicate they may be more trusting of information they find on the Internet compared to younger individuals (Grimes, Hough, Mazur, & Signorella, 2010).

Online fraud is often successful because of the visceral cues that scammers incorporate into their communications, for example prizes, sex, love, and fame. Individuals focus on fulfilling their visceral desires (Wang, Herath, Chen, Vishwanath, & Rao, 2012) and "tend to produce decisions that are nearly devoid of cognitive deliberations.... Instead action is driven by instinct and gut feelings, and careful analysis is abandoned" (Langenderfer & Shimp, 2001, p. 769). However, Wang et al. (2012) argued that heuristic decision making can lead to a decrease in online risk-taking and susceptibility to victimisation. For example, individuals with knowledge of fraud perpetrated via phishing emails are more likely to intuitively pick up on deception indicators and are less likely to respond (Wang et al., 2012).

The idea that intuitive or heuristic processes do not necessarily have to lead to increased risk-taking has also been proposed by Fuzzy Trace Theory (FTT; Reyna & Brainerd, 1995). Most research applying FTT to (offline) risk taking has concentrated on adolescents and young adults, revealing that adolescents' preference for verbatim over gist reasoning can compel them to take more risks (Mills, Reyna, & Estrada, 2008; Reyna, Estrada, DeMarinis, Myers, Stanisz, & Mills, 2011). The ability to utilise gist reasoning strategies improves with age, so young adults begin to reason about risk in a more simplistic and heuristic (gist) fashion (Reyna & Farley, 2006). Since no (or fewer) risks are preferred, risk-taking is more often avoided in adulthood (Reyna, Wilhelms, McCormick, & Weldon, 2015).

As shown in Chapters 2 and 3, (see also White, Gummerum, & Hanoch, 2015, 2016) FTT is able to explain differences in adolescents' and young adults' online risk-taking behaviour, showing that gist reasoning about online risks increases between adolescence and young adulthood. Furthermore, individuals who reason about online risk-taking using gist representations are less likely to have taken risks online and are less likely to take risks online in the future. Consequently, increased gist reasoning is protective of online risk-taking behaviour whereas increased verbatim reasoning is predictive of increased online risk-taking for adolescents.

Very little research exists on whether gist and verbatim reasoning strategies affect the risk-taking of younger and older adults differently. Memory research has indicated that gist reasoning is significantly higher in older, compared to younger, adults (Koustaal, Schater, Galluccio, & Stofer, 1999), and that relationships exist between older adults' reduced memory recall accuracy and increased reliance on semantic gist (Dennis, Kim, & Cabeza, 2008). Brainerd, Reyna, and Howe's (2009) results also demonstrated that memory declines in healthily-ageing older adults were associated with diminished direct access to verbatim

memories, while gist-based familiarity for memories was unaffected by declines in age. Taken together these findings suggest that the reliance on gist reasoning might increase over the course of adulthood and might consequently lead to a decrease in risk-taking with age. This is the first study to draw upon FTT to explore the processes underlying online risk-taking across adulthood.

To explore this topic, the study focussed on the two specific online activities that were previously identified as risky in Chapter 2, which adults of all ages are likely to engage in (Age U.K., 2015); the disclosure of personal information online and befriending strangers online (Ybarra, Mitchell, Finklehor, & Wolak, 2007). Measures were applied that had previously been used to assess adolescents' and young adult's online risk-taking as described in Chapter 2 (see also White et al., 2015).

Research in the FTT framework suggests that the development and employment of gist representations improve and increase with age (e.g., Corbin, McElroy, & Black, 2010) in risky choice situations. Accordingly, I predicted that throughout adulthood, gist reasoning about online risk would increase with age and be predictive of lower online risk-taking behaviour and intentions to take risks online. I also expected that sensation seeking would play a part in risk-taking behaviour showing positive relationships to past online risk-taking and future risk-taking intentions. This study also enabled the exploration of possible relationships between exposure to risk and risk-taking behaviour, in line with lifestyle-routine activities theory (Holt & Bossler, 2008) by examining potential relationships between time spent online, past online risk-taking and future risk-taking intentions.

4.3. Method

4.3.1. Participants

Ethical approval was granted by the appropriate ethics committee prior to data collection. Participants were recruited through Amazon's Mechanical Turk website, where registered users are invited to participate in research for a token payment of 0.25 U.S. dollars (Buhrmester, Kwang, & Gosling, 2011; Mason & Suri, 2012; Paolacci, Chandler, & Ipeirotis, 2010). After non-completed questionnaires were removed, the sample consisted of 326 adults (171 female, 155 male; age range 18–79 years, M_{age} = 49.54 years, SD = 16.95). Participants were predominantly White (71.2%), followed by African American (13.8%), Latin American (4.9%), Filipino (3.1%), South Asian (1.8%), and Chinese (1.5%). The remaining adults (3.6%) were Arab, Southeast Asian, Japanese, Korean, Aboriginal, or 'Other'. Most participants indicated their highest educational attainment as 'some college' (35.9%) or higher (44.8%), 18.1% completed 'high school' and 1.2% reported less than a high school education. Most participants resided with a spouse (40.5%), with others living with family members (23.6%), roommates/friends (4.9%), or other/shared accommodation (1.5%) and the remaining (29.4%) living alone. One hundred and sixty-six (51%) participants were 60 years or older.

4.3.2. Materials

Participants completed online questionnaires which recorded their demographic information followed by nine measures containing 58 items investigating risk-taking attitudes (sensation seeking - 8 items), past and future online behaviour (hours online involved in various activities - 12 items; past risk-taking behaviour – 4 items; future online risk intentions – 4 items), and gist and verbatim reasoning (categorical gist – 9 items; gist principles – 14 items; global risk perceptions – 4 items; specific risk – 2 items; quantitative risk – 1 item).

Sensation seeking. The Brief Sensation Seeking Scale (BSSS-8; Hoyle, Stephenson, Palmgreen, Lorch, & Donohue, 2002) used a 5-point Likert scale scored from 1 (*strongly disagree*) to 5 (*strongly agree*) to assess participants' agreement with eight statements such as "I would like to explore strange places" and "I would like to try bungee jumping" (see Appendix 4). Scores were averaged ($\alpha = .83$).

Gist and verbatim reasoning. To investigate the use of gist and verbatim reasoning in this adult sample the same measures were used as those described fully in Chapter 2 (see Appendix 1).

Gist reasoning about online risk-taking. The categorical risk measure included nine questions and participants indicated their agreement on a 5-point Likert scale from 0 (*strongly disagree*) to 4 (*strongly agree*). Scores across the nine items were averaged ($\alpha = .83$). Strongly agreeing to these statements indicated participants perceived higher risk compared to those participants who strongly disagreed.

The gist principles measure contained 14 statements. Participants were asked to tick the statements they endorsed and leave blank those they did not endorse. A higher number of endorsements again reflected higher risk perceptions. Four items were reverse scored and the number of endorsements summed ($\alpha = .71$).

Global risk perception measures included two questions aimed at assessing gist-based perceptions of risks and was measured on a 4-point scale of *none* (0)*, low* (1)*, medium* (2)*,* and *high* (3). These two items were found to correlate significantly, $r(326) = .56, p < .001$, so scores were combined and averaged to create one Global Risk Perception variable.

Verbatim reasoning about online risk-taking. Specific risk involved two verbatim-focussed questions that were specifically worded to assess participants' perceptions of their own future risk from using the Internet, rated on a 5-point Likert scale scored from 0 (*very*

unlikely) to 4 (*very likely*) (α = .73). As these two measures were significantly correlated, $r(324) = .587, p < .001$, they were summed and averaged to create one Specific Risk variable. For the quantitative risk scale, participants indicated their answer on a scale ranging from 0% to 100%.

Online behaviour, past risk-taking, and future intentions. Participants were asked to describe how they spent their time online by indicating for how long each week, in hours, they were involved in these different online activities: using social networking sites (such as Facebook, Twitter, or MSN), emailing, gaming, shopping, trying to meet new people (including dating sites), doing work (in an employment capacity), visiting chatrooms, searching for information regarding health matters, searching for information regarding hobbies, reading the news, banking or completing finances, doing other things. Time spent participating in these activities was summed to create one variable: Total Time Online. For four participants, the sum of the hours spent on these activities each week exceeded the number of hours in a 7-day period. Data for these four cases were replaced with missing values. Since this variable was non-normally distributed, data were transformed using the square-root function. Participants were then asked to indicate whether they had ever given out personal information online or made friends with someone they knew only online (see Appendix 2). Two variables were created, (a) past online risk-taking: disclosed personal information and (b) past online risk-taking: made unknown friends, both coded as 0 ('no') and 1 ('yes'). If they responded yes to either of these questions participants were then asked to indicate how many times they had displayed this behaviour in the past 12 months (see Appendix 2). These past risk-taking variables were found to be significantly correlated, $r(323) = .29, p < .001$, and were therefore combined to create one Past Risk-Taking variable.

Four questions then measured participants' intentions to give out their personal information (e.g., name, address, date of birth, email address and phone number), make unknown friends, communicate with unknown people in chatrooms, or share personal information with people they knew only online in the coming year (see Appendix 2). Participants answered on a 5-point Likert scale scored from 0 (*very unlikely*) to 4 (*very likely*) ($\alpha = .80$). These four intention measures were found to significantly correlate (all rs > .25, all ps < .001). Therefore, scores were summed and averaged to create an Online Risk Intentions variable.

4.3.3. Design

A between-subjects design considered differences in past risk-taking with personal information and making unknown friends (dependent variables) by the two age groups (independent variable). Regression analysis investigated the outcome variable, Online Risk Intentions, using the predictor variables of Age, Past Risk-Taking – Disclosed Personal Information, Past Risk-Taking – Made Unknown Friends, Gist Reasoning, and Verbatim Reasoning.

4.3.4. Procedure

A link to the study was posted on the Mechanical Turk website. Data collection took place over a 3-week period. Individuals were invited to take part in this study and could access the questionnaire via a Web link. Participants were informed that the study aimed to determine whether people of different ages displayed different online behaviours in terms of judgement and decision making. They were invited to participate, fully briefed, and then provided consent by clicking on a 'continue' button. They were then guided through the

93

questionnaire items and fully debriefed on completion. Participants received $0.25 for their involvement and were allocated up to 30 minutes to complete the survey.

4.4. Results

In total, 61.3% of participants had disclosed personal information online, an average of 28.4 times during the preceding 12-months. One hundred and twenty-six (38.7%) participants had befriended, on average, eight unknown individuals in the 12-months prior to their participation in the study. There were no significant differences in risk-taking activities between those under 60 years old and those aged 60 and over. However, although fewer participants over 60 disclosed their personal information online, the mean number of information disclosures in the previous year for the over-60 group was higher (33.89 disclosures) compared to participants under 60 (23.55 disclosures). Additionally, fewer participants over 60 reported befriending strangers online. However, the mean number of strangers befriended in the previous year was higher for the over 60's (10.65 'friends') compared to the under-60 group (6.20 'friends'). These figures, however, were not significantly different (disclosed personal information, $t(198) = -.45$, $p = .66$; befriended strangers, $t(62.22) = -1.34$, $p = .19$).

4.4.1. Relationships of Gist and Verbatim Measures

Following the results relating to the relationship between gist and verbatim in Chapter 2, it was expected the two verbatim measures of risk perception (specific risk and quantitative risk) to positively correlate with each other and the same for the three gist measures of risk perception (categorical risk, gist principles, and global risk perception). However, gist and verbatim measures should not correlate with each other. Table 10, displaying these intercorrelations, reveals that the specific risk and quantitative risk verbatim measures were

94

significantly and positively correlated. All three gist measures were also significantly and positively correlated. The first verbatim measure, specific risk, did not correlate with either the global risk or the categorical risk gist measures, and the second verbatim measure, quantitative risk, did not correlate with any of the gist measures. However, specific risk and gist principles were found to significantly, negatively correlate with each other.

Table 10. *Intercorrelations of Gist Measures of Risk Perception (Categorical Risk, Gist Principles, Global Risk Perception) and Verbatim Measures of Risk Perception (Specific Risk, Quantitative Risk) for Online Risk-Taking*

Variable	Categorical risk	Gist principles	Global risk perception	Specific risk
Gist principles	.53**			
Global risk perception	.33**	.30**		
Specific risk	-.07	-.22**	.02	
Quantitative risk	-.04	-.09	.07	.37**

**p < .01.

Based on these intercorrelations, a principal component analysis on all five (three gist and two verbatim) measures with orthogonal rotation (varimax) was conducted. Two components, incorporating all five items, had eigenvalues over 1 and together accounted for 64% of the variance. Table 11 shows the factor loadings after rotation, which suggest that all three gist measures loaded onto Component 1 (gist component) and both verbatim measures loaded onto Component 2 (verbatim component).

Table 11. *Results of Principle Component Analysis for the Gist and Verbatim Measures (N = 326)*

Item	Rotated factor loading	
	Gist factor	Verbatim factor
Categorical risk (Gist)	.82	-.07
Gist principles (Gist)	.79	-.25
Global risk perception (Gist)	.69	.20
Specific risk perception (Verbatim)	-.10	.81
Quantitative risk (Verbatim)	.04	.81
Eigenvalue	1.84	1.37
% of variance	36.79	27.32

4.4.2. Intentions to Take Online Risks

Table 12 shows the intercorrelations between age (in years), the gist component, the verbatim component, total time online, sensation seeking, past online risk-taking, and online

risk intentions. Age was significantly negatively correlated with past risk-taking, time spent online each week, sensation seeking, and intentions to take online risks but was significantly positively correlated with the gist reasoning component.

Table 12. *Intercorrelations of Age, Past Online Risk-Taking, Time Spent Online, Sensation Seeking, Gist and Verbatim Components, and Future Online Risk Intentions*

	1	2[a]	3	4	5	6	7
1. Age	–						
2. Past risk-taking[a]	-.14*	–					
3. Time spent online	-.25**	.17**	–				
4. Sensation seeking	-.23**	-.07	.05	–			
5. Gist component	.11*	-.07	-.05	-.21**	–		
6. Verbatim component	-.05	.000	.10	.10	.000	–	
7. Online risk intentions	-.18**	.37**	.24**	.17**	-.42**	.26**	–

[a] Spearman correlations.

*p < .05. ** p < .001.

Past risk-taking correlated significantly positively with both time spent online each week and online risk intentions. A significantly positive relationship was also found between online risk intentions and time spent online. Sensation seeking was found to significantly positively correlate with online risk intentions, but was negatively correlated with the gist

component. Importantly, intentions to take online risks in the future were positively correlated with the verbatim component and negatively correlated with the gist component.

To further investigate the effect of age, past online risk-taking behaviour, time spent online, sensation seeking, and gist and verbatim representations on intentions to take online risks, hierarchical linear regressions were conducted. In Step 1 the independent variables of age, time spent online, and past risk-taking were entered. Step 2 additionally included sensation seeking, the gist component, and the verbatim component. Step 3 also included the interaction terms of Past Risk-Taking × Age, Sensation Seeking × Age, Gist Component × Age, and Verbatim Component × Age. Results can be found in Table 13 (in each regression model Age was used as a continuous variable).

The first regression model showed that age, time spent online, and past risk-taking behaviours significantly predicted online risk intentions, $\Delta R^2 = .17$, $\Delta F(3,316) = 22.57$, $p < .001$. Age marginally ($p = .052$) negatively predicted intentions to take online risks; that is, with increasing age intentions to take online risks decreased. Past online risky behaviours and increased time spent engaged in online activities significantly predicted online risk intentions.

The second regression model also included sensation seeking, the gist component, and the verbatim component as independent variables. The results showed that the gist and verbatim components additionally predicted online risk intentions, $\Delta R^2 = .38$, $\Delta F(6, 313) = 34.13$, $p < .001$. The age variable, however, became nonsignificant once the gist and verbatim predictors were added, as both these predictors explain effects of age, a result which is consistent with FTT. Although sensation seeking was significantly correlated with intentions to take online risks (see Table 12), it did not prove predictive of intentions to take online risks. Gist reasoning negatively predicted online risk intentions and verbatim reasoning positively predicted online risk intentions. The third regression model also included the interaction terms of Age × Past Risk-Taking, Age × Sensation Seeking, Age × Gist

Component, and Age × Verbatim Component, but none of the interaction terms significantly predicted online risk intentions (see Table 13). Concordant with the predictions of FTT, the gist and verbatim components independently contributed to online risk-taking intentions even after the other potential predictors (i.e. age, past risk taking, time spent online, and sensation seeking) had been taken into account.

Table 13. *Results of Hierarchical Regression Analysis Predicting Online Risk Intentions*

Step	Independent variable	Online risk intentions				
		β	R^2	F	df	p
Step 1			.16	20.80	3, 321	< .001
	Age	-.10				
	Time spent online	.15*				
	Past risk-taking	.33**				
Step 2			.37	32.06	6, 318	< .001
	Age	-.04				
	Time spent online	.13*				
	Past risk-taking	.33**				
	Sensation seeking	.05				
	Gist component	-.40**				
	Verbatim component	.24**				

Step	Independent variable	Online risk intentions				
		β	R^2	F	df	p
Step 3			.36	19.56	10, 314	$< .001$
	Age	-.13				
	Time spent online	.12*				
	Past risk-taking	.33**				
	Sensation seeking	.05				
	Gist component	-.40**				
	Verbatim component	.24**				
	Age × Past Risk Taking	-.08				
	Age × Sensation Seeking	.16				
	Age × Gist component	.04				
	Age × Verbatim component	.01				

*$p < .01$. ** $p < .001$.

4.5. Discussion

According to the National Council on Aging (n.d.) "Financial scams targeting seniors have become so prevalent that they're now considered the crime of the 21st century", with Internet fraud representing one of the top 10 scams (see also van Wilsem, 2011). Although government agencies—such as the U.S. Federal Bureau of Investigation (FBI) - emphasise this issue, there is currently little empirical data on older adults' online risk-taking behaviour

and the factors that could help mitigate their risk behaviour. The present study was designed to address this important lacuna.

The findings revealed that the majority of adults, regardless of age, took some risks online with their personal information, disclosing details about themselves multiple times in the previous year. Clearly this type of risk-taking is not restricted to younger age groups, and is comparable to the 66% of adolescents in Chapter 2 (White et al., 2015) who reported personal information disclosure. Although it appears this behaviour is common across age-groups, personal information disclosure is potentially problematic for a number of reasons, and requests for such information are pervasive in online scams (Newman & Clarke, 2003). Oftentimes fraudsters pose as reputable companies or organisations requesting that individuals update or verify their personal information, resulting in identity or financial fraud (Get Safe Online, n.d.).

In the present study, over one-third of adults had also befriended a number of strangers, developing online relationships with an average of eight people they did not know offline. This online behaviour has also proven to be risky with almost 6,000 individuals reporting financial losses of upwards of $86 million as a consequence of confidence fraud and romance scams in the United States (FBI, 2014). These financial losses affected adults of all ages, but while adults over the age of 60 constituted only 18% of those reporting victimisation, this age group accounted for 30% of the overall financial losses.

Although risk-taking behaviour in the present study did appear to decline with age, individuals over 60 who were involved in these two risky online activities reported higher rates of risk-taking than those under 60 years old, both with information disclosure and 'friending' behaviour. Consequently, ensuring that increasing the number of older adults online does not lead to a substantial increase in the number of online fraud victims is vital. It is therefore crucial to discover why this particular subset of older adults were more risk-

taking, given that the majority of those over 60 appeared to be more cautious in general compared to those under 60. Further investigation in this respect should be a focus of future research.

Concordant with the previous empirical work reported in this thesis, this investigation capitalised on FTT (Reyna, 2004; Reyna & Brainerd, 1995) and was able to show that while verbatim reasoning about online risk can be reflective of actual risky behaviour online, simple, categorical gist reasoning about online risk can be protective of risk-taking behaviour among adults in general, with gist reasoning about risk increasing with age into older adulthood. Previous research has focussed almost exclusively on the application of FTT among younger age groups and has found that gist reasoning can be protective of sexual risk-taking behaviour in young adults (Reyna et al., 2011). The findings in the previous chapters also highlight the potentially protective nature of gist reasoning in relation to online behaviours and how this specific reasoning strategy improves with age (White et al., 2015). In contrast, greater reliance on specific, deliberative, verbatim reasoning was associated with increased risky behavioural intentions.

These findings, thus, nicely augment previous research by highlighting that the use of verbatim reasoning about online risk was not only correlated with increased past risk-taking behaviour, but also predictive of increased intentions to take online risks in the future among adults of all age groups. Conversely, adults who relied more on gist reasoning about online risk displayed lower rates of past risk-taking behaviour, and the use of intuitive, gist reasoning predicted lower behavioural intentions to engage in risky online activities. Critically, this research lends much-needed support to the findings relating FTT to risk-taking in younger individuals by showing that the use of gist reasoning about online risk appears to increase with age, well into adulthood.

Given the paucity of data on FTT among older adults, it is only possible to speculate why gist reasoning increased with age. Prior research has attributed increased gist reasoning ability to experience (Reyna & Lloyd, 2006). However, in the domain of Internet use, this might not necessarily be the case, as increased aged was inversely associated with experience. During healthy ageing, specific (verbatim) representations of memory decay faster and are less accessible than gist representations, and as such older adults' increased gist reasoning in false-recall experiments has been linked to this decay in their neurocognitive functioning (e.g., Brainerd & Reyna, 2015; Koustaal et al., 1999). In addition, Corbin et al. (2010) found that individuals with higher working memory capacity show a preference for gist reasoning strategies in risky decision making, and Huang, Wood, Berger, and Hanoch (2015) have shown that a greater age effect exists when participants make decisions on deliberative tasks compared to experiential tasks. Therefore, it is possible that increases in, and preferences for, gist reasoning emerge via a process of increased life experience alongside reduced cognitive ability. As the present study did not measure cognitive ability, this idea should be taken with caution and much further work is needed to test this hypothesis.

In addition to investigating reasoning strategies, an aim of this research was to assess the influence of sensation seeking on past risk-taking and risk-taking intentions. The development of sensation seeking has been shown to follow an inverted U-shaped function, with its peak at adolescence and a reduction thereafter (e.g., Steinberg, Albert, Cauffman, Banich, Graham, & Woolard, 2008). The findings in the present study, likewise, demonstrate a continued reduction in sensation seeking with age. Higher sensation seeking was also related to gist reasoning about online risk-taking and showed a significant negative relation to online risk intentions. Within the regression models, however, sensation seeking did not

significantly contribute to predicting online risk intentions, suggesting that further investigations are required to assess how sensation seeking interplays with other variables.

Finally, the findings show a clear relationship between time spent online and engaging in both past and future online risk-taking. Lifestyle-routine activities theory (Holt & Bossler, 2008) proposes four elements that can increase individuals' chances of victimisation: being in high-risk situations or environments, exposure/proximity to offenders, being attractive targets, and lacking protection from others. These results showed that individuals who spent more time online (exposure) had also engaged in more, risky activity online in the past (high-risk situations). Since there are suggestions that older individuals are seen as profitable targets for online fraudsters (FBI, 2014), these are critical indications of potentially increased victimisation risk. Time spent online was also predictive of individuals' increased intentions to engage in risky online behaviour. However, time spent online was not related to either the verbatim or the gist component, suggesting that the protection from online risk-taking afforded by gist reasoning is not a function of experience alone. Further research in this area is essential before drawing any firm conclusions about the relationships between online exposure, risk-taking, and victimisation, particularly since individuals' victimisation experiences were not recorded during this study. In addition, the assessment of online experience in this study requires further investigation since this was based on time spent online. A finer distinction between novices and experts may be required as time online may not necessarily be reflective of online expertise for all individuals, and these distinctions are relevant to FTT research (Reyna et al., 2014).

This study has some limitations. As shown by Rolison, Hanoch, Wood, and Liu (2014), risk-taking behaviour can vary depending on the risk domain, and as this study focussed on only the online risk domain, it is difficult to tell whether the findings could be extended to other risk domains (e.g., medical). Furthermore, there is very little data on

whether offline and online risk-taking behaviour relate. For example, the online disinhibition effect (Suler, 2004) argues that people display behaviours online that are out of sync with their offline personas. Thus these findings may be applicable to only online environments involving specific risk-taking behaviours, and this sample of North American participants possibly limits its applicability to individuals in other countries or cultures. Finally, this study was self-reported by nature and therefore not necessarily reflective of individuals' real online behaviours, for instance, individuals may not remember every instance of personal information disclosure or friending behaviour online. More ecologically valid research methods would be helpful in this respect.

Despite these limitations, these findings highlight some interesting areas for future research and will hopefully prompt further studies into the online behaviour of older adults. Building on prior FTT investigations this investigation has shown that gist reasoning about risk can continue into adulthood, and that gist reasoning about online risk can have a protective relationship with online risk-taking behaviours and behavioural intentions. It also highlighted that older adults do engage in risky behaviour online and put themselves in situations where they increase their chance of experiencing victimisation. These findings suggest that all adults could benefit from 'e-safety' training incorporating gist values, and that older adults may be even more receptive to these types of messages than younger adults due to their increased reliance on gist reasoning strategies in older age. As a consequence, the emphasis on the requirement for gist focussed education programmes could potentially be even greater for younger adults. Gist-based intervention strategies have yet to be widely implemented, but have already been shown to significantly reduce sexual risk-taking in adolescents by educating young people to process information intuitively in order to retrieve categorical, risk-avoidant attitudes (Reyna & Mills, 2014; Reyna, Weldon, & McCormick, 2015).

Throughout the three chapters thus far, it is clear that FTT could potentially be a key theoretical consideration in the design of online safety interventions, able to enhance the effectiveness of education for younger internet-users and also able to help establish programmes to aid new, yet much older, internet-users; help which is currently informal, difficult to locate, and inconsistent. With the number of older adults using the Internet set to increase significantly in the future it is essential that educational programs enhance adults' knowledge of, and protection from, online risks to ensure that their online experiences are pleasurable and safe.

Chapter 5

Will you be my Friend? Developmental Differences in Online Friending Behaviour

5.1. Abstract

Despite young people being encouraged to avoid 'stranger danger' offline, the studies outlined in Chapters 2 and 4 highlight that friending strangers online is a behaviour that many individuals engage in. This study investigated this risky behaviour in more detail, aiming to understand why young people might accept some friend requests from strangers on Facebook but decline others, and whether these choices differed with age. Initial focus groups with young people aged 13-21 years revealed that three main variables were considered which were then incorporated into mock Facebook profiles. These variables were then manipulated within the profiles to reflect friend requests from high and low attractive individuals, those who lived in the same hometown as the participant or in Glasgow, and those with 0, 1 or 5 mutual friends. Young Adolescents (13 – 14 years, $N = 35$, $Mage = 13.63$ years), Older Adolescents (15 – 16 years, $N = 33$, $Mage = 15.55$ years), and Young Adults (18 – 24 years, $N = 31$, $Mage = 19.36$ years) viewed each of the profiles, choosing whether to accept the friend request or not, while their eye movements were also tracked. Choice data revealed that the acceptance of a stranger's friend request increased with age and predominantly requests were accepted from individuals who lived in the participants' hometown and had at least 1 mutual friend. Eye-tracking data not only revealed distinct differences across age groups, but also showed that Young Adolescents spent longer making their decisions, deliberating over the profile content more than the older participants. The relevance of these findings to safety interventions, developmental differences, and Fuzzy Trace Theory are discussed.

5.2. Introduction

Online connectivity has risen exponentially since the inception of social networking sites (SNS) with websites such as Facebook attracting over 1.2 billion members worldwide (Facebook Newsroom, 2017). The use of Facebook continues to grow year on year with over 70% of Americans online (Duggan & Smith, 2013) and more than 31 million Britons (Comscore, 2013) registering a profile. The majority of users visit their SNS daily (Duggan & Smith, 2013).

While participation in SNSs is usually considered to be a positive way for people to increase social capital by growing their social networks (Ellison, Steinfield, & Lampe, 2007; Steinfield, Ellison, & Lampe, 2008) and to enhance self-esteem and positive emotions (Madden, Lenhart, Duggan, Cortesi, & Gasser, 2013), there are also reports of undesirable and tragic consequences when people disclose information to, strike up relationships with, or are contacted by, people they do not already know offline (Madden et al., 2013; Smahel & Wright, 2014; Wolak, Finkelhor, Mitchell, & Ybarra, 2008).

Friending individuals on the SNS Facebook enables communication in either an asynchronous way or instantly via instant messaging (IM). However, once the direct communication has ended the friend still has the capacity to continue to view the subject's profile at their leisure, and not only information that has been posted in the recent past but details put on the site since the subject first created their profile (the timeline). An individual's profile contains a lot of personal information – profile pictures, photo albums, friends list, hobbies, likes and dislikes (including films, TV programmes, books, sports, and social, religious or political causes that are supported), birthday, mobile phone number, email address, hometown, relationship status (and who the relationship is with if they are also on Facebook), place of work, places studied and worked in the past, places visited, and current location. All of this information can reveal a great deal about individuals. Indeed, a recent

study was able to determine individuals' sexual orientation, political and religious affiliations, and relationship status just from their Facebook profile and 'likes' (Kosinski, Stillwell, & Graepel, 2013). Facebook does allow users to manipulate their own privacy settings with three possible exposure levels; everyone, friends-of-friends, and friends only. Therefore, if an unknown person is on the list of friends then they have access to this personal information. Consequently, the decision whether to accept an unknown person into one's online social network should not be taken lightly.

It is fairly standard practice currently for children and adolescents to be provided with eSafety training and education (Livingstone, Haddon, Gorzig, & Olafsson, 2011; Smahel & Wright, 2014). Typically, much of this advice relates to avoiding the disclosure of personal information to strangers online. Despite this training, it is still a common practice for young people to make "friends" online with people who are not known offline (Madden et al., 2013). Madden et al.'s (2013) recent investigation of social networking profiles revealed that the average American Facebook user had 300+ "friends". While the majority of users' Facebook friendships were with familiar people (family and friends known offline), 33% admitted they were friends with people who they had never met before. Those with the largest social networks were more likely to have unknown friends. In addition, only 60% of the Facebook users interviewed had their profile privacy level set to 'friends only'. Lenhart, Madden, McGill, and Smith (2007) also found that 49% of teens surveyed used SNSs to make new online friends. Given the possible risks of befriending strangers online, it is important to understand what factors influence individuals' decision to accept online friendship requests. One first step to addressing this question is to examine how young people make friends offline (Mazur & Richards, 2011; Sparrow & Chatman, 2013).

5.2.1. Young People's Offline Friends

Much past research has investigated children's and adolescents' friendship formation in offline environments and has focussed on how they choose their friends, what attracts them to each other, and what kinds of friendships last longer than others (Epstein & Karweit, 1983). One common theme to emerge from this research is that young people's friendships are based on homophilus selection, that is, choosing friends based upon perceived similarity to oneself (McPherson, Smith-Lovin, & Cook, 2001). McPherson et al. (2001) identify two forms of homophily: s*tatus homophily* concerns similarities in age, gender, race, ethnicity, religion, education and occupation; *value homophily* considers likeness in beliefs and attitudes.

Kupersmidt, DeRosier, and Patterson (1995) found that a number of status variables, specifically gender, race, family income, and academic attainment, characterised best-friend relationships in pre-adolescents. In addition, they found that children's withdrawn and/or aggressive behaviour was highly similar in friendship pairs. Behavioural homophily in adolescent friendships has been reported for delinquent behaviours, such as marijuana and alcohol use (Hafen, Laursen, Burk, Kerr, & Stattin, 2011; Logis, Rodkin, Gest, & Ahn, 2013), as well as favourable behaviours, such as being prosocial and caregiving (Linden-Andresen, Markiewicz, & Doyle, 2008; Logis, Rodkin, Gest, & Ahn, 2013).

Studies have also found that young people select friends based upon popularity status in school (Dijkstra, Cillessen, & Borch, 2013; Kupersmidt et al., 1995; Logis et al., 2013). Dijkstra et al. (2013) followed over 500 students for three years starting in 6th grade and found that adolescents who were popular were more often sought after as friends and the process of having many friends resulted in increased popularity. Individuals chose friends who were of equal or higher popularity status but avoided making friends with unpopular

peers in order to maintain their status. Dijkstra et al. also found that befriending a higher status peer increased one's own status and popularity.

While gender is believed to be one of the strongest predictors of friendship (Kupersmidt et al., 1995; Maccoby, 1998), Poulin and Pedersen (2007) suggest that there are developmental and gender differences in this regard. Their five-year longitudinal study of boys and girls from 6th through to 10th grade showed that not only did other-sex friendships increase with age but this was particularly the case for girls who developed friendships with boys older than themselves and typically outside of the school environment.

Developmental research reveals that the importance of status and value homophily to friendship formation is dynamic across the lifespan (Epstein, 1983a). Cross-sex relationships in young children give way to almost exclusive same-sex friendships in middle childhood, with the number of other-sex friends increasing again through adolescence and into adulthood (Karweit & Hansell, 1983). Cross-race friendships decrease throughout childhood (Shrum, Cheek, & Hunter, 1988) and during adolescence more friendships develop between young people of different ages (Epstein, 1983b). Evidence also suggests that a focus on status homophily in childhood is increasingly replaced by an emphasis on value homophily in adolescence and young adulthood, such that similarity of academic interests and achievement is overridden by similarities in academic and career goals and aspirations (Epstein, 1983c). Additionally, the importance of having similar hobbies and interests is replaced by the importance of shared beliefs and values, similarities in personality, and pro-social or anti-social behaviour (Burgess, Sanderson, & Umana-Aponte, 2011).

Taken together, children and adolescents appear to select friends that are typically similar in age, gender, race, behaviours, grades in school, future aspirations, and popularity. Geographical proximity probably plays a much greater role in friendship selection in offline

than online friendships (Epstein, 1983d), and geography also impacts the diversity of the local population. Comparing the limitless opportunities that exist online, one might wonder whether young people make friends according to the same criteria online as they do offline.

5.2.2. What do Young People Look for in Online Friends?

People typically make friends in offline environments through face to face interactions. In online environments many of the cues available to form impressions of an individual are not available, such as body language, facial expression and real-time communication (McCall, 2013; Sparrow & Chapman, 2013). Additionally, while some argue that personal misrepresentation online is uncommon (Sparrow & Chapman, 2013), others suggest that some level of manipulation is inevitable during the process of building a personal profile on a SNS, with profile pictures, age and interests carefully presented to appear more appealing (Donath, 2007).

Guadagno, Okdie, and Muscanell (2013) posit that the lack of available cues, coupled with cognitive load brought about by individuals being engulfed with information online, results in the abandonment of deliberative, systematic decision making when in online environments. Instead, Guadagno and colleagues suggest that, when considering potential virtual friends, people resort to the most prominent heuristic cues, such as likability and similarity. This therefore suggests that status and value homophily would play an important role in friend acceptance on SNS.

According to Wang, Moon, Kwon, Evans and Stefanone (2010), for American college students, attractiveness was the most salient cue when assessing Facebook profiles for potential friendships. Participants were presented with profile pictures of attractive or unattractive males and females and asked if they would initiate a friendship with that person.

There was also a no-photo condition. A three-way interaction effect revealed that people were most likely to initiate friendships with attractive individuals, and least likely to initiate friendships with unattractive individuals, particularly when the profile picture was of the opposite sex. When comparing offline friend choices with online friend choices, research is limited. Mazur and Richards (2011) examined the content of MySpace wall posts of 129 16-to19-year-olds to determine if their friend choices were homophilus or more diverse when online. Findings were mixed. Similarity between friends was maintained online in general, however there were more cross-gender (particularly for males befriending females) and cross-ethnicity friendships. Friends were usually of similar age until they reached young adulthood and then greater age differences emerged. Interestingly, however, despite the geographical reaches of the internet, friends tended to live relatively closely together and were almost always in the same U.S. state.

While status attributes (e.g., age, gender, ethnicity, geographical proximity) may be more prominent when viewing an online profile, the values, beliefs, personality and behaviour of an individual are less obvious. Walther, Van Der Heide, Hamel, and Shulman (2009) argued that when assessing the values of a potential friend, young adults draw on the comments, images and information posted by other friends on the individual's wall, timeline or profile page. Utz (2010) also showed how young adults further deduce an individual's honesty, integrity, extraversion, popularity, and social attractiveness by the visual and textual information displayed by that person's Facebook friends. Drawing on the information others post on a person's wall has also been said to imply trustworthiness (Weisbuch, Ivcevic, & Ambady, 2009), pro-social behaviour (Guadagno et al., 2013) and aggression (Donath, 2007). While this information is generally available once a person has become a friend, often these details are blocked to non-friends and therefore unavailable to view when considering an initial friend request from a stranger.

Investigations into online impression formation and friendship initiation have tended to look at the influence of a single cue, such as attractiveness, on friending decisions online. One notable exception is the work of Rashtian, Boshmaf, Jaferian, and Beznosov (2014) who, through semi-structured interviews and an online survey, highlighted that having a common background and interests, an attractive profile picture, and close mutual friends were important in Facebook friendship acceptance from known individuals and strangers. However, since there are fewer cues included in a Facebook friend request from a stranger the current study examined which cues were particularly important to young people when receiving friendship requests from a stranger on Facebook. Furthermore, with few exceptions (e.g., Mazur & Richards, 2011) past research participants have been limited to college undergraduate students. Therefore, given the well-documented age differences in offline friendship formation, this study investigated whether the criteria for making friends online changed over the course of adolescence and young adulthood.

5.3. Study 1: Focus Groups

Given the paucity of research in the field, using mixed methods of investigation is particularly useful (Greenfield & Yan, 2006). To investigate what criteria individuals use to accept friends online, Study 1 gathered information from three focus groups with adolescents and young adults. Specifically, the focus groups were designed to establish which cues of the profile page the participants considered during the decision making process and the relative weight of each cue across different age groups. The focus groups mainly examined the relative importance of status attributes (e.g., age, gender, ethnicity, attractiveness of the friend requester) as this is the information available to those considering friend requests by strangers on Facebook.

5.3.1. Focus Groups Method

5.3.1.1. Participants

Three focus groups were conducted with young people of three different age groups. The first involved 10 young adolescents in year 9 aged 13- to 14-years-old (five females and five males) who attended a U.K. secondary school. The second included a group of nine older adolescent, sixth form students from a different U.K. secondary school who were aged 17-to 19-years-old (five females and four males). Finally, the third group consisted of eight young adults who were psychology undergraduate students aged 19- to 21-years-old (four females and four males).

5.3.1.2. Procedure

Parental consent was obtained for all participants under 18 years-old and each individual also gave their own informed consent to take part. Each discussion was held in a quiet location and was completely unstructured apart from the initial question, "How do people decide whether or not to accept a friend on a social networking site if they don't already know that person offline?" The groups were prompted with further questions if necessary. Each discussion lasted 30 minutes and was recorded using a dictaphone. The audio recordings were then fully transcribed and themes within the data identified using the process of thematic analysis as described by Braun and Clarke (2006).

5.3.2. Focus Groups Results

All of the participants had a current Facebook profile which they used on a regular basis. Many admitted that they had manipulated their age in order to set up a Facebook profile when they were under the age of 13. Most had begun using Facebook when they were

11- to 13-years-old. The number of "friends" participants reported ranged between 60 and 990. In all three groups participants reported that they had received friend requests from strangers. Most participants admitted accepting at least one stranger's friend request, even if that person had later been deleted as a friend.

Some participants initially reported that they were over-cautious about accepting friend requests, particularly from unknown people. However, through the course of the conversations it became clear that a number of the participants, and people they knew, did not always do this.

"Yeah I tend to just accept anybody and then if they end up being dodgy I'm like 'bye, bye'"

"....some girls in my year group literally will be like 'yeah I met someone at a bus stop',....I don't even know how they found them on Facebook but they'll, like, really talk to them and meet up with them..."

"My Mum on Facebook, it's terrible she's like, 'Oh this person added me,' and I'm like, 'yeah but do you know them?' and she's like, 'well I must do because they added me on Facebook'."

"...my little sister's friends that get Facebook and then they all add you, I've got so many 12 year olds on my Facebook"

"Like if it was someone who I had a really close friend with or a few really close friends I might accept and then message them and be like 'oh do I know you from somewhere, have I met you?' but if it was people I didn't know then I wouldn't necessarily message them, just accept and leave it alone"

Some of the youngest participants had also had negative experiences associated with the acceptance of unknown friends.

"...most guys who don't have mutual friends and stuff and you add them and they're just creeps"

"When I first went on Facebook I got a friend request from, well I didn't recognise the name but I did recognise the photo, and I added them and then they started sending me loads of messages and, like, asking me to do things for them so I blocked them straight away"

Five major themes emerged from the data and were discussed by participants from all three focus groups as specific criteria that they considered when deciding whether to accept someone as a friend or not: The extent of the friend requester's social networks; visual clues of the profile picture; ethnicity, race, and geography; positive and negative emotions; and age diversity. While the use of some of these criteria differed slightly between age groups, and participants of the same age, the general themes were shared in all three focus groups.

Extent of social networks – how many people do you know, and do we know the same people? In all three age groups the primary answer to the research question was that having mutual friends would compel participants to consider accepting a friendship request. There was some disagreement over how many mutual friends would be sufficient, however, and who the person was mutual friends with.

In the youngest group, for example, one 14-year-old girl stated,

"So if it's like a best mate, then that's one mutual friend and that's enough. But if it's someone you don't really know that well then one's not enough"

Some other young people in the youngest group suggested that one mutual friend was insufficient even if they were friends with your best friend. Other participants in this group suggested that 20-30 mutual friends would be acceptable.

The 17- to 19-year-old group also identified mutual friends as the initial consideration. The majority in this group stated that if there were no mutual friends then they would not consider the request any further, *"Yeah coz you think 'how did you find me?'"* Generally, it was suggested that 2-3 or more mutual friends was the minimum requirement. However, two of the participants said that having no mutual friends would simply lead them to look at other criteria instead. Overall, while mutual friends is the first characteristic to assess, it is not the only one.

The 19- to 21-year-old group echoed some of the comments from the youngest participants, stating that a mutual friend of your best friend might be sufficient but if the mutual friends were people not that well known then more mutual friends would be needed:

"...if it is a really close friend then you think well I'll probably like you if they get on with you, but if there are like, I dunno, 60 mutual friends and you don't really know any of them that well it's probably that I just might know you from Uni or somewhere, so you wouldn't necessarily initiate a conversation"

In contrast, one undergraduate participant suggested that having mutual friends might actually be a disadvantage;

"I look at mutual friends. For example if they're friends with [name of peer] and we're on the same course then I won't accept them because if I go through a break up or my relationship status changes then the last thing I want to see...........because I don't want people taking pride, and I know some people would, and enjoyment over my life going, like, tits up"

Some participants also identified that the number of friends a friend requester had was also important criteria. It was generally agreed that if people had a very large social network then this was off-putting.

"Well like famous people on Facebook, you can either follow them or add them as a friend, and people add them as a friend to just get more friends on Facebook so they feel better about themselves and they can go around and like say 'I've got like 900 friends' or something"

"If they've got loads of friends as well then you know they're just adding you because they want loads of friends, so it's like, what, you don't really want to get to know me"

"If you don't know that person and they have like 1000 friends then you think well you're just adding me because you add that many people on Facebook, so you probably wouldn't accept it"

Once again, however, ascertaining how many friends was "too many" was difficult to achieve. Research in offline environments, as discussed above, suggests that more popular individuals are more desired as friends (Dijkstra et al., 2012; Kupersmidt et al., 1995; Logis et al., 2013) and interviews with Facebook users suggest that the average user has around 300+ online "friends" (Madden et al., 2013). Kleck, Reese, Ziegerer-Behnken, and Sundar (2007) presented participants with mock-ups of Facebook profiles depicting individuals with a low (9 or 62) or high (221) number of friends in their social network. Those with a large social network were seen as significantly more popular and received higher ratings of sexiness, pleasantness, and confidence than those with small social networks.

Some research suggests, however, that number of friends is not related to social attractiveness, which involves wanting to be friends with or getting to know an individual better (Utz, 2010). As alluded to by the focus group participants, having a network that is

deemed as excessive can, in some cases, reverse the positive perceptions discovered by Kleck et al. (2007). Tong, van der Heide, Langwell, and Walther (2008) found that college students, who were presented with Facebook mock profiles depicting individuals with a range of social network sizes (specifically 102, 302, 502, 702, and 902 friends), rated those with the fewest and largest number of friends as significantly less socially attractive than those with an average number of friends, producing a curvilinear relationship. Despite offline research highlighting similarity between friends, Tong et al. found no relationship between the social network size of the mock profile and the participant, and subsequent ratings of social attractiveness.

While research in this area is still evolving, it therefore appears that friend requesters with at least 3 mutual friends, and a social network classed as relatively average (i.e., about 300 friends) are seen as the most attractive.

The profile picture. The second most important profile characteristic that was discussed in all groups was the profile picture. Facebook users are able to upload as many picture of themselves as they like on their own profile, and Facebook users can post photographs of other people and "tag" the individuals so that the picture is linked to their profile. The profile picture, however, is the primary visual cue on an individual's page and is one piece of information that is often available for all Facebook users to view, regardless of whether they are friends or not.

The profile picture is considered by some "the central component of online self-presentation" (Hancock & Toma, 2009, p. 368) and is often the very first, and most prominent, component of the profile that people will construct (Hum et al., 2011). This aspect

of the profile page, though, is potentially an unreliable representation of the profiler (Donath, 2007; Hancock & Toma, 2009) which was highlighted by one of the young adult participants,

"... I never thought someone would go on the internet and use a picture that wasn't theirs…if you see someone who's really attractive in a picture or looks a bit of a professional picture, you think, um is that really you?"

But despite this, every focus group member revealed it was one of the first and most important things they would consider. Profile pictures were used to, firstly, determine if the person was known, and then to assess attractiveness, age (because sometimes people are untruthful about their date of birth), ethnicity, and personality (extraversion, introversion, self-esteem).

Due to suspicions about individual's honesty on Facebook the youngest age group reported that they tended to use the profile picture to affirm identity.

"You can see who they are or supposedly who they say they are"

Participants suggested that the profile picture could confirm other aspects of the person, such as age and ethnicity. In support of this both the older adolescent and young adult groups told of their dislike of profile pictures that were not of the friend requester. This included group pictures (where it was hard to tell which person was the friend requester), photos of pets, and particularly, cartoon characters.

Attractiveness of the requester was only touched upon very briefly in the youngest age group, with only one female participant mentioning that looks would be important to her decision if the request was from a male. How attractive the subject of the photo was appeared to become more important with age, and was certainly discussed more by females than by males. Many individuals, mostly females, stated that friend invitations from attractive opposite-sex requesters would be more easily considered than unattractive ones. While the

older adolescent and young adult groups discussed that an attractive or *"hot"* individual would be more likely to be viewed positively and therefore accepted as a friend, the young adolescent group outlined how unattractive, *"weird"*, or *"ugly"* individuals would be viewed negatively and probably not accepted. This finding certainly corresponds to offline literature where attractive children and adults have been found to be judged more positively, treated more positively, and act more positively than their less attractive peers (Langlois et al., 2000).

Additionally, Wang et al. (2010) suggested that in online environments the attractiveness of the friend requester was an important visual cue in friendship initiation. The focus group participants also stated that attractive individuals would be considered more positively whereas unattractive individuals would be considered more negatively. Wang et al. discovered that profiles lacking a photo were more positively considered than unattractive photos, but this hierarchy was not found in the focus groups. Wang et al. reported that male participants were more likely to rely on attractiveness in their friendship decisions compared to females. However, female focus group participants were far more vocal in their assertions that a friend-requester's looks would influence their befriending behaviour.

While good looks were important, it was also vital that subjects did not cross a line of vanity or sexual provocativeness if the request was to be considered. Selfies were acceptable provided they were not *"overtly posing pictures"*. Many comments were made on this subject regarding both males and females;

"..coz you do get boys who are in the gym, lift their top up…ewww"

"…what is really annoying is when they do the duck face"

"Like if you're a girl and you take a picture where your boobs are very prominent and put a caption like 'Look at my hair', everyone's like, you know everyone's looking at your chest. Lets' be honest that's why you posted it."

"Or they're not wearing enough clothes…that puts me off"

"And they're like topless and you're like 'Yeah that's nice, now put it away'."

Collins, Martino, and Shaw (2011) reviewed a number of studies where MySpace pages of young people, typically aged 16 to18, were analysed for sexual content (that is sexually provocative language, photographs of individuals in swimwear, underwear or provocatively posed, or references to sexual preferences; Hinduja & Patchin, 2008; Moreno, Brockman, Rogers, & Christakis, 2010; Moreno, Parks, Zimmerman, Brito, & Christakis, 2009; Williams, & Merten, 2008; Ybarra, Mitchell, Finklehor, & Wolak, 2007) and found that between 24-50% of profiles were sexualised. Females' profiles were typically more sexualised than males'. Collins et al. suggested that young people created sexualised online profiles either to make themselves more popular, seem mature, or simply to experiment with different online personas.

These types of profiles, however, as discussed in the focus groups, are not always considered socially attractive. Male college students in the US have described how females' use of sexually provocative references on Facebook profiles may increase their interest in them as a sexual partner but not as a dating partner (Moreno, Swanson, Royer, & Roberts, 2011). This may well explain why our participants were less likely to consider accepting this type of person as a "friend".

In addition, the profile picture was used to infer some aspects of the subject's personality. Prior research has broached this subject and found that Facebook profiles are an accurate reflection of individual's actual (as opposed to self-idealised) personality,

particularly in terms of extraversion and agreeableness (Back et al., 2010), that profile pictures on Facebook are more relied upon in impression formation than textual cues (van der Heide, D'Angelo, & Schumaker, 2012) and that people can accurately identify extraverted individuals from their profile picture (Utz, 2010).

A young adult male participant described how the profile picture was the most important aspect of the profile for him in order to ascertain how *"healthy"* the friend requester was and whether they *"took care of themselves"*, believing that this visual representation of their physical appearance was a direct reflection of their happiness, self-esteem, and intelligence. It was also seen as a way to assess how out-going and fun-loving the individual was, and this was also linked to social attractiveness;

"people having fun look much better than people just standing there, just a picture of themselves"

Ethnicity, race and geography: the importance of being English. All three age groups discussed the importance of where the friend requester originated from, even though they believed this to be a contentious and delicate issue. Although early in the discussions individuals expressed concerns that they would be viewed as racist or making stereotypical assumptions, each group eventually discussed how it was common to receive friend requests from individuals described as *"Arabic"* or Indian. These requests were viewed with suspicion and typically led to the request being immediately declined.

"Well we live in Britain and we are used to British names so if quite a strong foreign name pops up then you're a bit like 'ummmm sorry'"

"Well I look at the name first and if it's, like, an Indian name or something I don't even bother looking at the picture"

"...I'll look at the location on their profile and if it's, like, some random country and they don't even know how to speak English and they've just clicked on me from some comment I've made on something, then I'll just decline it..."

Much of this suspicion was not simply borne out of a xenophobic culture but based on lack of commonality, perhaps because the requester did not speak English, or questioning why a middle-aged, married man, with children, would want to befriend a 14-year old English boy. In addition, some individuals had direct or vicarious negative experience associated with non-English friend requesters;

"You get a lot of foreign people, like, adding people and then they won't leave them alone or they'll ask them for, like, pictures or whatever..."

The importance of geographical proximity was not just limited to countries outside of the U.K. As one 14-year old boy stated;

"...if they, like, live in the same place and area as you then, like, I would accept because they are, like, local. But say if they lived in Scotland or something I probably wouldn't accept because I'd have, like, absolutely no connection with them"

Many other young people discussed the importance of the requester being "local" suggesting that this was almost a way to gauge their credentials as a reputable "friend". Despite the very nature of the web being "world-wide" it appears that, as found in previous online and offline research (e.g., Epstein, 1983d; Mazur & Richards, 2011), geographical proximity is important in building new friendships.

Positive and negative emotions. Both the older adolescent and young adult groups highlighted the importance of emotion in their consideration of friend requests, be these

emotions positive or negative. Individuals discussed how different emotions (e.g., feeling happy, sad, lonely, or angry) would influence their decisions. However, there was no clear relationship between positive and negative mood and acceptance or denial of a request. That is to say, positive emotions could just as easily result in accepting a friend as it could in denying or deleting a friend, and the same was true for negative emotions.

"If you're happy with what is going on then you're like 'I don't need more friends', but if you're on a downer, I don't know if you've had an argument with someone that's important to you, you'll go through the list and think 'I'll add you because you seem to care' but they don't. All they've done is click a button to add you as a friend, but because you feel vulnerable it's like…"

"…because if you don't know them and you're in a bad mood it's, like, auto-reject, whereas if you're in a good mood you might send them a message saying 'do I know you?' because then, yes, there's a chance you could be their friend"

Diversity of age. While much prior research on offline friend choice has described how young people tend to favour friends of the same, or similar, age, there appeared to be a good deal of age diversity in the friends that individuals were willing to consider online. In prior studies on online friendships, Mazur and Richards (2011) reported how little online friends differed in age (typically + or − 2 years) until individuals reached young adulthood when more age diversity was found.

The focus group participants reported having known Facebook friends ranging from much younger to much older. A number of students aged 17- to 19-years-old discussed how they had friends of younger siblings as Facebook friends, around 11- to 13-years-old. In addition, they also had family friends and acquaintances as old as, or older than, their parents.

When discussing the friending of unknown individuals, the same students suggested that a cut-off point would be 25- to 30-years-old, although this could be influenced by where they lived, if they had mutual friends, or how attractive they were. Young adolescent participants generally agreed that they would seriously consider accepting someone in their 20s if they lived locally, and particularly if they were attractive. The young adults did not discuss age as a factor.

5.3.3. Focus Groups Discussion

Information on Facebook can be self-generated (i.e., profile pictures, details of interests and hobbies, age, ethnicity), system-generated (i.e., mutual friends), or other-generated (i.e., postings about you made by people in your friends list). Research suggests that when considering social attractiveness in others on Facebook we are more influenced by other-generated information, which infers people's values, beliefs, personality and behaviour (Utz, 2010). However, that did not appear the case for individuals in the focus groups. Primarily, details generated and posted by the friend requester, or determined by the system, were seen as most important to the decision suggesting that details of a person's status, rather than details of a person's values, were more important criteria in the decision making process. Specifically, individuals considered number of friends, profile pictures, geography/ethnicity, and age. This may be as a consequence of the depth of information (or lack thereof) that can be viewed by a non-friend. Typically, much of the profile information is limited to friends only and certainly the full details of a friend-requester's friends are rarely obtainable. Therefore, access to this information is only granted once the friend request has been accepted.

The considerations made when receiving a friend request were very similar across groups. Participants from all three age groups were concerned with the number of mutual

friends the requester had and with their geographical location and ethnicity. Contrary to findings about the developmental differences in offline friendships, in terms of age similarity being maintained until young adulthood, participants of all ages discussed the age diversity of the people they befriended online. One difference between groups concerned the significance of attractiveness of the friend requester which increased with age, presumably as the potential for romantic or sexual relationships became more important.

Considering these variables collectively it seemed that, for these focus group participants, there was an individual profile that was the most likely candidate to be accepted as a friend: A male or female, under 25 years-old, preferably living locally but definitely English, with an average number of Facebook friends, around 300. Of these friends at least 3 should be mutual friends, and the more the better. The profile picture should contain the friend requester and definitely not be of a cartoon character. This picture should show the person doing something and they should appear happy in it. Additionally, the picture should preferably not be a selfie or a professionally generated picture. The friend requester should look well-groomed and dressed well and be attractive. However, pictures should avoid any sexual provocativeness and not portray the individual as vain. Certainly it is apparent that young people do not consider one variable in isolation when making decisions about who to befriend online.

5.4. Study 2: Experimental Study

Based on the data from the focus groups, an experimental study was designed. As there appears to be no known study that has examined these factors among these age groups, the present research was the first to assess which variables were salient in the decision making process. To gain a more holistic and robust picture, I employed two different but

128

complementary methodologies. Using mock-up Facebook friend requests, each containing a different person profile, we a) recorded which requests were accepted by participants, and b) we used eye-tracking equipment to record which elements of information on the profile the participants viewed and for how long. Information about the friend requester was fully counterbalanced between profiles which allowed me to assess the influence of different pieces of information on accepting friend requests from strangers.

To my knowledge only two studies have used eye-tracking procedures in previous research of this kind. One study highlighted that adults pay more attention to the profile pictures of attractive females, and to the likes and interests of males, when viewing strangers' profiles on Facebook (Seidman & Miller, 2013). Another showed that when viewing Facebook profiles with a social motivation (i.e., a potential friend) individuals showed more interest in areas of the page related to personal information and appearance compared to textual information such as posts and comments (Scott & Hand, 2016). Processing eye movements and fixations can be particularly informative using web pages with familiar layouts, such as Facebook, because this familiarity makes it more likely that fixations on particular areas of the page are indicative of interest in the information, rather than a general search strategy (Scott & Hand, 2016). By combining information relating to the acceptance of different friend requests, alongside eye-tracking processes, the data afforded a more complete picture of decision making processes when making friends online.

5.4.1. Study 2 Method

5.4.1.1. Participants

Participants from three age groups were recruited from a number of educational establishments in the South West of England during the period March 2015 to March 2016.

Young adolescents ($N = 35$) attended year 9 of secondary school (13-14 years; $M_{age} = 13.63$, $SD = .49$; 21 females), older adolescents ($N = 33$) attended year 11 of secondary school (15-16 years; $M_{age} = 15.55$, $SD = .79$; 12 females), and young adults ($N = 31$) were university undergraduates (18-24 years; $M_{age} = 19.36$, SD = 1.31; 26 females). The students in years 9 and 11 of participating schools were invited to volunteer and parental consent was then sought for those students who were under 18 years of age. While the university students participated for course credit, no incentives were offered to the secondary school students.

5.4.1.2. Materials

Generating Facebook Profiles. In order to generate a cache of photographs which could be used to compile Facebook profile pages, volunteers over 18 years of age were recruited via word of mouth. The volunteers were asked to provide photographs of themselves from the waist up, wearing a plain white or light coloured top, and against a plain light background. Nine volunteers were recruited, five females and four males, who each gave consent for their pictures to be independently rated using the Interpersonal Attraction Scale (McCroskey & McCain, 1974) by another group of volunteers, and potentially used in the main study.

Thirty university students, an opportunity sample recruited on campus, independently rated each photograph using the physical attractiveness sub-scale of the Interpersonal Attraction Scale (McCroskey & McCain, 1974). Each participant rated their agreement with 12 statements (e.g., "I find him/her attractive physically"; "He/she has an attractive face") on a 7-point Likert scale, from strongly agree to strongly disagree (see Appendix 6). Mean scores for each of the images were then calculated (Cronbach's alpha = .88). A paired-samples t-test revealed a significant difference between the scores of the highest and lowest

scoring female, $t(29) = 4.27$, $p < .001$, $d = 0.95$, and the highest and lowest scoring male, $t(29) = 5.53$, $p < .001$, $d = 0.84$. Therefore, these four images were used to create the profiles for the main study

Profile Pages. Mock Facebook profile pages depicting the four friend requesters (two male and two female) were created for the study, each image an exact replica of a genuine Facebook friend request (see Figure 5 for an example).
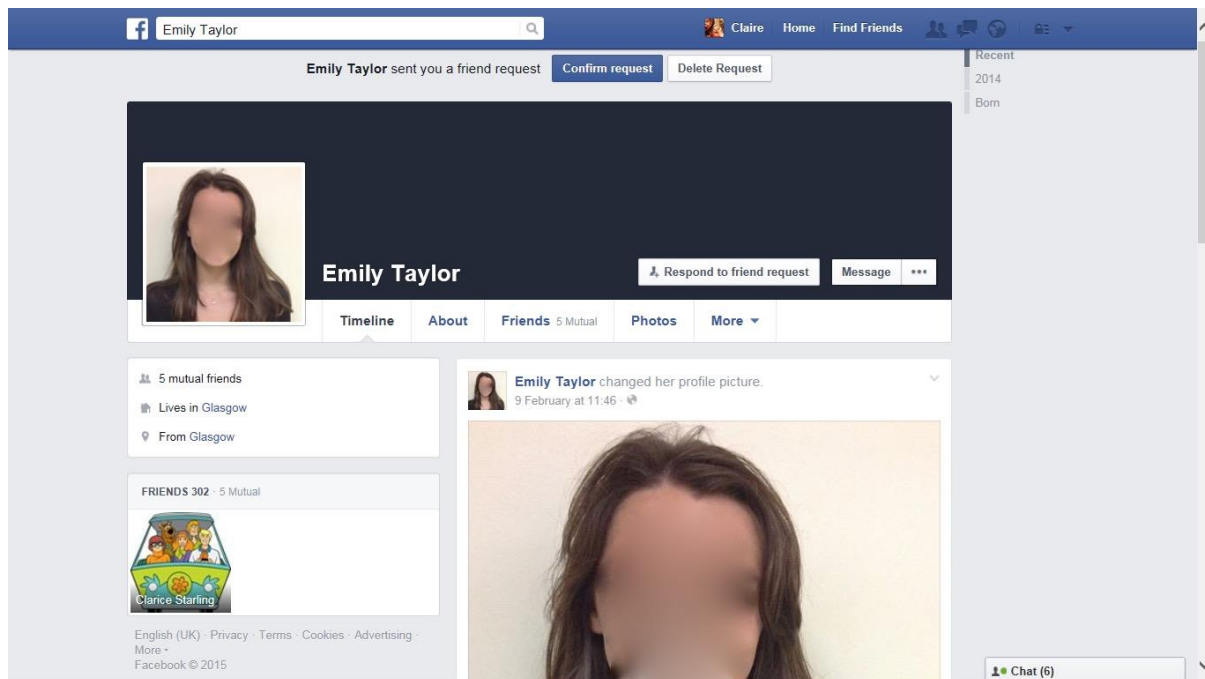
Figure 7. *Example Facebook profile page viewable following a friend request (NB. Faces were not obscured for participant viewing)*

Profile pages were full colour, measured 1366 x 768 pixels, and were captured at this resolution. Each profile contained information about the friend requester and while some variables remained unchanged for every image, other variables were manipulated. The name of the friend requester was displayed as either Emily Taylor (female images) or Daniel

Williams (male images). These names were generated by choosing the most popular girls'

and boys' names in the U.K. and the first and second most common surnames in the U.K. for

the year 1997. Two images of the friend requester were displayed, one partial image central

to the page and one smaller image in the upper left hand corner. Three different areas of the

profile page contained the number of (fictional) mutual friends the requester and participant

shared. The friend requester's place of birth and hometown were also displayed. The number

of friends the requester had in total remained consistent for each profile and was set at 302,

an optimal number according to Tong et al. (2008). The profile consistently displayed a

profile picture (a cartoon image of the mean machine from the cartoon series Scooby-doo)

and the name of a friend of the requester (the fictional character Clarice Starling). Each

profile page also contained the text "Emily Taylor/Daniel Williams has sent you a friend

request" followed by two boxes, one containing the text "confirm request" and the other

"delete".

Interpersonal Attraction Scale. Participants completed two sub-scales of

McCroskey and McCain's (1974) Interpersonal Attraction Scale. The Physical Attraction

sub-scale contained 12 items such as "I find him/her physically attractive" and "He/she is not

good looking" (reverse scored). The social attractiveness sub-scale contained five items

including "I think he/she could be a friend of mine" and "We could never establish a personal

friendship with each other" (reverse scored). Each scale was rated on a 7-point likert scale

from strongly agree to strongly disagree with high scores reflecting high physical or social

attractiveness ratings (see Appendix 6). Eight items were reverse scored. ($\alpha = .94$).

Eye-tracking device. An Eye-Tribe C# SDK portable eye tracker was used during the

study which was positioned in the centre of a laptop computer where the back of the

keyboard and bottom of the screen meet. This hardware was supported with a custom

designed programme written in C# / .NET framework, v4.5. The eye-tracker was set to operate at 30Hz and was connected to a laptop computer by a USB3 connection.

5.4.1.3. Design

Each profile page was manipulated to show either the high attractive or low attractive female or male. The number of mutual friends the requester and participant shared was manipulated to show either 0, 1 or 5 friends. The friend requester's place of birth and hometown were either the name of the participant's hometown or Glasgow. Glasgow was chosen due to it being a well-known, English speaking, British city relatively geographically distant from south-west England. The counterbalancing of these variables resulted in each participant viewing 24 profile pages using a 2 (sex of the friend requester – male/female) x 2 (attractiveness of the friend requester – high/low) x 2(hometown – local/Glasgow) x 3 (number of mutual friends – 0/1/5) design.

5.4.1.4. Procedure

Participants completed the study individually in quiet conditions. Individuals were fully briefed and informed that the aims of the research were to better understand how individuals decided whether or not to accept Facebook friend requests. The relevance of the eye-tracking equipment, and the associated set-up procedure, were also explained. After giving their consent, participants were given instructions and some key information about the procedure. Notably, participants were told they would see a number of Facebook friend requests and needed to decide whether or not they would accept that request, imagining that this was a real request on their real Facebook page. They were informed that the page they would see was static and therefore they could not scroll the page up or down or click on any

of the links. Prior to commencing the study, it was also explained that all the female friend requesters had the same name, as did the male requesters, and that due to the random nature of the programme they may see a profile picture more than once. If this happened, they should consider the request as if it were they first time they had seen it since other information on the profile may have changed. Participants were also told they could take as much time as they needed to make their choices and there was no time limit, however the entire procedure lasted between 20-30 minutes for each participant.

Following the initial briefing, individuals were asked to assume a comfortable sitting position before being sited with their eye level approximately central to the laptop screen at a distance of 50cm. The eye-tracker was then calibrated to each individual. Participants were asked to remain still while they tracked a circle moving around the screen with their eyes only, keeping their head as still as possible. A 9-point calibration procedure was used, after which a calibration report defined the accuracy of the eye tracking on one of 6-points; Un-calibrated, Re-calibrate, Poor, Moderate, Good, Perfect. The study proceeded when a calibration accuracy of Good or Perfect had been achieved. This process took no more than 5 minutes.

Participants were presented with the first friend request and viewed the profile page. When they had reached a decision on whether or not to accept the request they used an externally-connected mouse to click the cursor on either the "Confirm Request" (accept) or "Delete" (decline) button, at which point the next friend request automatically appeared. After the 24 profiles had been presented the participants completed the Physical Attraction and Social Attraction questionnaires for each of the four (high attractive female, low attractive female, high attractive male and low attractive male) friend requesters. These questionnaires were also presented on the laptop.

In addition to collecting data concerning which profiles were accepted and which were declined, further parameters were applied to analyse the eye-tracking data. Following Scott and Hand (2016), specific Regions of Interest (ROI's) were defined which related to the manipulated variables (see Figure 6) and included the two profile pictures, three regions relating to number of mutual friends, and the two regions relating to the where the friend requester was from and their hometown. The number of fixations (NF) within each ROI and total dwell time (DT) was calculated. These two measurements are known to be reliable indicators of participants' attention to specific ROIs, with the frequency of fixations (NF) indicative of interest, and the duration of fixations (DT) indicative of processing difficulty (Scott & Hand, 2016). Data were then combined to create total NF and DT values for Photos, Mutual Friends, and Location. Participants were then fully debriefed following the task.
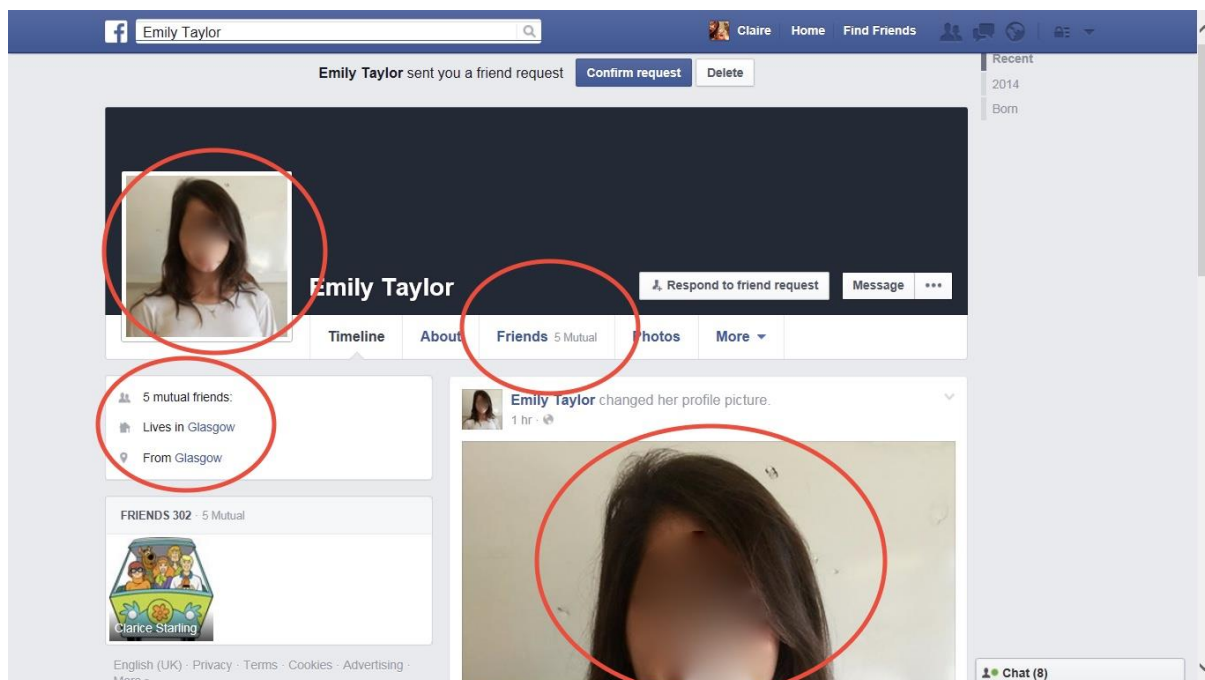
Figure 8. *Regions of Internet (ROIs) for which Dwell Time (DT) and Number of Fixations (NF) were calculated for defined areas of Profile Photos, Number of Mutual Friends, and Location (NB. Faces were not obscured for participant viewing).*

5.4.2. Study 2 Results

5.4.2.1. Study 2a: Choice Data Results

Acceptance rates for all three age groups can be seen in Table 14. Acceptance rate increased with age, as did the average number of requests accepted.

Table 14. *Percentage of Friend Requests Accepted and Mean Number of Requests Accepted (Standard Deviation in Parenthesis) for Each Age Group, and All Participants*

	Year 9	Year 11	Young Adult	All
At least one acceptance (%)	63	83	100	81
Mean no. accepted (*SD*)	3.94 (4.06)	6.90 (5.73)	9.20 (4.50)	6.56 (5.20)

Perceived Social and Physical Attractiveness. The high attractive female and male requesters were given significantly higher physical attractiveness ratings than the low attractive female and male requesters (female - $t(97) = 7.48$, $p < .001$, $d = 0.51$; male $- t(97) = 3.73$, $p < .001$, $d = 0.36$) but there was no significant difference for ratings of social attractiveness (see Table 15). However, when broken down by age group the young adolescent group only rated the high attractive vs low attractive females significantly different in terms of physical attractiveness, $t(33) = 4.23$, $p < .001$, $d = 0.46$. The older adolescent group also rated the high attractive female more physically attractive compared to the low attractive female, $t(32) = 4.22$, $p < .001$, $d = 0.49$, as well as the high attractive male vs the low attractive male more physically attractive, $t(32) = 2.31$, $p = .041$, $d = 0.39$. The young adult group also displayed this pattern of physical attractiveness ratings for the female, $t(30) = 4.54$, $p < .001$, $d = 0.88$, and male, $t(30) = 2.67$, $p = .012$, $d = 0.42$, requesters as well

as rating the low attractive female more socially attractive than the high attractive female,

t(30) -2.54, *p* = .017, *d* = 0.40.

Table 15. *Mean (Std. Dev in parenthesis) Physical and Social Attractiveness Ratings for*

Male and Female, High and Low Attractive Friend Requesters, by Age Group

		Young Adolescent	Older Adolescent	Young Adult	Total
Female High Attractive	Physical	4.47 (0.91)	4.56 (1.04)	5.62 (0.57)	4.86 (1.00)
	Social	3.75 (1.01)	3.81 (1.04)	4.97 (0.68)	4.16 (1.07)
Female Low Attractive	Physical	4.05 (0.91)	4.00 (1.22)	5.00 (0.82)	4.33 (1.09)
	Social	3.61 (1.12)	3.61 (1.12)	5.23 (0.63)	4.12 (1.24)
Male High Attractive	Physical	3.41 (0.71)	3.61 (1.21)	4.29 (1.11)	3.75 (1.08)
	Social	3.06 (1.23)	3.55 (1.25)	4.48 (1.12)	3.67 (1.33)
Male Low Attractive	Physical	3.14 (1.00)	3.18 (0.96)	3.78 (1.31)	3.36 (1.12)
	Social	3.02 (1.37)	3.27 (1.43)	4.44 (1.32)	3.55 (1.49)

A series of between subjects (Age Group) one-way ANOVA revealed age group differences in perceived physical attractiveness for the high attractive female, $F(2, 95) = 17.31$, $p < .001$, $\eta_p^2 = 0.56$, the low attractive female, $F(2, 95) = 10.11$, $p < .001$, $\eta_p^2 = 0.46$, the high attractive male, $F(2, 95) = 6.45$, $p = .002$, $\eta_p^2 = 0.37$, and the low attractive male, $F(2, 95) = 3.42$, $p = .037$, $\eta_p^2 = 0.28$. In all cases, post-hoc analyses revealed no significant difference in physical attractiveness ratings between the young and the older adolescents, but significant differences between the young adolescents and young adults, and the older adolescents and young adults (all p's $< .05$).

In addition, there were significant age group differences in perceived social attractiveness for the high attractive female, $F(2, 95) = 17.38$, $p < .001$, $\eta_p^2 = 0.58$, the low attractive female, $F(2, 95) = 28.43$, $p < .001$, $\eta_p^2 = 0.77$, the high attractive male, $F(2, 95) = 11.65$, $p < .001$, $\eta_p^2 = 0.52$, and the low attractive male, $F(2, 95) = 9.78$, $p < .001$, $\eta_p^2 = 0.52$. In all cases, post-hoc analyses revealed no significant difference in social attractiveness ratings between the young and the older adolescents, but significant differences between the young adolescents and young adults, and the older adolescents and young adults (all p's $< .01$).

There appeared to be very little relationship, however, between perceived physical and social attractiveness and the acceptance of friend requests. Perceived physical attractiveness was only correlated with acceptance of the friend request in the young adolescent group, and only for the high attractive female, $r(34) = .38$, $p = .027$, and the low attractive female, $r(34) = .49$, $p = .003$, friend requesters. Perceived social attractiveness was significantly correlated with the low attractive female, $r(34) = .47$, $p = .005$, and the high attractive male, $r(34) = .40$, $p = .021$, in the young adolescent group, and with the low attractive female in the older adolescent group, $r(33) = .43$, $p = .014$.

Predicting Acceptance of Friend Requests using Choice data. Generalized Estimating Equations were used to fit a Binomial regression with a natural log link function with Acceptance as the dependent variable. The predictor variables were Gender (Female, Male), Attractiveness (High, Low), Location (Glasgow, Hometown), Mutual Friends (0, 1, 5), and Age Group (Young Adolescent, Older Adolescent, Young Adult). The predicted interaction effects of Gender x Age Group, Attractiveness x Age Group, Location x Age Group, and Mutual Friends x Age Group were also included.

Table 16 displays the parameter estimates and the 95% Wald confidence intervals for all main and interaction effects. Requests from females significantly predicted acceptance ($OR = .35$, $p < .001$) as did requests from individuals living in the same hometown as the participant ($OR = 4.35$, $p < .001$), and those who had five mutual friends compared to either zero ($OR = 29.96$, $p < .001$) or one ($OR = 6.17$, $p < .001$). There were also main effects of Age Group with Young Adults significantly more likely to accept requests compared to the Young Adolescents ($OR = 8.59$, $p < .001$) and Older Adolescents ($OR = 3.13$, $p < .001$). Requests from females (compared to males) were significantly more often accepted by Young Adolescents ($OR = 1.39$, $p = .041$) and Older Adolescents ($OR = 2.14$, $p < .001$) compared to Young Adults. Young Adolescents also accepted significantly fewer requests from Glasgow profiles compared to the Young Adults ($OR = 0.56$, $p = .008$). Finally, interaction effects were found for Mutual Friends x Age Group such that requests from those with zero mutual friends were accepted significantly less often by Young Adolescents ($OR = 0.22$, $p < .001$) and Older Adolescents ($OR = 0.34$, $p < .001$) compared to the Young Adults, and both younger age groups were also less likely to accept requests from those with 1 mutual friend compared to the Young Adult participants (Young Adolescents $OR = 0.56$, $p = .002$; Older Adolescents $OR = 0.63$, $p = .009$).

Table 16. *Results of Regression Analysis Predicting Choices to Accept a Friend Request* †

Predictors	B (standard error)	95% Wald confidence interval
Intercept	-1.20 (.15)***	[-1.50, .91]
Gender		
Female	-1.05 (.15)***	[1.34, -.76]
Male	0	
Attractiveness		
High	-.06 (.15)	[-.35, .23]
Low	0	
Location		
Glasgow	1.47 (.20)***	[1.08, 1.86]
Hometown	0	
Mutual Friends		
0	3.40 (.27)***	[2.87, 3.93]
1	1.82 (.19)***	[1.46, 2.18]
5	0	
Age Group		
Young Adolescents	2.15 (.18)***	[1.80, 2.50]

Older Adolescents	1.14 (.14)***	[.87, 1.41]
Young Adults	0	
Gender x Age Group		
Female x Young Adolescents	.33 (.16)*	[.01, .64]
Female x Older Adolescents	.76 (.16)**	[.44, 1.08]
Female x Young Adults	0	
Male x Young Adolescents	0	
Male x Older Adolescents	0	
Male x Young Adults	0	
Attractiveness x Age Group		
High x Young Adolescents	-.28 (.16)	[-.59, .03]
High x Older Adolescents	.02 (.15)	[-.28, .32]
High x Young Adults	0	
Low x Young Adolescents	0	
Low x Older Adolescents	0	
Low x Young Adults	0	
Hometown x Age Group		
Glasgow x Young Adolescents	-.53 (.20)**	[-.93, -.14]
Glasgow x Older Adolescents	-.25 (.20)	[-.64, .14]

Glasgow x Young Adults	0	
Hometown x Young Adolescents	0	
Hometown x Older Adolescents	0	
Hometown x Young Adults	0	
Mutual Friends x Age Group		
0 x Young Adolescents	-1.50 (.26)***	[-1.96, -.94]
0 x Older Adolescents	-1.08 (.29)***	[-1.65, -.52]
0 x Young Adults	0	
1 x Young Adolescents	-.58 (.19)**	[-.95, -.21]
1 x Older Adolescents	-.47 (.18)**	[-.83, -.12]
1 x Young Adults	0	
5 x Young Adolescents	0	
5 x Older Adolescents	0	
5 x Young Adults	0	

† Regression analysis predicting risky online self-presentation was modelled using

Generalized Estimating Equations (GEE) assuming a Poisson distribution for the outcome

*$p < .05$, **$p < .01$, ***$p < .001$

5.4.2.2. Study 2a: Choice Data Discussion

The results from the choice data revealed a number of findings that supported previous literature on online and offline friendship formation, as well as the comments of the focus groups. Across all age groups there was importance placed on the number of shared friends, with acceptance increasing with the number of mutual friends, especially for the young adolescents. Not only is this indicative of individuals choosing friends who may share common interests (Rashtian et al., 2014) but potentially also reflective of safety concerns, in that individuals who share mutual friends are potentially more trustworthy. The relative importance of attractiveness, in line with focus group comments, also increased with age. The young adult participants rated all four friend requesters as more physically and socially attractive than the two other age groups, but while this group also accepted significantly more requests overall the attractiveness of the friend requester was not predictive of acceptance. In fact, the only relationship between attractiveness and acceptance was found for the youngest age group and their choice of higher attractive females. Contrary to the findings of Wang et al. (2010) attractiveness was not more important to the male participants. In line with the focus group comments, and prior research in online and offline environments (Epstein, 1983d; Mazur & Richards, 2011), the geographical location of the requester was also found to be a key decision making criteria. Far fewer friend requests were accepted from individuals living in Glasgow, particularly if they were from males. Individuals who lived in the same hometown as the participant were also more likely to be accepted if they shared at least 1 mutual friend or were more attractive. Finally, gender of the friend requester was also found to be a decision making criteria that differed by age. Female participants were more likely to accept requests from females until young adulthood when the gender of the friend requester became less relevant, in line with literature highlighting the increase in cross-sex relationships with age (Karweit & Hansell, 1983; Poulin & Pedersen, 2007).

Based on these results it was possible to ascertain specific decision making criteria which were indicative of friend acceptance for each age group. Young adolescents accepted requests from females and high attractive males who lived in the same hometown as them and had at least 1 mutual friend. Older adolescents' choices appeared to only be based on whether the requester lived in their hometown. Young adults made choices also based on whether the requester was from their hometown but also accepted more requests from females. To further investigate these initial results, eye-tracking data was analysed.

5.4.2.3. Study 2b: Eye-tracking Results

Overall trial duration (i.e., the time it took the participant to decide whether to accept or decline the friend request), total NF in the three ROI's and total DT in the three ROI's can be seen in Table 17. These seven measurements were used as the dependent variables and Age Group (Young Adolescent, Older Adolescent, Young Adult) and Choice (Accept, Decline) as the independent variables in a series of ANOVA.

There was a main effect of Age Group for trial duration, $F(2, 2115) = 10.97$, $p < .001$, with young adolescents ($p < .001$, $d = 0.36$ for trials accepted, $d = 0.11$ for trials deleted) and older adolescents ($p = .005$, $d = 0.18$ for trials accepted, $d = 0.20$ for trials deleted) taking significantly longer to reach decisions compared to young adults. Further main effects of age were found for Mutual Friends DT, $F(2, 2115) = 10.49$, $p < .001$ ($d = 0.17$), Mutual Friends NF, $F(2, 2115) = 5.15$, $p = .006$ ($d = 0.07$), and Hometown NF, $F(2, 2115) = 4.27$, $p = .048$ ($d = 0.06$), with each case representing significantly longer DT or higher NF for the young adolescent compared to the young adult group (all p's $< .01$, Cohen's d effect size for comparisons provided above).

Further main effects were found for choice, with longer trial duration, $F(1, 2115) = 5.67$, $p = .017$, $d = 0.10$, longer DT for Photos, $F(1, 2115) = 5.20$, $p = .023$, $d = 0.13$, and Hometown, $F(1, 2115) = 4.45$, $p = .035$, $d = 0.10$, and higher NF for Photos, $F(1, 2115) = 4.48$, $p = .034$, $d = 0.12$, and Hometown, $F(1, 2115) = 6.39$, $p = .012$, $d = 0.13$, for those friend requests that were accepted.

Table 17. *Mean (Standard Deviation in parenthesis) scores for Total Trial Duration (ms), Dwell Time (ms) in ROIs, and Number of Fixations in ROIs split by Age Group*

	Choice	Young Adolescent	Older Adolescent	Young Adult
Total Trial Duration	Accepted	9037.12 (9017.37)	7102.50 (6116.17)	6527.50 (4074.53)
	Declined	7099.61 (5911.38)	7233.18 (6554.72)	6146.54 (4381.78)
Photo Dwell Time	Accepted	1089.34 (1365.31)	957.74 (1074.21)	1054.67 (909.13)
	Declined	864.59 (1388.66)	908.92 (1050.37)	918.75 (932.95)
Mutual Friends Dwell Time	Accepted	1152.75 (1271.15)	694.37 (793.54)	634.86 (757.50)

	Declined	795.23	799.20	711.45
		(1066.62)	(1267.99)	(941.27)
Hometown Dwell Time	Accepted	792.29	710.20	798.83
		(1623.97)	(769.62)	(908.69)
	Declined	695.32	720.08	564.92
		(1024.98)	(970.16)	(708.81)
Photo Fixations	Accepted	3.36 (3.88)	2.95 (2.59)	3.13 (2.34)
	Declined	2.63 (2.69)	3.01 (2.91)	2.99 (2.48)
Mutual Friends Fixations	Accepted	2.09 (2.31)	1.56 (1.30)	1.44 (1.42)
	Declined	1.56 (1.75)	1.50 (1.58)	1.58 (1.60)
Hometown Fixations	Accepted	1.09 (1.62)	1.32 (1.17)	1.18 (1.05)
	Declined	.99 (1.19)	1.13 (1.24)	1.00 (1.00)

Finally, Age x Choice interaction effects were found for trial duration, $F(2, 2115) = 3.77$, $p = .023$, and Mutual Friends DT, $F(2, 2115) = 6.82$, $p = .001$, and NF, $F(2, 2115) = 5.22$, $p = .005$, in each case this related to the Young Adolescent group and Accepted friend requests.

Further analysis of the data considered whether there were relationships between how long/often participants viewed the profile photographs and their ratings of the physical and

social attractiveness of the friend requester. Small, yet significant, correlations between dwell time in the photo ROI and attractiveness rating, and the number of fixations in the photo ROI and attractiveness rating, were found. Additionally, NF and attractiveness and DT and attractiveness were more related for the Young Adult group who spent considerably longer viewing these areas for more highly rated attractive friend requesters (see Table 18).

Table 18. *Correlation between Dwell Time (DT) and Number of Fixations (NF) in Regions of Interest (ROIs) Displaying Profile Photos of the Friend Requester, and Participants' Ratings of Physical and Social Attractiveness of the Friend Requester, by Age Group.*

	Young Adolescent		Older Adolescent		Young Adult	
	NF	DT	NF	DT	NF	DT
Physical Attractiveness	.11*	.06	.12*	.11*	.14**	.19**
Social Attractiveness	.10*	.07*	.10*	.08*	.11*	.14**

 * p < .05, ** p < .001

In a series of paired-samples *t*-tests it was discovered that for all age groups there were higher NFs for photos, followed by mutual friends, followed by hometown ROIs (all *p* values < .001). However, when considering the DT in these ROIs some age differences were discovered. For young adults and older adolescents, photos received more DT compared to

mutual friends (older adolescents, $p = .008$, $d = 0.13$; young adults, $p < .001$, $d = 0.32$) and compared to Hometown (older adolescents, $p < .01$, $d = 0.20$; young adults, $p < .001$, $d = 0.37$), but there was no significant difference in DT between mutual friends and Hometown, suggesting these two areas shared roughly equal importance. In contrast, young adolescents showed higher DT for photos compared to Hometown ($p < .001$, $d = 0.15$) and for mutual friends compared to hometown ($p = .007$, $d = 0.13$) but there was no significant difference in DT between photos and mutual friends, suggesting these two variables shared roughly equal importance.

5.4.2.4. Study 2b: Eye-Tracking Discussion

According to van der Heide et al. (2012), people rely more heavily on profile pictures displayed on SNSs than textual information when forming an impression. The findings in the current study indicate that, across all age groups, participants spent more time considering profile pictures to draw conclusions about the friend requester. This may be a natural consequence of the profile pictures covering a larger area of the profile page compared to ROIs dedicated to mutual friends or location information, but also it is likely that this picture is highly informative. Taking into consideration the findings from the choices data, participants can very easily gather information about the gender of the requester, their approximate age, and some cues regarding both physical and social attractiveness from the picture, all of which were relevant variables to participants when making their choices.

Overall the young adolescent group took longer to make decisions, deliberating over the content on the profile page for those friend requests that were accepted and declined. However, trial duration was even longer for those requests that were accepted, suggesting that the process of decision making was more deliberative for the youngest participants. In

addition to the profile photo, the young adolescent participants also displayed more DT and NF for areas reflecting information about mutual friends, compared to the older participants. This finding further supports the results from the choices data that the number of mutual friends is a key variable in the decision making process for young adolescents and also that number of mutual friends is a key decision criterion for friend requests from strangers (Rashtian et al., 2014).

Although the choices data revealed that the hometown of the requester was an important variable in the decision to accept the request, the eye-tracking data showed that ROIs related to location had the least DT and NF. This does not necessarily mean that this information is not important, but could simply reflect an element of the decision process that requires very little deliberation. Arguably, the location of the requester is a binary question (does this person live in the same town as me?) that can very quickly be answered. If the participant's decision rules are focussed on only accepting requests from local individuals, then this information need only be considered very briefly.

Findings from this dataset revealed further information pertaining to different decision making processes for each age group. While the profile picture showed the most DT and NF overall, the young adolescents deliberated equally over the number of mutual friends while location had the briefest DT and fewest NF. In contrast, for older adolescents and young adults, the photo again received the most DT and NF. However, consideration of mutual friends and location were considered equally, and much less so than the photo.

5.5. General Discussion

In the offline world, young people are warned about 'stranger danger' from a very young age, with educational programmes focussed on this subject stretching back over 30

years (Newiss, 2014). This study investigated what might attract a young person to accept a friend request from a stranger on the most popular worldwide SNS, Facebook, using a mixed-methods approach to explore this under-researched topic.

Decades of research into the formation of offline friendships tells us that, typically, young people are attracted to others because of similarities in status and similarities in values and beliefs (McPherson et al., 2001). However, Facebook friend requests from strangers typically contain sparse information about the friend requester until the request is accepted. Therefore, individuals must base their decision on limited information or cues. Conducting focus groups with individuals of different age groups enabled me to gain some insight into what these variables might include. What the individual looked like, where they lived, and how many mutual friends were shared, were all highlighted as key considerations. By creating realistic (but fake) profiles and counterbalancing these variables this study was able to further investigate the information about friend requesters that adolescents and young adults consider in their decision-making process.

Concordant with literature concerning friendship formations online and offline, the acceptance of requests from members of the opposite sex increased with age (Poulin & Pedersen, 2007; Mazur & Richards, 2011) and requests were more likely to be accepted from individuals who lived in the same hometown as the participant (Mazur & Richards, 2011). However, attractiveness did not explicitly play a role in decision making, such that requesters who had previously been rated as more attractive were not accepted more than those who were rated lower in attractiveness, contrary to the findings of Wang et al. (2010). However, the analyses did reveal that the older participants spent longer looking at the profile pictures of individuals they rated as more physically and socially attractive. One possible explanation for this is that the high and low attractiveness ratings were not disparate enough for a truly perceivable difference to exist.

Young adolescents spend longer making their decisions compared to older adolescents and young adults. When viewing the profile page, they give greater consideration to the profile picture and how many mutual friends the requester shares. This younger age group are more likely to then choose to accept requests from females. They are also more likely to reject requests from individuals who do not share mutual friends and those who do not live locally. Young adolescents make quicker decisions to reject if the requester does not live locally, but if they do live in the same hometown they give more consideration to the physical appearance of the individual (via the profile picture) and also the number of mutual friends.

Older adolescents and young adults appear to share similar decision strategies. They are also more likely to choose to accept requests from females and those with more mutual friends, as well as those that live locally. However, their strategies appear somewhat different to the younger participants when considering their eye-movements during the process. Decisions were made more quickly, particularly those to reject, and location and number of mutual friends were given less consideration than the profile picture.

These findings suggest that individuals have relatively clear ideas about what they consider attractive in potential Facebook friends. As highlighted by Guadagno et al. (2013), the information contained on SNSs can be overwhelming, and therefore individuals utilise more heuristic cues rather than engaging in deliberative decision making. The salience of these cues is further highlighted by the information search strategies identified via the eye-tracking data, and these strategies are indicative of risky decision making as outlined in Fuzzy Trace Theory (FTT; Brainerd & Reyna, 1990). The longer duration of trials for younger participants reflects a more deliberative process based on increased verbatim reasoning. For instance, if the young adolescent notes that the requester lives locally (potentially a gist strategy that would lead to immediate rejection if they are not local) they

then spend longer than older participants deliberating the number of mutual friends (perhaps considering whether one mutual friend is enough, given the other variables, or who those mutual friends might be) and also the profile photo (perhaps ascertaining gender, whether the individual is physically and socially attractive, and of similar age). This greater reliance on verbatim reasoning naturally involves more deliberation, weighing up the pros and cons of any decision, leading to a longer trial duration and increased DT in the ROIs.

In contrast, both older adolescents and young adults give much less consideration to the number of mutual friends and hometown. This reflects potential gist reasoning of this information. If the individual does not live locally they may be instantly rejected, and if they share zero mutual friends they may be rejected. Then any further deliberation can be focussed on the physical attributes as denoted by the profile picture. This approach is reflected by quicker decision making overall and shorter DT in the ROIs. These developmental differences have previously been highlighted using eye-tracking procedures, revealing that young adults employ significantly more heuristic compared to analytic processing of information in risky gambling tasks (Kwak, Payne, Cohen & Huettel, 2015).

The main contrast with FTT, however, is the notion that gist reasoning is somehow protective of risky decision making and yet, in the sample used in this study, the older participants were considerably more likely to accept a stranger's friend request. In fact, acceptance increased linearly with age. This finding may be explained in two ways. Firstly, according to Sunstein (2008), older adolescents and young adults may well begin to reason more heuristically as they get older, but this reasoning is only effective if they have sufficient experience to form relevant cues. In line with FTT, the formation of gist representations of risk is often based on experience (Reyna & Lloyd, 2006), so if experience is lacking or inappropriate (e.g., my friend has hundreds of unknown Facebook friends and has never had a bad experience) then these gist cues will not be informative against risk-taking.

Consequently, as highlighted in sexual health interventions (Reyna & Mills, 2014) young people need to be armed with these easy to retrieve and salient gist representations to increase retrieval and effectiveness. Secondly, there is the issue of perceived risk. With stranger friending behaviour so commonplace, and the objective risks associated with such behaviour generally low, it is arguably not considered to be a risky behaviour by young people. Consequently, the participants in this study may not have deemed the acceptance of these requests as risky in this particular domain. Future research should ascertain individual's risk perceptions of this type of online behaviour.

In addition, making friends with new people is a normal and frequent behaviour for most undergraduate students. Therefore, the young adults in this study may well have simply been continuing a behaviour online which they frequently engage in offline. However, despite good support for developmental theories of decision making highlighted in previous chapters of this thesis, these observations are currently speculative and require more in depth research in order to fully support the notions of FTT.

Some limitations need to be noted. The equipment used during the eye-tracking process was a portable variation of the typical static equipment used. There were a number of benefits associated with this equipment. It was convenient, in terms of being able to visit various locations to carry out the research, and was quick and easy to set-up at each location. In addition, using this equipment helped to foster a more natural environment by allowing the participant to complete the study without being constrained by apparatus. However, this freedom also created issues that could not be controlled. For instance, the location, lighting, distance from the screen, and head movement of the participant could not be controlled, possibly impacting on the quality of the eye-tracking data obtained. Future investigators interested in furthering this research should consider employing static, and therefore potentially more reliable, equipment.

Additionally, based on the information obtained from the focus groups, only the relevance of a small number of variables on the decision to accept or reject the friend request was investigated. While the profile and timeline of non-friends on Facebook is more restricted, it is possible to link to information such as the individual's friends' profiles and specifically which mutual friends are shared. This then allows further consideration of the friend request which may reveal additional details on popularity (Dijkstra et al., 2012), hobbies (Burgess et al., 2011) and values and beliefs (Epstein, 1983c; Linden-Andersen et al., 2008; McPherson et al., 2001) for example, which have been identified as relevant considerations in friendship formation in other online and offline research.

Notwithstanding these limitations, this is the first study of this kind to consider why young people might accept a friend request from a stranger on Facebook, using both exploratory and experimental methods. These results not only enhance our understanding of which variables individuals consider when they receive the request, but also how they go about making their decision. Current online safety education programmes tend to deem age differences as indicative of different online activities. As such, the programmes are tailored to address these different activities. For example, children and young adolescents are warned against sharing personal information with strangers and are encouraged to engage in appropriate online behaviour (i.e., not cyberbullying). Older adolescents are mainly targeted with programmes designed to tackle the issues of sexting and sharing (nearly)nude images. Finally, adults are predominantly warned about the potential risks of identity theft and cyber-fraud. However, this study clearly identifies that individuals across a broad age range are engaged in the same online behaviours, that could potentially lead to exposure to any number of risks (e.g. grooming, cyberbullying, identity theft, and cyber-fraud). Therefore, this is a specific behaviour that ought to be focussed upon within intervention strategies. In addition, the age differences that were discovered relating to the decision to accept or reject a friend

request from a stranger are important when considering how to more effectively tailor safety messages. For instance, research which has used FTT as a basis to develop interventions that promote healthy sexual behaviours (e.g., Reyna & Mills, 2014) highlights that arming young people with easy to retrieve, salient gist cues, which guard against risky behaviours are effective at increasing risk perception and reducing risky behaviour. These same strategies could be integrated into online safety interventions focussing on friending strangers online. For instance, *If not from your hometown then reject* and *If you do not share mutual friends then reject,* are gist cues that would trigger a decision. Focussing these cues on the variables that are most important to each age group might further enhance the effectiveness of these interventions. As such, the young person will retain some element of control over the decisions they make, yet still quickly and effectively tend towards less risky behaviour.

Chapter 6

A Cross-Cultural Study of Risky Online Self-Presentation

This chapter is strongly based on a published paper (White, Cutello, Gummerum, & Hanoch, 2017)

6.1. Abstract

The use of social media is pervasive amongst young adults. However not all posted content is beneficial to their self-presentation, but can have negative and damaging consequences. This study investigated how individual differences in self-monitoring and impulsiveness influence risky online self-presentation in British and Italian samples. British participants ($n = 88$) were more likely to post comments and images related to their alcohol and drug use, while Italian ($n = 90$) participants posted more offensive content and personal information. High self-monitoring and high impulsiveness was positively predictive of risky self-presentation online regardless of nationality, highlighting the normative influence of social media culture, and the influence of both spontaneous and deliberative behaviour on posting inappropriate content online. These novel insights regarding the way young adults present themselves on social network sites could help explain differences in self-presentation.

6.2. Introduction

Social Networking Sites (SNS) are extremely popular among adolescents and young adults, providing them with a unique platform to enhance their social development (Yang &

Brown, 2016), increase social capital (Moll, Pieschl, & Broome, 2014), and find academic and employment opportunities. However, not all user-generated content on SNSs is appropriate or even legal. Young adults often use SNSs to share images of alcohol and drug consumption (Drouin & Miller, 2015; Morgan, Snelson, & Elison-Bowers, 2010), disseminate personal information (Nosko, Wood, & Molema, 2010; Peluchette & Karl, 2010), and post (semi-)nude selfies (Sarabia & Estevez, 2015). Since young internet users from different European countries have been shown to behave differently and experience different risks online (Haddon, Livingstone, & the EU Kids Online Network, 2012) this study investigated individual and cultural differences in risky online self-presentation in the U.K. and Italy.

Most users report that they would be happy for their friends and family to view their SNS posts. However, many worry about future employers or strangers gaining access to this information (Peluchette & Karl, 2008). In fact, almost 40% of British, Canadian, and US companies now use SNSs to check candidates' suitability (Beeger, 2007; Cerasaro, 2008; Simpson, 2015). Individuals have been fired from jobs (Shaw, 2013), resigned from public office (Kingkade, 2015) and suspended from higher education (Subrahmanyam, Reich, Waechter, & Espinoza, 2008) because of disparaging social media posts. At the same time, researchers (Marder, Joinson, Shankar, & Thirlaway, 2016) have argued that positive self-presentation on SNSs is more vital than ever due to the "nonymous" (Marder et al., 2016) nature of these sites. Indeed, self-presentation management, successfully portraying a positive image of oneself while avoiding creating an unfavourable one, appears to run counter to posting potentially damaging information online (Snyder & Gangestad, 1986). Therefore, it is vital to understand the processes that might underlie the propensity to self-disclose personal and unfavourable information on SNSs.

It is debated how much (cognitive) effort individuals invest in online self-presentation. Some suggest that postings on sites such as Instagram or Twitter are spontaneous (Marder et al., 2016) and may be linked to impulsivity (Drouin & Miller, 2015). Risky online posts on SNSs, therefore, might be driven by individuals not spending time and cognitive efforts on thinking about the (negative) effects of those posts. Others (Marder et al., 2016) indicate that online personas, particularly on dating sites, are carefully crafted and edited until an ideal-self is presented, suggesting a fully deliberated approach. One fundamental factor in such a deliberate approach to online self-presentation might be self-monitoring, typically defined as an individual's ability to regulate their physical and emotional self-presentation such that situationally appropriate, favourable self-images are maintained (Snyder, 1987). Individuals high in self-monitoring adapt the information they present of themselves based on social and interpersonal cues and norms. Thus, high self-monitors adjust their self-presentation to fit with what they perceive to be favoured by others in a particular situation. Conversely, low self-monitors maintain a consistent self-image more akin with their 'true' selves, personality and beliefs (Snyder, 1987). Individuals low in self-monitoring are also typically more impulsive (Snyder, 1987), probably because they do not have to adapt their self-image to different situations.

This study investigated whether risky online posting on SNSs are associated with spontaneous (i.e., impulsive) or deliberate (i.e., self-monitoring) processes. Previous research indicates that impulsivity is positively related to risky online self-disclosure (Drouin & Miller, 2015). However, since high self-monitors strive to amend their self-presentation in line with perceived social and situationally-appropriate norms (Snyder, 1987), people high in self-monitoring might also be more likely to post risky information on SNS, because they perceive this to be the "right thing to do" in these situations.

While previous research highlighted cultural differences in the perception and use of social media (Al Omoush, Yaseen, & Alma'aitah, 2012; Brandtzaeg & Heim, 2009; Jackson & Wang, 2013; Kobayashi & Boase, 2014; Recabarren, Nassbaum, & Leira, 2008) and internet performance and ability (Hofstede, Hofstede, & Minkov, 2010), cultural variations in risky online self-presentation and its underlying processes have rarely been considered. Karl et al. (2010) argued that cultural variations, based on Hofstede's (2001) six cultural dimensions, could elucidate differences in online risky self-presentation. American, compared to German, students were more likely to post inappropriate material (e.g. sexual content) on their profiles, due in part to the lower Uncertainty Avoidance and higher Individualist culture in America (Chau, Cole, Massey, Montoya-Weiss, & O'Keefe, 2001). The behaviour of young adults from Italy and the U.K. were compared, which differ particularly on Uncertainty Avoidance and Indulgence. British culture scores low on Uncertainty Avoidance resulting in a relaxed attitude towards uncertainty and an acceptance to take things as they come (Hofstede, 2001). Conversely, Italian culture scores high on Uncertainty Avoidance, indicating intolerance for beliefs and behaviours outside the norm and more rigid codes of conduct. Additionally, the British high score on the Indulgence dimension is associated with an inclination to gratify desires for the purposes of fun and enjoyment, while Italy's lower score on this dimension is associated with a suppression of gratification to preserve social normative expectations (Hofstede, 2001).

In sum, it was hypothesised that (i) people high in impulsiveness would display higher rates of risky online self-presentation; (ii) participants high in self-monitoring should engage in higher rates of risky online self-presentation; (iii) there would be an interaction between self-monitoring and impulsiveness; (iv) due to their higher cultural scores on Indulgence and lower scores on Uncertainty Avoidance British participants would score higher on impulsivity compared to Italians. Therefore, impulsivity would be a stronger predictor of

risky online self-presentation for British participants; (v) due to their higher cultural scores in Uncertainty Avoidance and lower scores in Indulgence, Italians should show higher self-monitoring than British participants. Consequently, self-monitoring should be a stronger predictor of risky online self-presentation for Italian participants. A Self-Presentation measure and time spent online were also included as control variables.

6.3. Method

6.3.1. Participants

One hundred and seventy-eight British (N=88, M_{age} = 20.87 years, SD = 4.92, 73 Female) and Italian (N=90, M_{age} = 22.37 years, SD = 2.06, 57 Female) participants were recruited to complete an online questionnaire. All were undergraduate students, who received course credit for their participation.

6.3.2. Materials

Social Network Use. Participants indicated which of the top 10 social networking sites in Britain, and Italy (Ten Most Searched…, 2015) they frequented and how many hours per week they used each site.

Online Risk Exposure. To measure risky online self-presentation we designed a risk exposure scale containing 19 items relating to potentially risky images or texts that individuals could post online, such as drug and alcohol use, sexual content, personal details, and offensive material. This scale was pilot tested in the U.K. and Italy, and any ambiguous items were re-worded for clarity. Participants indicated whether they had engaged in these activities in the past by responding No (0), Don't Know (1) or Yes (2). If individuals responded 'Don't Know' or 'Yes' they were asked to state which SNSs these postings were on. A risk exposure score, engagement x number of SNSs, was calculated. The items were

then categorized by five independent coders into four content areas: Alcohol/Drugs, Sexual, Personal, and Offensive Content Exposure (Cohen's κ = .84).

The Values Survey Module (VSM; Hofstede & Minkov, 2013) assessed cultural differences on six dimensions: Power Distance, Individualism vs. Collectivism, Masculinity vs. Femininity, Uncertainty Avoidance, Long- vs. Short-Term Orientation, and Indulgence vs. Restraint. The 24 items were scored on a 5-point scale (scored 1-5), and country scores on each dimension calculated using specific index formulae (see Hofstede & Minkov, 2013).

Self-Presentation. The Psycho-social Aspects of Facebook Use (PSAFU) Scale (Bodroza & Jovanovic, 2016) evaluates a range of psychological behaviours on Facebook. Only the Self-Presentation sub-scale was utilised, which contained eight items. Items were tailored to represent social media use in general by removing reference to Facebook specifically. Participants responded on a 5-point scale (1 = *It doesn't refer to me at all* to 5 = *It completely refers to me*) and scores for the eight items were summed (α = .87).

The Self-Monitoring Scale (Snyder, 1987) measured individuals' active control of their behaviour and the way they presented themselves to others. Participants answered "True" or "False" to 18 statements. Each statement was predefined as requiring a specific response to reflect a high self-monitoring individual. As such, 10 statements were keyed as False and eight statements were keyed as True. High self-monitors answered in the keyed direction (1) while low self-monitors answered in the opposite direction (0). Because the answer options on this scale were binary, the polychoric ordinal alpha was calculated (α = .80) (Gadermann, Guhn, & Zumbo, 2012).

The Eysenck Impulsivity Inventory (Eysenck, Pearson, Eastings, & Allsopp, 1985) Impulsiveness sub-scale asked participants to answer Yes (1) or No (0) to 19-items (α = .82).

Full details of the measures used in this study, response scales and scoring methods can be seen in Appendix 7.

6.3.3. Design

Two different designs were used. The first was a between subjects design using nationality (British or Italian) as the dependent variable and the four different risky content areas (alcohol/drugs, sexual, personal information, and offensive content), self-monitoring, self-presentation, and impulsiveness as the independent variables. The second used Risky Online Content as the outcome variable, and nationality, self-presentation, self-monitoring, impulsiveness, and weekly time spent online as the predictor variables.

6.3.4. Procedure

The questionnaire was first produced in English before being translated and back-translated to from Italian to English. All participants provided consent before completing the questionnaire online.

6.4. Results

British participants used significantly more SNSs but did not spend more time on these sites each week compared to Italian participants (Table 19). Italians scored considerably higher on Masculinity and Uncertainty Avoidance, while the British showed a higher score for Long-term Orientation and Indulgence (Table 20).

Table 19. *Mean Scores (and standard deviation in parenthesis) and Results of the Independent Samples t-test with effect size for Risky Online Self-Disclosure in the Four Content Areas for the British and Italian Participants*

Risky Content Type	British	Italian	t, df, p, d
Alcohol/Drug content	7.00 (6.83)	3.82 (5.71)	3.35, 167.59, .001, 0.51
Sexual content	7.65 (10.90)	5.08 (8.18)	1.77, 157.80, .079, 0.27
Personal content	1.46 (2.60)	3.61 (3.95)	-.425, 155.40, <.001, 0.64
Offensive content	12.99 (15.50)	24.93 (26.45)	-3.68, 144.84, <.001, 0.55

Table 20. *Country Scores for Sub-Scales of the Values Survey Model for Britons and Italians*

VSM sub-scale	Britain	Italy
Power Distance	31.99	22.42
Individualism	38.58	38.08
Masculinity	8.01	45.38
Uncertainty Avoidance	13.81	38.57
Long-term Orientation	40.44	8.07
Indulgence vs Restraint	72.52	62.64

A series of independent samples *t*-tests (Table 19) with risky self-presentation (alcohol/drug; sexual; personal; offensive) as the dependent variable and nationality (British; Italian) as the independent variable was conducted. British participants posted significantly more images/comments containing alcohol and drug content than Italian participants. Italian participants posted significantly more personal information and offensive content than British participants. There was no significant cultural difference for sexual content postings.

A series of independent samples *t*-tests (Table 21) revealed no significant cross-cultural difference on the self-monitoring scale. However, British participants scored significantly higher on Self-Presentation and marginally significantly higher on impulsiveness.

Table 21. *Mean Scores (and standard deviation in parenthesis) and Independent Samples t-test Results (effect sizes for significant results) for Self-Monitoring, PSAFU, and Impulsiveness for British and Italian Participants*.

Scale	British	Italian	t, df, p, d
Number of SNS Used	5.30 (1.47)	4.24 (1.34	4.98, 176, <.001, 0.75
Time Weekly on SNS	15.72 (8.58)	13.96 (7.21)	.15, 176, .140
Self-Monitoring	9.78 (2.83)	9.01 (3.12)	1.77, 177, .079
PSAFU	26.70 (6.57)	20.77 (7.35)	5.72, 177, <.001, 0.85
Impulsiveness	8.21 (4.75)	6.87 (3.87)	1.94, 176, .054, 0.31

A full breakdown of correlations for each country can be seen in Tables 22 and 23. For both British and Italian participants, weekly time spent on SNSs was correlated with the number of SNSs used and with sexual content disclosure, and alcohol/drug content disclosure for the Italian participants. For both samples, posting offensive content was significantly related to posting risky content in the other three content areas. The impulsiveness scale was significantly positively correlated with alcohol/drug, personal information and offensive content postings for the British participants, and with alcohol/drug postings and offensive content for the Italian participants. Scores for Self-Presentation were negatively significantly correlated with offensive content postings for the British sample.

Self-monitoring was significantly related to risky online postings in both samples. For British participants, significant correlations were found for alcohol/drug content, sexual content and personal content. For Italian participants there was a significant relationship between self-monitoring and alcohol/drug content, personal content, and offensive content.

Generalized Estimating Equations were used to fit a Poisson regression with a natural log link function with risky online postings on SNSs as the dependent variable. The predictor variables were Nationality (Italy, U.K.), Risk Type (Alcohol/Drug Use, Sexual Content, Personal Information, Offensive Content), Self-Monitoring, Impulsiveness, Self-Presentation, and Weekly Time Spent Online. The predicted main effects of Impulsiveness, Self-Monitoring, and Nationality were included, as well as the predicted interaction effects of Impulsiveness x Self-Monitoring, Nationality x Impulsiveness, and Nationality x Self-Monitoring. Furthermore, Risk Type, Self-Presentation, and Weekly Time Spent Online were added as control variables. Since the descriptive analysis revealed country differences in risky online postings by risk type, the interactions of Nationality x Risk Type x Impulsiveness and Nationality x Risk Type x Self-Monitoring were additionally entered.

Table 22. *Correlations Between Risky Self-Disclosure (alcohol/drugs, sexual, personal, offensive), Self-Monitoring, PSAFU, and Impulsiveness for the British Participants*

	1	2	3	4	5	6	7	8	9
1.Weekly Time on SNS									
2.No. of SNSs	.56**								
3.Alcohol/Drug Disclosure	.17	.13							
4.Sexual Disclosure	.27*	.18	.41**						
5.Personal Disclosure	.20	.14	.33*	.15					
6.Offensive Disclosure	.05	-.001	.30**	.23*	.30**				
7.Self-presentation	.13	.20	-.04	-.05	.01	-.39**			
8.Self-monitoring	.09	-.02	.31**	.23*	.30**	.01	.18		
9.Impulsivity	.16	.07	.29**	.09	.30**	.28**	.10	.33**	

* *p<.05 ** p<.01*

166

Table 23. *Correlations Between Risky Content Area Postings (alcohol/drugs, sexual, personal, offensive), Self-Monitoring, PSAFU, and Impulsiveness for the Italian Participants.*

	1	2	3	4	5	6	7	8	9
1.Weekly Time on SNS									
2.No. of SNSs	.33**								
3.Alcohol/Drug Disclosure	.26*	.001							
4.Sexual Disclosure	.25*	.12	.19						
5.Personal Disclosure	.21	-.01	.05	.21*					
6.Offensive Disclosure	.15	.04	.22*	.46**	.32**				
7.Self-presentation	.10	.17	.09	.03	.19	.20			
8.Self-monitoring	.07	-.08	.26*	.07	.24*	.21*	.11		
9.Impulsivity	.20	.07	.27*	.07	.17	.24*	.14	.21*	

* p<.05 ** p<.01

167

Table 24 displays the parameter estimates and the 95% Wald confidence intervals for all main and interaction effects. Impulsiveness (*OR* = 1.07, *p* = .04) and self-monitoring (*OR* = 1.16, *p* = .01) positively predicted risky online postings. Overall, Italians (*OR* = 1.54, *p* = .02) posted more risky content than U.K. participants. Those participants who spent more time online showed more risky online self-presentation (*OR* = 1.02, *p* = .02). Risky online postings differed by risk type; participants took significantly less risks when giving out personal information (*OR* = .51, *p* < .01), and significantly more risks when posting offensive content (*OR* = 3.86, *p* <.01). A three-way interaction also revealed that U.K. participants who scored higher in self-monitoring posted significantly less offensive content (*OR* = 1.18, *p* = .01).

Table 24. *Results of Regression Analysis Predicting Risky Online Self-Presentation*†

Predictors	*B* (standard error)	95% Wald confidence interval
Intercept	1.08 (.21)**	[.67, 1.48]
Nationality		
UK	0	0
Italy	.43 (.18)*	[.07, .79]
Impulsiveness	.07 (.03)*	[.004, .14]
Self-Monitoring	.15 (.06)*	[.03, .27]
Self-Presentation	-.01 (.01)	[-.03, .02]

Weekly time online	.02 (.01)*	[.003, .03]
Risk type		
Alcohol/Drugs	0	0
Sexual content	.21 (.14)	[-.06, .47]
Personal information	-.68 (.15)**	[-.98, -.39]
Offensive content	1.35 (.13)**	[1.10, 1.61]
Nationality x Impulsiveness		
UK x Impulsiveness	0	0
Italy x Impulsiveness	-.004 (.04)	[-.09, .08]
Nationality x Self-Monitoring		
UK x Self-Monitoring	0	0
Italy x Self-Monitoring	-.07 (.06)	[-.19, .06]
Impulsiveness x Self-Monitoring	-.005 (.01)	[-.02, .01]
Country x Risk Type x Impulsiveness		
UK x Alcohol/Drugs x Impulsiveness	0	
UK x Sexual content x Impulsiveness	-.06 (.04)	[-.14, .02]
UK x Personal information x Impulsiveness	-.03 (.04)	[-.11, .06]
UK x Offensive content x Impulsiveness	-.01 (.04)	[-.08, .06]
Italy x Alcohol/Drugs x Impulsiveness	0	
Italy x Sexual content x Impulsiveness	-.05 (.04)	[-.13, .04]

Italy x Personal information x Impulsiveness	-.04 (.04)	[-.12, .05]
Italy x Offensive content x Impulsiveness	-.02 (.04)	[-.09, .06]
Country x Risk Type x Self-Monitoring		
UK x Alcohol/Drugs x Self-Monitoring	0	
UK x Sexual content x Self-Monitoring	.04 (.07)	[-.12, .18]
UK x Personal information x Self-Monitoring	-.05 (.08)	[-.20, .11]
UK x Offensive content x Self-Monitoring	-.16 (.06)*	[-.28, -.05]
Italy x Alcohol/Drugs x Self-Monitoring	0	
Italy x Sexual content x Self-Monitoring	-.05 (.04)	[-.14, .03]
Italy x Personal information x Self-Monitoring	.01 (.06)	[-.12, .13]
Italy x Offensive content x Self-Monitoring	-.02 (.05)	[-.12, .09]

† Regression analysis predicting risky online self-presentation was modelled using Generalized Estimating Equations (GEE) assuming a Poisson distribution for the outcome

*p <.05, **p <.001

6.5. Discussion

Social media use is pervasive among young adults (Pew Internet Research Center, 2015), yet with so much emphasis on maintaining a good online reputation, little is known about why some individuals post potentially negative or damaging comments and images. To address this important question, this study investigated psychological factors which may influence risky online activity, namely self-monitoring, and impulsiveness. It was expected

that higher impulsiveness and self-monitoring would predict higher rates of risky online postings. Concordant with predictions, and with earlier findings (Drouin & Miller, 2015; Peluchette & Karl, 2010), the data indicated that impulsiveness was predictive of online risky postings. This is very much in line with previous research on impulsivity, and online (e.g., posting illegal content [Drouin & Miller, 2015], problematic internet use [Jeske, Briggs, & Coventry, 2016; Mottram & Fleming, 2009] and internet addiction [Zhang, Mei, Jingxin, Chae, Li, & Du]) and offline risk-taking (e.g., alcohol and drug use, smoking, risky sexual behaviour [Zuckerman & Kuhlman, 2000]). The findings here extend this research to the study of risky online self-presentation.

Self-monitoring was also positively predictive of risky online posting activities. Superficially, posting details of drug consumption or sexually provocative images may not appear appropriate when considering that an individual's post is visible to current and/or potential employers (Marder et al., 2016). However, people high in self-monitoring behave in what they perceive is a situationally appropriate way (Snyder, 1987), and online identity is argued to be a product of the online social environment (Marder et al., 2016). Consequently, if individuals perceive risky postings as common, or the norm, on SNSs they may follow these normative expectations (Sarabia & Estevez, 2015). Furthermore, people are often driven by the pleasure related to their self-disclosure (i.e. likes) despite (or maybe due to) the potential risks involved (Krasnova, Kolesnikova, & Guenther, 2009). Some (Marder et al., 2016) have argued that individuals present themselves on SNS in ways that are congruent with both the standards of the online spectators as well as the value that those spectators can bring to the individual. High self-monitoring SNS users often experience 'audience segregation difficulties' (Leone & Corte, 1994) however, and are unable to effectively distinguish between groups of spectators and what is appropriate self-presentation. Thus, posts that may be highly inappropriate on a career networking site may seem situationally

appropriate on Facebook where this behaviour may be the norm. Indeed, many Facebook users utilise provocative pictures in order to be noticeable on SNSs (Marder et al., 2016), or to gain positive attention from friends (Petronio, 2002). The high self-monitoring participants clearly used SNSs as platforms to self-present themselves as 'cool' where this behaviour was valued and rewarded. Consequently, future research should more closely investigate how different risky posting behaviours are exhibited across different SNSs in relation to self-monitoring.

British participants scored higher on impulsiveness, lower on self-monitoring, lower on Uncertainty Avoidance, and slightly higher on Indulgence, compared to Italian participants. However, the data did not support the hypotheses that the processes underlying risky online posting (i.e., impulsiveness, self-monitoring) differed by country. Thus, it can be cautiously concluded that the psychological processes affecting risky online behaviour might be similar across culture. This would be in line with research on offline risk-taking, which has shown strong similarities in the factors influencing risk-taking across cultures (Deardorff, Gonzales, Christopher, Roosa, & Millsap, 2005; Kleop, Guney, Cok, & Simsek, 2007; Steinberg, 2008).

The results did, nonetheless, reveal differences by country for the types of risky self-presentation. U.K. participants were more likely to post images/comments of alcohol/drug use, whereas Italian participants posted personal information and offensive content. These findings could be attributed to the binge drinking culture in the U.K. (Measham & Brain, 2005) and by the Italian's high score on the Masculinity dimension of the VSM (Hofstede, 2001) which, coupled with low Uncertainty Avoidance, produce individuals who are highly passionate, emotional and expressive of their opinions. As such these social norms are expected to migrate to SNSs. However, the lack of differences between the U.K. and Italian participants in terms of what influences risky online self-presentation points to the

pervasiveness of cyberculture (Bell, 2007) and the possibility that internet cultures exact more influence than one's nationality (Macfayden, Roche, & Doff, 2004). This is certainly a promising area for future research.

There are some limitations to these findings. First, the samples were not representative of all British or Italian internet users. Research with participants from other cultures could determine if there are more widespread cultural differences in risky online posting behavior. Additionally, the self-monitoring and impulsiveness scales were focussed on offline behaviour and therefore may not reflect how individuals regulate their behaviour online. Since no online self-monitoring scale appears to exist this is a further area of potential future research.

What these results nicely reveal is that young people can behave both spontaneously and deliberately in their risky online postings on SNSs depending on the situation (Van Gool, Van Ouytsel, Ponnet, & Walgrave, 2015; Wang, Leon, Chen, Komandur, & Norice, 2013). Furthermore, postings, that may be viewed as impulsive (i.e. drug consumption), may turn out to represent deliberate choices that are driven by people's self-monitoring strategy. More deliberative risky decision making has been shown to result in higher rates of risk-taking in online situations by adolescents and young adults (White, Gummerum, & Hanoch, 2015; 2016). The findings support these previous studies, highlighting that the deliberate consideration of risks and rewards can result in potentially negative outcomes. These important revelations about young adult's online self-presentation behaviour have not previously been considered.

While young adults tend to focus less on being employable and are, therefore, less concerned about the potential future use of the information that can be harvested online (Chau et al., 2002; Nosko et al., 2010), many individuals come to regret previous online

disclosures (Dhir, Kaur, Chen, & Lonka, 2016; Wang et al., 2013). Consequently, further research will not only enable better understanding of this counterintuitive behaviour, but help to develop educational and technological strategies to enable young people to more appropriately manage their online self-presentation in order to avoid future regret and unfavourable consequences.

Chapter 7

General Discussion

"The biggest risk is not taking any risk…In a world that is changing really

quickly, the only strategy that is guaranteed to fail is not taking risks".

Mark Zuckerberg (founder of Facebook)

7.1. Background

The internet, and social media in particular, is becoming ever enmeshed in our daily lives. For some, reality and virtual reality are almost indistinguishable, and with the rise of online connectivity, and social networking, it has become increasingly vital to better understand human behaviour in this context. The aim of this thesis was to build on the scant research published to date, by focussing on risky online behaviours and investigating some of these behaviours within the framework of Fuzzy Trace Theory, as well as exploring the role of self-monitoring, impulsivity and culture.

It is somewhat ironic that Mark Zuckerberg believes that risk-taking is necessary in the modern world, because it is clear that some risky behaviours, when using social media, can lead to increased risk of victimisation online and offline (Livingstone, Masheroni, Olafsson, & Haddon, 2014; Wolak, Mitchell, & Finklehor, 2007) with negative consequences for children, adolescents, and adults (Age U.K., 2015; Byrne, Kardefelt-Winther, Livingstone, & Stoilova, 2016; Federal Bureau of Investigation [FBI], 2015; Livingstone et al., 2014). Understanding why people are willing to take these risks, and how this type of risk-taking can potentially be avoided, could greatly reduce the number of victims. With research suggesting that regular internet use begins at as young as three years old (Ofcom,

2016), and the U.K. Government aiming to have 90% of the adult population online in the next three years (Cabinet Office, 2014), designing and delivering effective safety interventions will be vital across age groups.

7.2. Online Risk-Taking

The empirical research outlined in Chapters 2, 3, 4, 5 and 6 highlighted that online risk-taking behaviour, specifically involving disclosing personal information , friending strangers online and posting risky content, is commonplace in participants ranging in age from 13- to 79-years-old. For some, these behaviours appear to be habitual and an everyday component of online conduct.

Although adolescence is often considered a time of greater risk-taking, the rates of personal information disclosure reported by 13-to 17-year –olds in Chapter 2 (66%) was comparable to that of the adult sample in Chapter 4 (61%). These figures are illuminating, given that very little is currently known about adults' online risk-taking behaviour. Research in offline domains indicates that risk-taking reduces with age, and this is supported by crime and victimisation statistics (e.g., Ministry of Justice, 2017) as well as research which considers the neurobiological and cognitive influences, and behavioural manifestations of risky conduct (e.g., Steinberg, Albert, Cauffman, Bernich, Graham, & Woollard, 2008). Therefore, indications that some risky online behaviours do not diminish with age raise new questions about the domain-specificity of risk-taking. Rolison, Hanoch, Wood, and Liu's (2014) investigation of risk-taking and age found domain-specific differences in risky behaviour. Notably, Rolison et al. showed how some social risk-taking increases from young- to middle-adulthood before declining in older adulthood. Online risk-taking may be a completely separate risk-taking domain than those that have been previously studied.

Whether or not online and offline risk-taking propensity differ, and if age differences exist, is yet to be studied.

Chapter 3 highlighted that individuals will also take risks in an online gambling scenario, driven by gist reasoning. In an adaptation of the classic framing task (Tversky & Kahneman, 1981), adolescents chose the gamble option in 24% of cases, and young adults gambled 22% of the time. These results also display a tendency for individuals to freely provide their personal information, since the gamble option involved the disclosure of full name and address, date of birth, email address and telephone number.

The measures and scenarios used in Chapters 2, 3, 4 and 6 reflected self-reported behaviours in hypothetical online situations, however Chapter 5 involved a task where actual behaviour was measured. Again, in this study, individuals made risky choices, accepting friend requests from strangers in a mock Facebook environment. While risk-taking tended to reduce with age in the previous studies, in this Facebook scenario rates of acceptance of friend requests increased with age. Very little is known about why people make these online personal connections with strangers. There is some research which suggests that individuals with a large offline social network like to continue to extend this network online (the Rich-Get-Richer hypothesis) when both making friends online (Lee, 2009) and when looking for romantic partners (Poley & Lao, 2012). However, further research suggests that theories which posit that those who find relationships difficult to form offline prefer the online environment, with its anonymity and opportunities to create alternative online personas (the Compensation and the Seek and Ye Shall Find hypotheses, for example) can equally explain online friendship formation (Tufekci, 2010). As such, the motivations behind individuals' behaviour in this context appear to also need further enquiry. In considering a different risky online behaviour, Chapter 6 clearly highlighted young people's seemingly comfortable stance when posting potentially risky, inappropriate, and offensive content on SNSs. While this

behaviour appeared to be prevalent both in British and Italian culture (albeit some of the risky content posted differed in context), importantly it was the influence of online culture that appeared to drive much of this behaviour.

Taken together, however, these five chapters have clearly outlined that, notwithstanding online safety messages delivered to young people in schools and online, and seemingly reduced risk-taking by adults compared to adolescents in most domains, online risk-taking is prevalent across the lifespan.

7.3. Fuzzy Trace Theory

Given that traditional theories of risky decision making appear inadequate to fully describe and predict individuals' behaviour, the focus of Chapters 2 to 4 in this thesis was the application of Fuzzy Trace Theory (FTT) to online risk-taking and decision making. As described in the Introductory chapter, FTT has been successfully applied to a number of risk-taking domains. For instance, FTT has provided explanations for risky behaviour in real-life contexts, such as sexual health (Reyna, Estrada, DeMarinis, Myers, Stanisz, & Mills, 2011), behaviour to prevent cancer, HIV infection, and heart disease, as well as decisions regarding medical and genetic risks (Blalock & Reyna, 2016; Reyna, 2008). This research highlights how gist reasoning about these risks can protect individuals from engaging in risky behaviours, whereas verbatim reasoning about the same risks predicts increased risk-taking. In addition, controlled experimental studies have revealed that individuals' preference for gist reasoning can predict outcomes in economic tasks and games, such as the framing effect (Kuhberger & Tanner, 2010; Reyna & Brainerd, 1991; see also Chapter 3) and the centipede game, whereby cooperation with a competitor during the game is clearly illogical when considering behaviour from a viewpoint of maximum expected utility, but can be explained

in terms of ordinal (gist) considerations of potential losses and gains (Pulford, Colman, Lawrence, & Krockow, 2016) .

The experimental chapters in this thesis enhance the applied and theoretical understanding of FTT. Chapter 2 is the first, to my knowledge, to demonstrate the applicability of the main assumptions of FTT (as highlighted in Reyna et al., 2011) to online risky decision making. This study (see White, Gummerum, & Hanoch, 2015) revealed that not only can gist reasoning be protective of risky behaviours, such as personal information disclosure and stranger 'friending', and that verbatim reasoning can result in increased risk-taking activities, but also that developmental differences in these behaviours and reliance on these reasoning strategies migrate to the online domain. This novel insight is further enhanced in Chapter 3, where age differences in the display of framing effects also underscore that gist reasoning increases with age and can be protective against online risk-taking behaviour, independently of sensation-seeking (see also White, Gummerum, & Hanoch, 2016).

In consideration of the age trajectory of the development of this risk-protective reasoning style, Chapter 4 revealed that adult participants who preferred categorical and ordinal, simple, gist reasoning strategies were also less likely to take online risks or intend to take risks in this environment in the future. This study (see also White, Gummerum, & Hanoch, in press) enhanced the relatively weak, current understanding of the development of gist reasoning in (older) adulthood. While some research has speculated that gist reasoning would increase into adulthood based partially on increased experience (Reyna & Lloyd, 2006) but also on diminished cognitive ability (Brainerd, Reyna, & Howe, 2009; Corbin, McElroy, & Black, 2010) this was the first study to apply FTT to risky decision making in the context of online behaviour, and to investigate the behaviour of older individuals.

Finally, these tenets of FTT were identified as potential explanations for young people's stranger-friending behaviour on Facebook, with indications that older adolescents and young adults use heuristic (gist) reasoning strategies that influence their decision whether to accept a strangers' friend request on Facebook, or not. Young adolescents' decision making, however, appeared to utilise somewhat more deliberative (verbatim) strategies. What is key in this study is that the gist reasoning of older participants resulted in increased rates of friend acceptance, potentially a risky behaviour which can result in various forms of online victimisation.

These findings shed new light on the ability of gist representations to only encourage a reduction in risk-taking, something which, as yet, has not been considered in the literature. Arguably, gist reasoning about risks can only be effective if those gist traces reflect ideals that are risk avoidant. If individuals, or even cultures for that matter, hold beliefs which build philosophies that certain behaviours are, in fact, not likely to result in victimisation, perhaps these beliefs can lead to more risk-taking. For instance, friending strangers online may be viewed by those who create large online networks as a non-risky behaviour, with beliefs that involvement in these social networks can actually enhance social capital, as well as political, employment and educational opportunities. Consequently, gist representations of this nature are likely to result in very different behaviour to that which was evident in Chapters 2, 3 and 4, where risk-avoidant gist principles were displayed.

Overall, these findings contribute much to our understanding of FTT and the ability of this theory to potentially explain, and limit, some risk-taking behaviour. Given that FTT has already been successfully implemented in educational interventions resulting in significant reductions in sexually risky behaviours (Reyna & Mills, 2014) and obesity (Brust-Renck et al., 2016) as well as increases in cancer screening (Smith, Raine, Obichere, Wolf, Wardle, & von Wagner, 2015; Wolfe, Reyna, & Widmer, 2014), naturally its applicability to online

safety training is worthy of investigation. I discuss this consideration further, later in this chapter.

7.4. Limitations

The research conducted for this thesis has some limitations which require consideration. The study-specific limitations have generally been covered in the discussion section of each individual chapter. However, there are some general methodological issues which limit the findings of this research.

Due to the novel nature of research in this domain, it was necessary to devise new scales to measure online risk-taking. As such, while each study involved the careful design of these measures based on past research, followed by pilot studies, there is still much that needs to be done to validate these measures.

Additionally, the pilot studies conducted (see Chapters 2 and 3) did not reveal strong similarities between some of the previously used measures (e.g., Reyna et al., 2011) and the new online measures. This could be for two reasons. Firstly, each of the newly devised measures were first tested on an adult sample before being rolled out in the main study to samples of adolescents and young adults, therefore potentially reflecting other age effects. In future, pilot tests should be carried out on participants with the same profile as the intended final sample. Secondly, the adapted online framing scenario revealed very low rates of gambling behaviour. While this reflected overall low gambling rates in the pilot sample for the classic Asian disease problem, these rates were much lower than for the task designed by Reyna et al. (2011). Consideration of this should be investigated in future work. Furthermore, the Global Risk Perception measure, described in Chapters 2 and 4, did not behave concordant with results highlighted by Mills, Reyna, and Estrada (2008) and Reyna et al. (2011). This measure should have acted as a third gist measure, positively related to both the

gist principles and the categorical risk measures, but negatively related to the two verbatim measures. However, when applied to the adolescent and young adult sample the Global Risk Perception measure positively correlated with the verbatim measures, and had no significant correlation with these measures in the adult sample in Chapter 4. As such, the reliability and validity of this measure to capture gist reasoning is open to question. Finally, the quantitative risk scale contains only one item and as such the ability of this scale to truly tap into and measure individuals' propensity to verbatim reasoning is somewhat questionable. Future research should extend this scale to include more items which are then subject to statistical scrutiny, such as principle component analysis.

In consideration of the methods used, it is also notable that measures such as the Brief Sensation Seeking Scale (Hoyle, Stephenson, Palmgreen, Lorch, & Donohue, 2002) ,the Interpersonal Attraction Scale (McCroskey & McCain, 1974), and the Self-Monitoring Scale (Snyder & Gangestad, 1986) are based on offline behaviours and perceptions. Currently, to my knowledge, no equivalent online scales exist that consider individuals' online proclivities. As such, the measures used to assess these variables may not be indicative of sensation seeking or attraction in the online domain, rendering the comparison of online risk-taking behaviour to these scales potentially flawed.

In each of the studies described in Chapters 2, 3, 4 and 6, the behavioural measures involved self-reported, retrospective considerations of past risky behaviour. Naturally, while this method is widely used in psychological research, this form of data collection is open to a number of issues including response bias (denying risky behaviour was conducted or agreeing with more socially acceptable statements), forgetting or mis-remembering past behaviour, and carelessness in responses to, or mis-understanding of, the questions. The Facebook friending study described in Chapter 5, however, used more natural methods and eye-tracking data, which is likely to have been more successful in recording individuals'

usual behaviour. Research of this kind, in future, could focus on these more naturalistic

methods in order to increase the trustworthiness of results.

Finally, there were a number of variables that were not included in these

investigations. For instance, with specific reference to FTT, past research has indicated the

relevance of emotion and affect (Rivers, Reyna, & Mills, 2008), past experience (Reyna,

Chick, Corbin, & Hsia, 2014), expertise (Reyna & Lloyd, 2006), need for cognition

(Broniatowski & Reyna, 2015), and cognitive ability (Brainerd & Reyna, 2015) on the

retrieval of gist and verbatim representations. As such there appears to be a potentially

complicated interplay between reasoning strategies and other variables, which were beyond

the scope of this thesis.

7.5. Future Directions

Based on the limitations identified above, as well as new avenues of research

highlighted in each chapter, there are a number of future directions which could be taken with

research in this domain that would be beneficial to our understanding of online risk-taking,

developmental differences in this behaviour, and the ability of FTT to influence successful

interventions. I begin by discussing the potential of other factors to guide risk-taking

behaviour, considering how research might be focussed on these areas, and conclude this

section by discussing the contribution of this research to intervention strategies.

As previously mentioned, there were a number of variables that were not included in

the research conducted for this thesis, and it is relevant to consider how these variables might

affect risk-taking online. For instance, no measure of past victimisation experience was

included for the adolescent and adult participants in the studies outlined in these chapters.

This is important for two reasons. Firstly, individuals are not very proficient at estimating the

likelihood of a particular event occurring (Hertwig & Erev, 2009; Pulford & Colman, 1996)

and as such, regardless of whether the potential event is a positive or negative one, risk perceptions of personal victimisation can be inaccurate and these perceptions can affect risk behaviours. Secondly, past experience of victimisation, direct or vicarious, can result in feelings of relief or regret about behaviour which may have led to a particular negative event. As such, these thoughts result in counterfactual thinking (what could have been) and can also relate to pre-factual thinking (what might be) which can both reduce individuals' risk-taking behaviour (Epstude & Roese, 2008). Future research must consider the past experiences of individuals, as this has been implicated in the formulations of gist and verbatim reasoning about risk (Reyna et al., 2014), and also how this relates to their risk perceptions and intended future behaviour. Without this knowledge there is no way of knowing how this experience might impact on the fundamental ideals of FTT.

Anticipated regret, however, may involve some elements that are only relevant to online behaviour. For instance, the concept of Fear of Missing Out (FOMO) relates to an individual's prolific use of social media to avoid the potential of missing a post or not being involved in a conversation. Such is the effect of FOMO on self-esteem and social anxiety that scales have been developed to measure this phenomena, and have found rates of FOMO to relate to social media use and compulsion to be engaged in SNS (Abel, Buff, & Burr, 2016). Further research in this area should consider these, apparent, social media nuances as distinctive to social media use and potential risk-taking.

Experience of using and being engaged in the online environment is also relevant. The study in Chapter 4 highlighted that experience (as denoted by time online) is not related to reduced risk-taking behaviour and intentions. However, some issues appear with this finding. FTT suggests that experience enables the escalation of gist reasoning, but if this was the case then it is acceptable to assume that young adults (known as digital natives because of their familiarity with digital technology) would be more experienced than older adults.

Would this not then result in reduced risk-taking in the younger age group? Conducting research which incorporates the time since the individual first began using the internet, combined with their average internet use each week/month/year, using different SNS platforms, then comparing risk behaviour across age groups, would result in a much more detailed consideration of online risk-taking across the lifespan and the influence of FTT.

The domain-specificity of online risk-taking must also be considered in depth. Despite suggestions that individuals' personality and behaviour may be consistent offline and online (Gosling, Augustine, Vazire, Holtzman, & Gaddis, 2011) there are also suggestions that our behaviour is different online (Blumer & Doring, 2012; Chen, Xie, Ping, & Wang, 2017) and that young people may take more risks online (Baumgartner, Valkenberg, & Peter, 2010a). Consistent with the research of Rolison, Hanoch, Wood, and Liu (2014), further consideration must be given to risk-taking tendencies in online environments compared to offline environments. Not only will this enable us to determine whether there are behavioural and age differences in risky behaviour but, crucially, whether theories developed to explain and predict offline risky decision making are also attributable to online environments. It is relevant to note that many online environments also differ (e.g., gambling sites compared to SNS, for instance) therefore, risk-taking behaviour within these distinctive online environments must also be considered. Finally, the cultural elements of the online environment must be explored. As Chapter 6 revealed, behaviours which may not be considered appropriate offline may manifest in online environments due to the cultural expectations. Further research is needed to not only compare the behaviour of individuals across cultures but also to determine if internet culture may over ride geographically cultural norms and values.

These behaviours that are deemed to be risky may also have benefits attached, for instance friending strangers and the expansion of one's social network associated with that.

Therefore, these potential benefits warrant further exploration through qualitative and quantitative methods.

Ensuring children and adolescents remain safe online should also be a task undertaken by parents. Some parents heavily monitor their children online, and while over-controlling internet use can indeed lower potential risks this also severely restrict young people's access to the benefits of the internet (Duerager & Livingstone, 2012) and can result in young people finding other ways to use the internet covertly. Installing software that aims to limit risk can also be somewhat effective, but is easily disabled, unable to prevent every risk, and does not help children to develop their own sense of responsibility and awareness (Duerager & Livingstone, 2012). Therefore parents are encouraged to proactively engage in their child's online world, act as good role models (for instance not playing 18-rated games in front of children) and to encourage an active and open dialogue regarding internet use and any difficulties their children experience online. A recent report by Internet Matters (2016) suggests that parents believe they should hold primary responsibility for their children's online safety education, however they are not confident in where to find sources of help and often rely on their child's school. This indicates to policy makers that equipping schools with comprehensive information which can be communicated to parents, through a school website, leaflets, or parents meetings for example, may be the best way to arm them with relevant information and encourage them to increase discussions with their children. The report also highlighted that parents often feel uncomfortable discussing unfamiliar, or contrived, information with their children and are happier to talk to them about something in the media, or their own experience. Consequently, ensuring parents are kept abreast of media reports relating to online risks that they can discuss with their children, perhaps using an online social network for parents, is also something that policy makers should consider. Finally, research suggests that children tend to learn their values from parents and other trusted adults

(Grusec, Goodnow, & Kuczynski, 2000) and as such the informal discussions that parents have with their children may serve to bolster their values around appropriate and safe internet use. When considering the tenets of FTT that can help to protect against risk-taking behaviour, instilling appropriate values in children from an early age, and reinforcing these values over time, is vital to ensure that young people have easily retrievable risk-averse principles as their gist reasoning develops. As such, educating parents to ensure this focus on the promotion of strong values would also be beneficial.

Finally, given the culmination of research concerning offline risky behaviours, which indicate that FTT is able to contribute considerably to the improvement of safety interventions, coupled with the findings of the studies contained in this thesis, it would be pertinent to consider the development of an eSafety strategy incorporating the teaching of gist-based representations. As outlined in the research by Reyna and Mills (2014) incorporating simple gist-based reasoning strategies and messages into standard (sexual health) safety programmes produced a reduction in risky sexual behaviour among enrolled adolescents, and also reduced intentions to take sexual risks in the future. Young people on this programme were also more confident of their ability to avoid risky situations and environments and to retrieve strategies to avoid these situations.

Programmes that promote positive images and models who reflect 'healthy' behaviour provide easily-retrievable images representing the benefits of risk avoidance. Using simple analogies that represent risk-avoidant, gist representations are also easier to encode and retrieve and therefore help individuals to avoid deliberating over facts and figures. In fact, education strategies should avoid the presentation of facts and statistics. Focussing on emotional cues (Rivers et al., 2008) which may be relevant to an individual can also highlight both positive and negative aspects of a (non-)risky behaviour and, finally, teaching individuals, particularly adolescents, about the short-term benefits of safe

behaviours enable them to draw upon cues that can help them to avoid risk (Reyna & Mills, 2014; Wargo, 2007).

Whether programmes are focussed on personal information disclosure and friending of strangers specifically, or consider password protection, sexting behaviour, appropriate online etiquette, or avoiding illegal downloading, programmes would be able to draw upon these key concepts to tailor programmes accordingly. In addition, the research in this thesis has supported the concept of developmental changes in the ability to "gistify" information relating to risky behaviour. As such, older adolescents begin to be able to reason using these strategies and would be much more receptive to safety messages presented in this way. This research has also highlighted that throughout adulthood individuals take risks online but are also potentially more receptive to gist reasoning. Consequently, not only should education also be aimed at these older age groups, but they should also contain easy to retrieve gist-based cues. Following my comments in the Limitations section concerning gist reasoning, it is also important that more is understood about people's risk perceptions of internet use, at both an individual and a societal/cultural level. If individuals accept social norms and values that are potentially risk-seeking (e.g., making friends with strangers online is good and has many benefits with few risks), then naturally this will influence their pre-conceived gist-representations of this behaviour.

7.6. Conclusion

I set out, in this thesis, to provide further empirical investigation of online behaviour, and specifically the risky behaviour that individuals engage in with regard to the disclosure of personal information online and the friending of strangers. The research discussed herein contributes to our knowledge about the online behaviour of people from 13- to 79-years old. The findings highlight the 'normative' disclosure and friending behaviour of adolescents and

adults alike, reporting high rates of engagement in these behaviours by many individuals. Since it is known that these behaviours can result in increased chance of victimisation it is vital that we not only have statistics revealing the rates of engagement, but that we also understand why people do what they do online.

Therefore, in addition to the rates of risk-behaviour, this thesis shows that Fuzzy Trace Theory is able to predict risk-taking and risk-averse behavioural intentions, contributing to our knowledge of the psychological mechanisms underlying this risk-taking behaviour. Specifically, the retrieval of gist-based, intuitive beliefs and values about online risk reduces risk-taking behaviour and intentions, whereas representing risk in a quantitative-based manner is representative of increased risk-taking intentions. Furthermore, the ability to reason using gist representations increases with age, as predicted by FTT, therefore emphasising the ability of gist-based, FTT driven, online safety interventions to specifically benefit individuals past the age of older-adolescence.

Drawing upon this knowledge could potentially inform the development of future prevention programmes. Consequently, the findings of the studies in this thesis represent new ways in which individuals of all ages can be taught to harness the power of the internet while easily and naturally choosing to avoid inherent risks.

Appendix 1

Gist and verbatim questions and statements as described and used in Chapters 2 and 4

Gist Measures

Categorical Risk

If you keep giving out your personal details online to people you don't know, risks will add up and you WILL get bullied or harassed

When in doubt about giving out personal information online delay or avoid it

If you keep giving out your personal details online to people you don't know, risks will add up and you WILL have your details stolen and abused

Even low online risk-taking adds up to 100% if you keep doing it

It only takes ONCE to give up your personal information online for it to be misused; Even low risks happen to someone

Even if you only communicate online with people you know, eventually you will get bullied or harassed if you use the internet enough

Once someone has your personal details, there is no second chance

If you cannot handle protecting your personal information, you are not ready to use the internet

Response Scale and Scoring:

Strongly Disagree (0)

Somewhat Disagree (1)

Neither Agree nor Disagree (2)

Somewhat Agree (3)

Strongly Agree (4)

Gist Principles

(R denotes reverse scoring)

Better not to accept unknown "friends" online than risk being bullied or harassed

Better to focus on school work than communicating for fun online

Avoid risk

Better to be safe online than sorry

Better to never give out personal information online than risk having my identity stolen

Better to wait to use the internet when you are not ready to deal with the risks

I have a responsibility to my family to not give out my personal details to people I don't know online

Better not to accept unknown friends online than to hurt my family

I have a responsibility to myself to keep my personal details

private

Better to have fun (accept lots of friends online) while you can (R)

Known online friends are safe friends (R)

Accepting unknown friends online is better than having no friends at all (R)

Accepting unknown friends online is worth risking getting bullied or harassed (R)

Giving out my personal information online is worth the risk of losing my identity (R)

Responses and Scoring:

The number of endorsements are allocated 1 point and these endorsements summed (note reverse scoring)

Global Risk

Overall for **you**, which best explains the risks of giving out your personal information online?

Overall for **you**, which best explains the risks of making friends online with people you do not already know offline?

Response Scale & Scoring:

None (0)

Low (1)

Medium (2)

High (3)

Verbatim measures

Specific risk

I am likely to have my personal details stolen and used against me within the next 6 months

I am likely to be bullied or harassed online in the next 6 months by a person I do not know offline

Response Scale & Scoring:

Very Unlikely (0)

Unlikely (1)

Neither Likely nor Unlikely (2)

Likely (3)

Very Likely (4)

Quantitative risk

What are the chances that your personal information has been stolen?

Response Scale & Scoring:

Participants indicate perceived chance on a scale of 0% to 100%

Appendix 2

Past Online Risk Taking and Online Risk Intentions Measures

In this section we would like to ask you about some of the things you might do online or might do online in the future. Please look at the statements below and answer all of the questions as honestly as possible. However, if you prefer not to answer a particular question then move on to the next one. When we say *personal information* we mean information like your full name, address, email address, date of birth, or mobile telephone number. Giving out personal information can mean giving all or just some of these details. It can also involve giving details to people, companies, or organisations.

1. Have you ever given out your personal information online? **Yes (1)   No (0)**

2. How many times would you guess you have given out your personal information online in the past year?   _____**times in the past year**

3. Have you ever made friends with someone you know only online? **Yes (1)   No (0)**

4. How many friends would you say you have made in the past year that you only know online?_____**friends made in the past year that I only know online**

5. Do you think you will give out personal information online in the next year?

6. Do you think you will make friends online with people you do not know in person in the next year?

7. Do you think you will communicate online with people you don't know (for example in a chat room) within the next year?

8. Do you think you are likely to share personal information with people you only know online in the next year?

Questions 5 – 8 Response Scale and Scoring:

Very Unlikely (0)

Unlikely (1)

Neither Likely nor Unlikely (2)

Likely (3)

Very Likely (4)

Appendix 3

Facebook Gambling Scenarios

1. Imagine you take an online music quiz one day and get all the answers correct. A pop-up informs you that you have won a £5 online music voucher. However, if you fill out a form with your full name, address, email, date of birth, and mobile phone number you will be entered into a draw. You now have a choice. If you chose option **A** you will win £5 for sure. If you chose option **B** you have a ½ chance of winning a £10 voucher but a ½ chance of winning nothing.

   Option A – Take the £5 music voucher

   Option B – Fill out the form for ½ chance of winning £10 or ½ chance of winning £0

2. Imagine you take an online music quiz one day and get all the answers correct. A pop-up informs you that you have won a £20 online music voucher. However, if you fill out a form with your full name, address, email, date of birth, and mobile phone number you will be entered into a draw. You now have a choice. If you chose option **A** you will win £20 for sure. If you chose option **B** you have a ½ chance of winning a £40 voucher but a ½ chance of winning nothing.

   Option A – Take the £20 music voucher

   Option B – Fill out the form for ½ chance of winning £40 or ½ chance of winning £0

3. Imagine you take an online music quiz one day and get all the answers correct. A pop-up informs you that you have won a £150 online music voucher. However, if you fill out a form with your full name, address, email, date of birth, and mobile phone number you will be entered into a draw. You now have a choice. If you chose option **A** you will win £150 for sure. If you chose option **B** you have a ½ chance of winning a £300 voucher but a ½ chance of winning nothing.

   Option A – Take the £150 music voucher

   Option B – Fill out the form for ½ chance of winning £300 or ½ chance of winning

   £0

4. Imagine you take an online music quiz one day and get all the answers correct. A pop-up informs you that you have won a £5 online music voucher. However, if you fill out a form with your full name, address, email, date of birth, and mobile phone number you will be entered into a draw. You now have a choice. If you chose option **A** you will win £5 for sure. If you chose option **B** you have a 1/4 chance of winning a £10 voucher but a 3/4 chance of winning nothing.

Option A – Take the £5 music voucher

Option B – Fill out the form for 1/4 chance of winning £10 or 3/4 chance of winning

£0

5. Imagine you take an online music quiz one day and get all the answers correct. A pop-up informs you that you have won a £20 online music voucher. However, if you fill out a form with your full name, address, email, date of birth, and mobile phone number you will be entered into a draw. You now have a choice. If you chose option **A** you will win £20 for sure. If you chose option **B** you have a 1/4 chance of winning a £40 voucher but a 3/4 chance of winning nothing.

Option A – Take the £20 music voucher

Option B – Fill out the form for 1/4 chance of winning £40 or 3/4 chance of winning

£0

6. Imagine you take an online music quiz one day and get all the answers correct. A pop-up informs you that you have won a £150 online music voucher. However, if you fill out a form with your full name, address, email, date of birth, and mobile phone number you will be entered into a draw. You now have a choice. If you chose option **A** you will win £150 for sure. If you chose option **B** you have a 1/4 chance of winning a £300 voucher but a 3/4 chance of winning nothing.

Option A – Take the £150 music voucher

Option B – Fill out the form for 1/4 chance of winning £300 or 3/4 chance of winning

£0

7. Imagine you take an online music quiz one day and get all the answers correct. At the end of the quiz you have £10 worth of 'virtual' winnings, half of which can be exchanged for real cash. However, if you fill out a form with your full name, address, date of birth, email, and mobile phone number you will be entered into a draw to win a bigger prize. You now have a choice. If you chose option A you will lose £5 of virtual money for sure. If you chose option B you have a ½ chance of losing all £10 but a ½ chance of losing nothing.

Option A – Lose £5 of your virtual money

Option B – ½ chance of losing all £10 and a ½ chance of losing nothing

8. Imagine you take an online music quiz one day and get all the answers correct. At the end of the quiz you have £40 worth of 'virtual' winnings, half of which can be exchanged for real cash. However, if you fill out a form with your full name, address, date of birth, email, and mobile phone number you will be entered into a draw to win a bigger prize. You now have a choice. If you chose option A you will lose £20 of virtual money for sure. If you chose option B you have a ½ chance of losing all £40 but a ½ chance of losing nothing.

   Option A – Lose £20 of your virtual money

   Option B – ½ chance of losing all £40 and a ½ chance of losing nothing

9. Imagine you take an online music quiz one day and get all the answers correct. At the end of the quiz you have £300 worth of 'virtual' winnings, half of which can be exchanged for real cash. However, if you fill out a form with your full name, address, date of birth, email, and mobile phone number you will be entered into a draw to win a bigger prize. You now have a choice. If you chose option A you will lose £150 of virtual money for sure. If you chose option B you have a ½ chance of losing all £300 but a ½ chance of losing nothing.

   Option A – Lose £150 of your virtual money

   Option B – ½ chance of losing all £300 and a ½ chance of losing nothing

10. Imagine you take an online music quiz one day and get all the answers correct. At the end of the quiz you have £10 worth of 'virtual' winnings, half of which can be exchanged for real cash. However, if you fill out a form with your full name, address, date of birth, email, and mobile phone number you will be entered into a draw to win a bigger prize. You now have a choice. If you chose option A you will lose £5 of virtual money for sure. If you chose option B you have a 3/4 chance of losing all £10 but a 1/4 chance of losing nothing.

    Option A – Lose £5 of your virtual money

    Option B – 3/4 chance of losing all £10 and a 1/4 chance of losing nothing

11. Imagine you take an online music quiz one day and get all the answers correct. At the end of the quiz you have £40 worth of 'virtual' winnings, half of which can be exchanged for real cash. However, if you fill out a form with your full name, address, date of birth, email, and mobile phone number you will be entered into a draw to win a bigger prize. You now have a choice. If you chose option A you will lose £20 of virtual money for sure. If you chose option B you have a 3/4 chance of losing all £40 but a 1/4 chance of losing nothing.

    Option A – Lose £20 of your virtual money

    Option B – 3/4 chance of losing all £40 and a 1/4 chance of losing nothing

12. Imagine you take an online music quiz one day and get all the answers correct. At the end of the quiz you have £300 worth of 'virtual' winnings, half of which can be exchanged for real cash. However, if you fill out a form with your full name, address, date of birth, email, and mobile phone number you will be entered into a draw to win a bigger prize. You now have a choice. If you chose option A you will lose £150 of virtual money for sure. If you chose option B you have a 3/4 chance of losing all £300 but a 1/4 chance of losing nothing.

Option A – Lose £150 of your virtual money

Option B – 3/4 chance of losing all £300 and a 1/4 chance of losing nothing

Appendix 4

Brief Sensation Scale for Adolescents (BSSS-8)

1. I would like to explore strange places

2. I would like to take off on a trip with no pre-planned routes or timetables

3. I like to do frightening things

4. I would like to try bungee jumping

5. I like wild parties

6. I like new and exciting experiences, even if I have to break the rules

7. I get restless when I spend too much time at home

8. I prefer friends who are exciting and unpredictable

Response Scale (and scoring):

Strongly Disagree (1)

Somewhat Disagree (2)

Neither Agree nor Disagree (3)

Somewhat Agree (4)

Strongly Disagree (5)

Appendix 5

Raw frequency scores and logarithmic unit calculations, by age group

		0	1	2	3	4	5	6	7	8	9	10	11	12	Total	Probability (odds, logits)	Indifference Point (odds, logits)	Framing (logits)
Gain Frame Gambles	**Adolescent**	71	16	15	9	6	2	5							137	.22, -1.49		
	Young Adult	103	40	16	9	2	1	1							118	.12, -2.05		
	Total	174	56	31	18	8	3	6							255			
Loss Frame Gambles	**Adolescent**	44	19	25	13	11	3	9							221	.43,-.086		
	Young Adult	55	27	30	29	12	9	10							327	.47, -.077		
	Total	99	46	55	42	23	12	19							548			
Total	**Adolescent**	41	11	15	10	14	10	9	4	3	2	1	1	3	358		.32, -1.18	0.31

Gambles

Young Adult	44	25	24	24	22	11	12	4	2	1	1	2	0	445		.25, -1.41	0.64
Total	85	36	39	34	36	21	21	8	5	3	2	3	3	803			

Interpersonal Attraction Scale

Physical Attraction Sub-Scale

I think he/she is handsome/pretty

He/she is sexy looking

I don't like the way he/she looks (Reverse Score)

He/she is ugly (Reverse Score)

I find him/her attractive physically

He/she is not good looking (Reverse Score)

This person looks appealing

I don't like the way this person looks (Reverse Score)

He/she is nice looking

He/she has an attractive face

He/she is not physically attractive (Reverse Score)

He/she is good looking

Social Attraction Sub-Scale

I think he (she) could be a friend of mine

It would be difficult to meet and talk with him (her) (Reverse Score)

He (she) just wouldn't fit into my circle of friends (Reverse Score)

We could never establish a personal friendship with each other (Reverse Score)

I would like to have a friendly chat with him (her)

Response Scale & Scoring

7 = Strongly agree

6 = Moderately agree

5 = Slightly agree

4 = Undecided

3 = Slightly disagree

2 = Moderately disagree

1 = Strongly disagree

Appendix 7

Risky Online Self-Presentation Questionnaire

Please indicate which of the following social networking sites you use:

Facebook ☐
Twitter ☐
Instagram ☐
Pinterest ☐
Tumblr ☐
LinkedIn ☐
YouTube ☐
Snapchat ☐
WhatsApp ☐
Flickr ☐

Do you use any other social networking sites?   Yes (1)   No (0)

If yes, which ones?   [   ]

Please indicate approximately how many hours each week you spend engaged in social networking on each of these sites. (*an example below*)

Facebook ⟶ Less than 1 hour
Twitter   1 – 5 hours
Snapchat   6 - 10 hours
               11 – 20 hours
               21 – 30 hours
               31 – 40 hours
               41 – 50 hours
               51 – 60 hours
               61 – 70 hours
               More than 70 hours

People use social networking sites for a number of reasons, sometimes to share details of their lives, their opinion on various subjects, or just to engage in conversation with others. Please read the following list of activities carefully and indicate if you have ever done any of these activities. In some cases we ask you to think about how others might perceive the activity rather than your own personal opinion of the activity.

Remember, your data is completely anonymous so the answers you give us will be confidential. Please be as honest as possible.

Where we use the term 'shared' this can also mean 'sent', 'posted', 'tweeted' or 'listed'

Please state which, if any, of these activities you have done on social networking sites

If you have done any of these activities, please tell us on which sites.

Shared comments about your own alcohol consumption	Yes	No	Don't know
Shared pictures/images of yourself consuming alcohol	Yes	No	Don't know
Shared comments about your own drug use	Yes	No	Don't know
Shared pictures/images of yourself using drugs	Yes	No	Don't know
Shared comments of a sexual nature	Yes	No	Don't know
Shared pictures/images of a sexual nature	Yes	No	Don't know
Shared pictures/images of yourself of a sexual nature	Yes	No	Don't know
Shared comments containing extreme political or religious views	Yes	No	Don't know
Shared contact information (private email, phone number, home address) with someone you do not know offline	Yes	No	Don't know
Shared personal information (date of birth, place of work, relationship status) with someone you do not know offline	Yes	No	Don't know
Shared financial information (bank details, credit/debit card details) with someone you do not know offline	Yes	No	Don't know
Shared comments or links to sites which some people may perceive as extreme (for example strongly pro- or anti-immigration)	Yes	No	Don't know
Shared pictures/images of yourself in less than full dress (for example in underwear or swimwear)	Yes	No	Don't know
Shared comments containing swear words	Yes	No	Don't know

Shared pictures/images of your children (if you have any)   Yes   No   Don't know

Shared comments which some may perceive as negative towards
a minority group (for example ethnic minority, homosexuals,
religious minority)   Yes   No   Don't know

Shared comments which some people may find offensive   Yes   No   Don't know

Shared pictures/images which some people may find
offensive   Yes   No   Don't know

Shared jokes which some people may find offensive Yes   No   Don't know

(*Scored Yes = 2, Don't Know = 1, No = 0*)

Please think of an ideal job, disregarding your present job, if you have one. In choosing an ideal job, how important would it be to you to ... (please select one answer in each line across):

1 = of utmost importance
2 = very important
3 = of moderate importance
4 = of little importance
5 = of very little or no importance

01. have sufficient time for your
     personal or home life   1   2   3   4   5

02. have a boss (direct superior)
     you can respect   1   2   3   4   5

03. get recognition for good performance 1   2   3   4   5

04. have security of employment   1   2   3   4   5

05. have pleasant people to work with   1   2   3   4   5

06. do work that is interesting   1   2   3   4   5

07. be consulted by your boss
     in decisions involving your work   1   2   3   4   5

08. live in a desirable area   1   2   3   4   5

09. have a job respected by your
     family and friends   1   2   3   4   5

10. have chances for promotion   1   2   3   4   5

In your private life, how important is each of the following to you: (please select one answer in each line across):

11. keeping time free for fun   1   2   3   4   5

12. moderation: having few desires   1   2   3   4   5

13. doing a service to a friend   1   2   3   4   5

14. thrift (not spending more than needed)1   2   3   4   5

Please click on the response that best answers these questions

15. How often do you feel nervous or tense?
       1. always
       2. usually
       3. sometimes
       4. seldom
       5. never

16. Are you a happy person ?
       1. always
       2. usually
       3. sometimes
       4. seldom
       5. never

17. Do other people or circumstances ever prevent you from doing what you really want to?
       1. yes, always
       2. yes, usually
       3. sometimes
       4. no, seldom
       5. no, never

18. All in all, how would you describe your state of health these days?
       1. very good
       2. good
       3. fair
       4. poor
       5. very poor

19. How proud are you to be a citizen of your country?
       1. very proud
       2. fairly proud
       3. somewhat proud

4. not very proud
5. not proud at all

20. How often, in your experience, are subordinates afraid to contradict their boss (or students their teacher?)
1. never
2. seldom
3. sometimes
4. usually
5. always

To what extent do you agree or disagree with each of the following statements? (please select one answer in each line across):

1 = strongly agree
2 = agree
3 = undecided
4 = disagree
5 = strongly disagree

21. One can be a good manager
without having a precise answer to
every question that a subordinate
may raise about his or her work   1   2   3   4   5

22. Persistent efforts are the
surest way to results   1   2   3   4   5

23. An organization structure in
which certain subordinates have two
bosses should be avoided at all cost   1   2   3   4   5

24. A company's or organization's
rules should not be broken -
not even when the employee
thinks breaking the rule would be
in the organization's best interest   1   2   3   4   5

This questionnaire contains a series of questions regarding behaviours on social networking sites. The items in this questionnaire describe different behaviours. Read every statement and rate the extent to which it refers to you, your behaviours, your thoughts and your feelings, i.e. how well the item describes you.

This is not a test – there are no right or wrong answers, and everyone will have different responses. We are interested in your behaviour and your opinions, so please respond as honestly and sincerely as you can.

Read each statement and decide how much you agree or disagree with it, or to what extent the described behaviour is characteristic of you.

For each statement, please click on a number from 1 to 5, where the numbers mean:

1 – it doesn't refer to me at all
2 – it mostly doesn't refer to me
3 – I'm not sure if it refers to me
4 – it mostly refers to me
5 – it completely refers to me

So, a bigger number means that the item is a better description of you and your behaviour!

1. When I post information about myself online I think about how I would like others to perceive me.

   1   2   3   4   5

2. I only post photos on my profile in which I look attractive.

   1   2   3   4   5

3. I care about the impressions others form about me when they see my profile.

   1   2   3   4   5

4. I pay a lot of attention to details of my profile, because I want to make a good impression on those who view it.

   1   2   3   4   5

5. I try to present myself positively on my profile especially for those people who do not know me well.

   1   2   3   4   5

6. I try to make a good impression on others by the things I post

   1   2   3   4   5

7. Before I post anything, I think about how others might perceive it.
   1   2   3   4   5

8. I post different types of content online (statuses, links, photographs, etc.) to attract the attention of others.

    1   2   3   4   5

Please read the following items and then indicate whether the statement is TRUE or FALSE for you. Please be as honest as possible and remember that different people will provide different answers. We are interested in what you think!

1. I find it hard to imitate the behaviour of other people   TRUE FALSE
2. At parties and social gatherings, I do not attempt to do or say things that others will like   TRUE FALSE
3. I can only argue for ideas that I already believe   TRUE FALSE
4. I can make impromptu speeches even on topics about which I have almost no information   TRUE FALSE
5. I guess I put in a show to impress or entertain others   TRUE FALSE
6. I would probably make a good actor   TRUE FALSE
7. In a group of people I am rarely the centre of attention   TRUE FALSE
8. In different situations and with different people, I often act like very different persons   TRUE FALSE
9. I am not particularly good at making other people like me   TRUE FALSE
10. I'm not always the person I appear to be   TRUE FALSE
11. I would not change my opinions (or the way I do things) In order to please someone or win their favour   TRUE FALSE
12. I have considered being an entertainer   TRUE FALSE
13. I have never been good at games like charades or improvisational acting   TRUE FALSE
14. I have trouble changing my behaviour to suit different people and different situations   TRUE FALSE
15. At a party I let others keep the jokes and stories going   TRUE FALSE
16. I feel a bit awkward in public and do not show up quite as well as I should   TRUE FALSE
17. I can look anyone in the eye and tell a lie with a straight face (if for a right end)   TRUE FALSE
18. I may deceive people by being friendly when I really dislike them   TRUE FALSE

Score questions 1, 2, 3, 7, 9, 11, 13, 14, 15, 16 True = 0, False = 1
Score questions 4, 5, 6, 8, 10, 12, 17, 18 True = 1, False = 0

Instructions: Please answer each question by clicking on the 'YES' or the 'NO' button following the questions. There are no right or wrong answers, and no trick questions. Work quickly and do not think too long about the exact meaning of the question.

PLEASE REMEMBER TO ANSWER EACH QUESTION

1. Would you enjoy water skiing?
2. Usually do you prefer to stick to brands you know are reliable, to trying new ones on the chance of finding something better?
3. Would you feel sorry for a lonely stranger?
4. Do you quite enjoy taking risks?
5. Do you often get emotionally involved with your friends' problems?
6. Would you enjoy parachute jumping?
7. Do you often buy things on impulse?
8. Do unhappy people who are sorry for themselves irritate you?
9. Do you generally do and say things without stopping to think?
10. Are you inclined to get nervous when others around you seem to be nervous?
11. Do you often get into a jam because you do things without thinking?
12. Do you think hitch-hiking is too dangerous a way to travel?
13. Do you find it silly for people to cry out of happiness?
14. Do you like diving off the highboard?
15. Do people you are with have a strong influence on your moods?
16. Are you an impulsive person?
17. Do you welcome new and exciting experiences and sensations, even if they are a little frightening and unconventional?
18. Does it affect you very much when one of your friends seems upset?
19. Do you usually think carefully before doing anything?
20. Would you like to learn to fly an aeroplane?
21. Do you ever get deeply involved with the feelings of a character in a film, play or novel?
22. Do you often do things on the spur of the moment?
23. Do you get very upset when you see someone cry?
24. Do you sometimes find someone else's laughter catching?
25. Do you mostly speak without thinking things out?
26. Do you often get involved in things you later wish you could get out of?
27. Do you get so 'carried away' by new and exciting ideas, that you never think of possible snags?
28. Do you find it hard to understand people who risk their necks climbing mountains?
29. Can you make decisions without worrying about other people's feelings?
30. Do you sometimes like doing things that are a bit frightening?
31. Do you need to use a lot of self-control to keep out of trouble?
32. Do you become more irritated than sympathetic when you see someone cry?
33. Would you agree that almost everything enjoyable is illegal or immoral?
34. Generally do you prefer to enter cold sea water gradually, to diving or jumping straight in?
35. Are you often surprised at people's reactions to what you do or say?
36. Would you enjoy the sensation of skiing very fast down a high mountain slope?
37. Do you like watching people open presents?
38. Do you think an evening out is more successful if it is unplanned or arranged at the last moment?

39. Would you like to go scuba diving?
40. Would you find it very hard to break bad news to someone?
41. Would you enjoy fast driving?
42. Do you usually work quickly, without bothering to check?
43. Do you often change your interests?
44. Before making up your mind, do you consider all the advantages and disadvantages?
45. Can you get very interested in your friends' problems?
46. Would you like to go pot-holing?
47. Would you be put off a job involving quite a bit of danger?
48. Do you prefer to 'sleep on it' before making decisions?
49. When people shout at you, do you shout back?
50. Do you feel sorry for very shy people?
51. Are you happy when you are with a cheerful group and sad when the others are glum?
52. Do you usually make up your mind quickly?
53. Can you imagine what it must be like to be very lonely?
54. Does it worry you when others are worrying and panicky?

Score Yes = 1, No = 0

References

Abel, J. P., Buff, C. L., & Burr, S. A. (2016). Social media and the fear of missing out: Scale development and assessment. *Journal of Business & Economic Research, 14*(1), 33-44.

Age U.K. (2015). *Only the tip of the iceberg: Fraud against older people. Evidence Review*. Retrieved from http://www.ageuk.org.uk/documents/en-gb/for-professionals/consumer-issues/age%20uk%20only%20the%20tip%20of%20the%20iceberg%20april%202015.pdf?dtrk=true.

Al Omoush, K. H. S., Yaseen, S. G., & Alma'aitah, M. A. (2012). The impact of Arab cultural values on online social networking: The case of Facebook. *Computers in Human Behavior, 28,* 2387-2399.

Alves, L. M., & Wilson, S. R. (2008). The effects of loneliness on telemarketing fraud victimization among older adults. *Journal of Elder Abuse & Neglect, 20*, 63-85.

Back, M. D., Stopfer, J. M., Vazaire, S., Gaddis, S., Schmukle, S. C., Egloff, B., & Gosling, S. D. (2010). Facebook profiles reflect actual personality not self-idealization. *Psychological Science, 20*(10), 1-3.

Baumgartner, S.E., Valkenberg, P., & Peter, J. (2010a). Assessing causality in the relationship between adolescents' risky sexual online behaviour and their perceptions of this behaviour. *Journal of Youth & Adolescence, 39*(10), 1226-1239.

Baumgartner, S. E., Valkenberg, P., & Peter, J. (2010b). Unwanted online sexual solicitation and risky sexual online behaviour across the lifespan. *Journal of Applied Developmental Psychology, 31*, 439-447.

Beeger, B. (2007). Soziale Netzwerke: Karrierekiller im Internet. Retrieved from

    http://www.stern.de/digital/online/soziale-netzwerke-karrierekiller-im-internet-

    3272102.html

Bell, D. (2007). *Cyberculture theorists: Manuel Castells & Donna Harraway.* Abingdon, U.

    K.; Routledge.

Blalock, S. J., & Reyna, V. F. (2016). Using fuzzy trace theory to understand and improve

    health judgements, decisions, and behaviors: A literature review. *Health Psychology,*

    35(8), 781-792.

Blaschke, C. M., Freddolino, P. P., & Mullen, E. E. (2009). Ageing and technology: A review

    of the research literature. *British Journal of Social Work, 39*, 641-656.

Blum, R. W., & Nelson-Mmari, K. (2004). The health of young people in a global context.

    Journal of Adolescent Health, 35(5), 402-418.

Blumer, T., & Doring, N. (2012). Are we the same online? The expression of the five factor

    personality traits on the computer and the internet. *Cyberpsychology: Journal of*

    Psychosocial Research in Cyberspace, 6(3), article 5.

Bodroza, B., & Jovanovic, T. (2016). Validation of a new scale for measuring behaviours of

    Facebook use: Psycho-social Aspects of Facebook Use (PSAFU). *Computers in Human*

    Behavior, 54, 425-435.

Bowling, A. (2005). Mode of questionnaire administration can have serious effects on data

    quality. *Journal of Public Health, 27*(3), 281-291.

Boyd, D. M., & Ellison, N.B. (2008). Social network nites: Definition, history, and

    scholarship. *Journal of Computer-Mediated Communication, 13*, 210-230.

Brainerd, C. J., & Reyna, V. F. (1990). Gist is the grist: Fuzzy-trace theory and the new intuitionism. *Developmental Review, 10*, 3-47.

Brainerd, C. J., & Reyna, V. F. (2015). Fuzzy-trace theory and lifespan cognitive development. *Developmental Review, 38,* 89-121.

Brainerd, C. J., Reyna, V. F., & Howe, M. L. (2009). Trichotomous processes in early memory development, aging, and neurocognitive impairment: A unified theory. *Psychological Review*, 116, 783–832. doi:10.1037/a0016963

Brandtzaeg, P. B., & Heim, J. (2009). Why people use social networking sites. *Lecture Notes in Computer Science, 5621,* 143-152.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101.

Broniatowski, D.A., & Reyna, V.F. (July 2015). *Formalizing risky choice with a logistic model of Fuzzy Trace Theory*. Paper presented at the 37th Annual Conference of the Cognitive Science Society. Pasadena, California USA.

Bryce, J., & Klang, M. (2009). Young people, disclosure of personal information and online privacy: Control, choice and consequences. *Information Security Technical Report, 14*(3), 160-166.

Bruine de Bruin, W., Parker, A. M., & Fischoff, B. (2012). Explaining adult age differences in decision making competence. In M. K. Dhami, A. Schlottmann, & M. R. Waldman (Eds). *Learning & Decision Making as a Skill: Learning, Development & Evolution*. Cambridge University Press: Cambridge.

Brust-Renck, P. G., Reyna, V. F., Wilhelms, E. A., Wolfe, C. A., Widmer, C. L., Cedillos-Whynott, E. M., & Moran, A. K. (2016). Active engagement in web-based tutorial to

prevent obesity grounded in Fuzzy-Trace Theory predicts higher knowledge and gist

comprehension. *Behavioral Research Methods*. E-pub ahead of print. Retrieved from

https://www.ncbi.nlm.nih.gov/pubmed/27531360.

Buhrmester, M., Kwang, T., & Gosling, S.D. (2011). Amazon's Mechanical Turk: A new

source of inexpensive, yet high quality, data? *Perspectives on Psychological Science,*

6, 3-5.

Burgess, S., Sanderson, E., & Umana-Aponte, M. (2011). *School ties: An analysis of*

homophily in an adolescent friendship network. Working Paper No. 11/267. The Centre

for Market & Public Organisation. Retrieved from http://www.bristol.ac.uk/media-

library/sites/cmpo/migrated/documents/wp267.pdf

Burns, T., & Roszkowska, E. (2016). Rational Choice Theory: Towards a psychological,

social and material contextualization of human choice behaviour. *Theoretical*

Economics Letters, 6, 195-207.

Byrne, J., Kardefelt-Winther, D., Livingstone, S., & Stoilova, M. (2016). *Global Kids Online*

Research Synthesis 2015-2016. UNICEF Office of Research Innocenti and London

School of Economics and Political Science. Retrieved from https://www.unicef-

irc.org/publications/pdf/IRR_2016_01.pdf.

Byron, T. (2010). *Do we have safer children in a digital world? A review of progress since*

the 2008 Byron Review. Department for Children, Schools and Families. Retrieved

(2015, September 27) from

http://webarchive.nationalarchives.gov.uk/20130321052639/https://www.education.g

ov.uk/publications/eOrderingDownload/DCSF-00290-2010.pdf

Cabinet Office. (2014). *Government digital inclusion strategy*. Retrieved from

    https://www.gov.uk/government/publications/government-digital-inclusion-

    strategy/government-digital-inclusion-strategy.

Casey, B. J., Getz, S., & Galvan, A. (2008). The adolescent brain. *Developmental Review, 28,*

    62-77.

Centers for Disease Control and Prevention. (2012). *Youth risk behavior summaries United*

    States 2011: Morbidity and mortality weekly report. Surveillance summaries Vol. 61

    No. 4. Atlanta (GA): Department of Health and Human Services, Office of

    Surveillance, Epidemiology, and Laboratory Services. Retrieved from

    http://www.cdc.gov/mmwr/pdf/ss/ss6104.pdf.

Cerasaro, A. (2008). Employers defy privacy by using Facebook. Tennessee Journalist.

    Retrieved from http://tnjn.com/2008/apr/08/employers-defy-privacy-byusin/

Chadwick, D., Wesson, C., & Fullwood, C. (2013). Internet access by people with

    intellectual disabilities: Inequalities and opportunities. *Future Internet, 5*, 376-397.

Chau, P. Y. K., Cole, M., Massey, A. P., Montoya-Weiss, M., & O'Keefe, R. M. (2002).

    Cultural differences in the online behaviour of consumers. *Communications of the*

    ACM 2002, 45, 138-143.

Chen, W., Xie, X. C., Ping, F., & Wang, M. Z. (2017). Personality differences in online and

    offline self-disclosure preferences among adolescents: A person-centred approach.

    Personality & Individual Differences, 105, 175-178.

Chiesi, F., Gronchi, G., & Primi, C. (2008). Age-trend-related differences in tasks involving

    conjunctive probabilistic reasoning. *Canadian Journal of Experimental Psychology,*

    62(3), 188-191.

Child Exploitation and Online Protection (CEOP) Centre. (2010). *Strategic Overview 2009-2010.* London: CEOP. Retrieved from https://www.ceop.police.uk/Documents/Strategic_Overview_2009-10_(Unclassified).pdf.

Child Exploitation and Online Protection (CEOP) Centre. (2011). *Annual Review 2010-11 and Centre Plan 2011-12. Final Report.* London: CEOP. Retrieved from http://ceop.police.uk/Documents/ceopdocs/Annual%20Rev2011_FINAL.pdf.

Child Exploitation and Online Protection (CEOP) Centre. (2013). *Children treated like 'slaves' to perform sexual acts.* Media Centre: CEOP Press Release. Retrieved from http://ceop.police.uk/Media-Centre/Press-releases/2013/Children-treated-like-slaves-to-perform-sexual-acts-/.

Chopik, W. J. (2016). The benefits of social technology use among older adults are mediated by reduced loneliness. *Cyberpsychology, Behavior & Social Networking, 19*(9), 551-556.

Christofides, E., Muise, A., & DeMernis, S. (2010). *Privacy and information disclosure on Facebook: Youth and adult's information disclosure and perceptions of privacy risks.* Report for the Office of the Privacy Commissioner Canada. Retrieved from https://www.ontariosciencecentre.ca/Uploads/researchlive/documents/OPC-FinalReport-FacebookPrivacy.pdf

Cifas. (2017). *Fraudscape 2017.* Retrieved from https://www.cifas.org.uk/secure/contentPORT/uploads/documents/CIFAS%20Reports/External-Fraudscape%20report%202017.pdf

Collins, R. L., Martino, S. C., & Shaw, R. (2011). *Influence of new media on adolescent sexual health: Evidence and opportunities.* ASPE working paper. Retrieved from

https://aspe.hhs.gov/basic-report/influence-new-media-adolescent-sexual-health-evidence-and-opportunities.

Comscore. (2013). *U.K. Digital Future in Focus 2013.* Comscore. Retrieved from http://www.comscore.com/Insights/Presentations-and-Whitepapers/2013/2013-UK-Digital-Future-in-Focus?cs_edgescape_cc=US

Corbin, J., McElroy, T., & Black, C. (2010). Memory reflected in our decisions: Higher working memory capacity predicts greater framing bias in risky choice. *Judgment & Decision Making, 5*, 110-115.

Corbin, J. C., Reyna, V. F., Weldon, R. B., & Brainerd, C. J. (2015). How reasoning, judgement, and decision making are colored by gist-based intuition: A fuzzy-trace theory approach. *Journal of Applied Research in Memory & Cognition, 4*(4), 344-355.

Cotten, S. R., Ford, G., Ford, S., & Hale, T. M. (2014). Internet use and depression among retired older adults in the United States: A longitudinal analysis. *Journal of Gerontology, Series B: Psychological Science & Social Science, 69*, 763-771.

Coyle, C. E., & Duggan, E. (2012). Social isolation, loneliness, and health among older adults. *Journal of Aging and Health, 24*, 1346-1363.

Currie, C., Zanotti, C., Morgan, A., Currie, D., de Looze, M., Roberts, C., Samdal, O., Smith, O. R., & Barnekow, V. 2012). *Social determinants of health and well-being among young people: Health behaviour in school aged children (HBSC) study: International Report from the 2009/10 survey. Health Policy for Children and Adolescents No. 6.* Copenhagen. WHO Regional Office for Europe. Retrieved from http://www.euro.who.int/__data/assets/pdf_file/0003/163857/Social-determinants-of-health-and-well-being-among-young-people.pdf?ua=1.

Deardorff, J., Gonzales, N. A., Christopher, F. S., Roosa, M. W., & Millsap, R. E. (2005). Early puberty and adolescent pregnancy: The influence of alcohol use. *Paediatrics, 116,* 1451-1456.

De Boer, J., Botzen, W. J. W., & Terpstra, T. (2014). Improving flood risk communication by focussing on prevention-focussed motivation. *Risk Analysis, 34*(2), 309-322.

Dennis, N. A., Kim, H., & Cabeza, R. (2008). Age-related differences in brain activity during true and false memory retrieval. *Journal of Cognitive Neuroscience, 20*, 1390-1402.

Department for Education. (2016). *New measures to keep children safe online and at home*. Retrieved from https://www.gov.uk/government/news/new-measures-to-keep-children-safe-online-at-school-and-at-home.

Dhir, A., Kaur, P., Chen, S., & Lonka, K. (2016). Understanding online regret experience in Facebook use: Effects of brand participation, accessibility and problematic use. *Computers in Human Behavior, 59,* 420-430.

Dijkstra, J. K., Cillessen, A. H. N., & Borch, C. (2012). Popularity and adolescent friendship networks: Selection and influence dynamics. *Developmental Psychology, 49*(7), 1242-1252.

Donarth, J. (2007). Virtually trustworthy. *Science, 317*(5834), 53-54.

Donohew, L., Zimmerman, R., Cupp, P. S., Novak, S., Colon, S., & Abell, R. (2000). Sensation seeking, impulsive decision-making and risky sex: Implications for risk taking and design of interventions. *Personality & Individual Differences, 28*(6), 1079-1091.

Drouin, M., & Miller, D. (2015). Why do people record and post illegal material? Excessive
   social media use, psychological disorder, or both? *Computers in Human Behavior, 48,*
   608-614.

Duerager, A., & Livingstone, S. (2012). How can parents support children's internet safety?
   EU Kids Online: London, U. K. Retrieved from
   http://eprints.lse.ac.uk/42872/1/How%20can%20parents%20support%20children%E2
   %80%99s%20internet%20safety%28lsero%29.pdf

Duggan, M., & Smith, A. (2013). *Social media update 2013*. Pew Research Internet Project.
   Retrieved from http://www.pewinternet.org/2013/12/30/social-media-update-2013/

Ellison, N. B., Steinfield, C., & Lampe, C. (2007). The benefits of Facebook "friends": Social
   capital and college students' use of online social network sites. *Journal of Computer
   Mediated Communication, 12*, 1143 – 1168.

Epstein, J. L. (1983a). Examining theories of adolescent friendships. In J. L. Epstein & N.
   Karweit, N. (Eds). *Friends in school: Patterns of selection & influence in secondary
   school*. London: Academic Press.

Epstein, J. L. (1983b). Friendship among students in schools: Environmental and
   developmental factors. In J. L. Epstein & N. Karweit, N. (Eds). *Friends in school:
   Patterns of selection & influence in secondary school*. London: Academic Press.

Epstein, J. L. (1983c). The influence of friends on achievement and affective outcomes. In J.
   L. Epstein & N. Karweit, N. (Eds). *Friends in school: Patterns of selection & influence
   in secondary school*. London: Academic Press.

Epstein, J. L. (1983d). Selection of friends in differently organized schools and classrooms. In J. L. Epstein & N. Karweit, N. (Eds). *Friends in school: Patterns of selection & influence in secondary school*. London: Academic Press.

Epstein, J. L., & Karweit, N. (1983). *Friends in school: Patterns of selection & influence in secondary school*. London: Academic Press.

Epstude, K., & Roese, N. J. (2008). The functional theory of counterfactual thinking. *Personality & Social Psychology Review, 12*(2), 168-192.

EU Kids Online. (2014). *EU Kids Online: findings, methods, recommendations.* EU Kids Online. London School of Economics & Political Science: London, UK. Retrieved from http://eprints.lse.ac.uk/60512/.

European Commission. (2016). *Digital single market: From a safer internet to a better internet for kids.* Retrieved from https://ec.europa.eu/digital-single-market/safer-internet-better-internet-kids.

Eurostat. (2012). *Internet use in households and by individuals in 2012.* Retrieved from http://ec.europa.eu/eurostat/documents/3433488/5585460/KS-SF-12-050-EN.PDF/39000dab-e2b7-49b2-bc4b-6aad0bf01279

Evans B. (3 February 2013). Police study Facebook page of 16-year old girl murdered in frenzied stabbing as 22-year old man is charged with her killing. *The Daily Mail*. Retrieved from http://www.dailymail.co.uk/news/article-2272824/Sasha-Marsden-Police-study-Facebook-page-16-year-old-girl-murdered-frenzied-stabbing-22-year-old-man-charged-killing.html

Evans, J. S. (2008). Dual-Processing accounts of reasoning, judgment, and social cognition. *Annual Review of Psychology, 59*, 255–278.

Eysenck, S. G. B., Pearson, P. R., Eastings, G., & Allsopp, J. F. (1985). Age norms for

impulsiveness, venturesomeness and empathy in adults. *Personality & Individual*

Differences, 6, 613-619.

Facebook Newsroom. (2017). *Company Info: Stats.* Retrieved from

https://newsroom.fb.com/company-info/

Fagley, N. S., & Miller, P. M. (1987). Framing effects and arenas of choice: Your money or

your life? *Organizational Behavior & Human Decision Processes, 71*, 355–373.

Federal Bureau of Investigation (FBI). (2014). *Internet crimes report 2014.* Retrieved from

https://www.fbi.gov/news/news_blog/2014-ic3-annual-report

Federal Bureau of Investigation. (2015). *2015 Internet crime report*. U.S. Department of

Justice. Retrieved from https://pdf.ic3.gov/2015_IC3Report.pdf.

Fischer, P., Lea, S. E. G., & Evans, K. M. (2013). Why do individuals respond to fraudulent

scam communications and lose money? The psychological determinants of scam

compliance. *Journal of Applied Social Psychology, 43*, 2060-2072.

Fouladi, R. T., McCarthy, C. J., & Moller, N. (2002). Paper-and-pencil or online? Evaluating

mode effects on measures of emotional functioning and attachement. *Assessment, 9*(2),

204-215.

Fromme, K., Katz, E. C., & Rivet. K. (1997). Outcome expectancies and risk-taking

behavior. *Cognitive Therapy Research, 21*(4), 421-442.

Gadermann, A. M., Guhn, M., & Zumbo, B. D. (2012). Estimating ordinal reliability for

Likert-type and ordinal item response data: A conceptual, empirical, and practical

guide. *Practical Assessment Research & Evaluation, 17,* 1-13.

Get Safe Online. (n.d.). *Think twice before you act.* Retrieved from

    https://www.getsafeonline.org/scams/

Gilovich, T. Griffin, D., & Kahneman, D. (2002). *Heuristics and biases: The psychology of*

    intuitive judgment. Cambridge University Press: New York.

Gosling, S. D., Augustime, A. A., Vazire, S., Holtzman, N., & Gaddis, S. (2011).

    Manifestations of personality in online social networks: Self-reported facebook-related

    behaviors & observable profile information. *Cyberpsychology, Behavior, & Social*

    Networking, 14(9), 483-488.

Greenfiled, P., & Yan, Z. (2006). Children, adolescents, and the internet: A new field of

    inquiry in developmental psychology. *Developmental Psychology, 42*(3), 391-394.

Greenwood, S., Perrin, A., & Duggan, M. (2016). *Social media update 2016.* Pew Research

    Center: Internet & Technology Report. Retrieved from

    http://www.pewinternet.org/2016/11/11/social-media-update-2016/.

Grimes, G. A., Hough, M. G., Mazur, E., & Signorella, M. L. (2010). Older adults'

    knowledge of Internet hazards. *Educational Gerontology, 36*, 173-192.

Grusec, J. E., Goodnow, J. J., & Kuczynski, L. (2000). New directions in analyses of

    parenting contributions to childrens' acquisition of values. *Child Development, 71*(1),

    205-211.

Guadagno, R. E., Okdie, B. M., & Muscanell, N. L. (2013). Have we all just become "Robo-

    Sapiens"? Reflections on social influence processes in the internet age. *Psychological*

    Inquiry, 24(4), 301-309.

Hafen, C. A., Laursen, B., Burk, W. J., Kerr, M., & Stattin, H. (2011). Homophily in stable and unstable adolescent friendships: Similarity breeds constancy. *Personality & Individual Differences, 51,* 607-612.

Halpern-Fisher, B. L., & Cauffman, E. (2001). Costs and benefits of a decision: Decision making competence in adolescents and adults. *Applied Developmental Psychology, 22*, 257-273.

Hancock, J. T., & Toma, C. L. (2009). Putting your best face forward: The accuracy of online dating photographs. *Journal of Communication, 59*(2), 367-386.

Harbough, W. T., Krause, K., & Berry, T. R. (2001). GARP for kids: On the development of rational choice behaviour. *American Economic Review, 91*(5), 1539-1545.

Health Protection Agency. (2008). *HIV in the United Kingdom. 2008 Report*. London: Health Protection Agency, HIV and Sexually Transmitted Infections Department, Centre for Infections. Retrieved from http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1227515298354.

Helsper, E. (2008). *Digital inclusion: an analysis of social disadvantage in the information society.* Department for Communities and Local Government. London. Retrieved from http://eprints.lse.ac.uk/26938/1/__libfile_REPOSITORY_Content_Helsper,%20E_Digital%20inclusion_Helsper_Digital%20inclusion_2013.pdf.

Hertwig, R., & Erev, I. (2009). The description-experience gap in risky choice. *Trends in Cognitive Science, 13*, 517–523.

Hinduja, S., & Patchin, J. W. (2008). Personal information of adolescents on the internet: A quantitative content analysis of MySpace. *Journal of Adolescence, 31*(1), 125-146.

Hinduja, S., & Patchin, J. W. (2016). *Cyberbullying victimization. 2016 Cyberbullying data*. Cyberbullying Research Center. Retrieved from http://cyberbullying.org/2016-cyberbullying-data.

Hodgson, G. M. (2012). On the limits of Rational Choice Theory. *Economic Thought, 1*, 94-108.

Hofstede, G. (2001). *Culture's consquences: Comparing values, behaviors, institutions and organizations across nations.* Thousand Oaks, CA. Sage.

Hofstede, G., Hofstede, G. J., & Minkov, M. (2010). *Cultures and organizations: Software of the mind (Revised 3rd Ed).* New York: McGraw.

Hofstede, G., & Minkov, M. (2013). Value Survey Model 2013. Retrieved from http://www.geerthofstede.eu/vsm2013

Holt, T. J., & Bossler, A. M. (2008). Examining the applicability of lifestyle-routine activities theory for cybercrime victimization. *Deviant Behavior, 30*, 1-25.

Home Instead. (2013). *Senior fraud protection toolkit: Helping seniors stay safely at home.* Retrieved from http://www.homeinstead.co.uk/Resources/senior-fraud-toolkit.pdf

Hoyle, R.H., Stephenson, M.T., Palmgreen, P., Lorch, E.P., & Donohew, R.L. (2002). Reliability and validity of a brief measure of sensation seeking. *Personality and Individual Differences, 32,* 401-414.

Huang, Y. H., Berger, D. E., Wood, S., & Hanoch, Y. (2015). Age differences in experiential and deliberative processes in ambiguous and unambiguous decision making. *Psychology & Ageing, 30,* 675-687.

Hum, N. J., Chamberlain, P. E., Hambright, B.L., Portwood, A. C., Schat, A. C., & Bevan, J.

L. (2011). A picture is worth a thousand words: A content analysis of Facebook.

Computers in Human Behavior, 27(5), 1828-1833.

Internet Matters (2016). Children's online safety in 2016: What are parents' concerns, how

do they address these, and what support do they need? Retrieved from

https://www.internetmatters.org/wp-content/uploads/2015/12/Internet-Matters-

Children_online_safety_in_2016_research.pdf

Jackson, L. A., & Wang, J. L. (2013). Cultural differences in social network use: A

comparative study of China and the United States. *Computers in Human Behavior,

29,* 910-921.

Jeske, D., Briggs, P., & Coventry, L. (2016). Exploring the relationship between impulsivity

and decision making on mobile devices. *Personal & Ubiquitous Computing, 20,* 545-

557.

Kahneman, D. (2003). A perspective on judgement and choice: Mapping bounded rationality.

American Psychologist, 58(9), 697-720.

Kahneman, D., & Tversky, A. (1979). Prospect Theory: An analysis of decision under risk.

Econometrica, 47(2), 263-292.

Kann, L., McManus, T., Harris, W. A., Shanklin, S., Flint, K. H., Hawkins, J., … Zaza, S.

(2016). *Youth Risk Behaviour Surveillance, United States, 2015. MMWR Surveillance

Summaries, Vol. 64, No. 6.* Centers for Disease Control & Prevention. Retrieved from

https://www.cdc.gov/healthyyouth/data/yrbs/pdf/2015/ss6506_updated.pdf.

Kaplan, A. M., & Haenlein, M. (2010). Users of the World unite! The challenges and

opportunities of Social Media. *Business Horizons, 53*(1), 59-68.

Karweit, N., & Hansell, S. (1983). Sex differences in adolescent relationships: Friendship and

    status. In J. L. Epstein & N. Karweit, N. (Eds). *Friends in school: Patterns of selection*

    & influence in secondary school. London: Academic Press.

Kingkade T. (2015, December 16). Colorado college suspends student for six months over

    Yik Yak post. Retrieved from http://www.huffingtonpost.com/entry/colorado-college-

    yik-yak_us_56718ab1e4b0648fe301b019

Klaczynski, P. A., & Felmban, W. S. (2014). Heuristics and biases during adolescence:

    Developmental reversals and individual differences. In H. Markovits (Ed). *The*

    Developmental Psychology of Reasoning and Decision Making. Hove: Psychology

    Press.

Kleck, C. A., Reese, C., Ziegerer-Behnken, D., & Sundar, S. (2007). The Company you keep

    and the image you project: Putting your best face forward in online social networks.

    Paper presented at the annual meeting of the International Communication

    Association, TBA, San Francisco, CA. Retrieved from

    http://citation.allacademic.com/meta/p_mla_apa_research_citation/1/7/2/7/5/pages1727

    56/p172756-1.php

Kleop, M., Guney, N., Cok, F., & Simsek, O. F. (2007). Motives for risk-taking in

    adolescence: A cross-cultural study. *Journal of Adolescence, 32,* 135-151.

Kobayashi, T., & Boase, J. (2014). Tele-cocooning: Mobile texting and social scope. *Journal*

    of Computer-Mediated Communication, 19, 681-696.

Kosinski, M., Stillwell, D., & Graepel, T. (2013). Private traits and attributes are predictable

    from digital records of human behavior. *Proceedings of the National Academy of*

    Sciences of the United States of America, 110(5), 5802-5805.

Koustaal, W., Schater, D. L., Galluccio, L., & Stofer, K. A. (1999). Reducing gist-based false recognition in older adults: Encoding and retrieval manipulations. *Psychology & Ageing, 14,* 220-237.

Kovalchik, S., Camerer, C. F., Grether, D. M., Plott, C. R., & Allmann, J. M. (2005). Ageing and decision making: A comparison between neurologically healthy elderly and young individuals. *Journal of Economic Behavior and Organization, 58*, 79-94.

Krasnova, H., Kolesnikova, E., & Guenther, O. (2009). "It won't happen to me!" Self-disclosure in online social networks. *AMCIS Proceedings. Paper 343.* Retrieved from http://aisel.aisnet.org/amcis2009/343

Kühberger, A. (1998). The influence of framing on risky choices: A meta-analysis. *Organizational Behavior and Human Decision Processes, 75*, 23–55.

Kühberger, A., & Tanner, C. (2010). Risky choice framing: Task versions and a comparison of prospect theory and fuzzy-trace theory. *Journal of Behavioral Decision Making, 23*, 314–329.

Kupersmidt, J. B., DeRosier, M. E., & Patterson, C. P. (1995). Similarity as the basis for children's friendships: The roles of sociometric status, aggressive and withdrawn behavior, academic achievement, and demographic characteristics. *Journal of Social & Personal Relationships, 12*(3), 439-452.

Kurniawan, S. (2008). Older people and mobile phones: A multi-method investigation. *International Journal of Human-Computer Studies*, *66*, 889-901.

Kwak, Y., Payne, J. W., Cohen, A. L., & Huettel, S. A. (2015). The rational adolescent: Strategic information processing during decision making revealed by eye-tracking. *Cognitive Development, 36,* 20-30.

Langlois, J. H., Kalakanis, L., Rubenstein, A. J., Larson, A., Hallam, M., & Smoot, M.
(2000). Maxims or myths of beauty? A meta-analytic and theoretical review.
Psychological Bulletin, 126(3), 390-423.

Langenderfer, J., & Shrimp, T. A. (2001). Consumer vulnerability to scams, swindles and
fraud: A new theory of visceral influences on persuasion. *Psychology & Marketing,
18*, 763-783.

Lee, S. J. (2009). Online communication and adolescent social ties: Who benefits more from
internet use? *Journal of Computer Mediated Communication, 14*(3), 509-531.

Lenhart, A., Madden, M., McGill, A. R., & Smith, A. (2007). *Teens & social media.* Pew
Internet & American Life Project. Retrieved from http://www.pewinternet.org/files/old-
media/Files/Reports/2007/PIP_Teens_Social_Media_Final.pdf.pdf

Leone, C., & Corte, V. (1994). Concern for self-presentation and self-congruence: Self-
monitoring, Machiavellianism, and social conflicts. *Social Behavior & Personality, 22,*
305-312.

Levin, J. (2004). *Introduction to choice theory*. Retrieved from
http://web.stanford.edu/~jdlevin/Econ%20202/Choice%20Theory.pdf.

Levin, I. P., Bossard, E. A., Gaeth, G. J., & Yan, H. (2014). The combined role of task,
child's age and individual differences in understanding decision processes. *Judgment
and Decision Making, 9*, 274–286. Retrieved from
http://journal.sjdm.org/14/14129/jdm14129.pdf

Levin, I. P., Weller, J. A., Pederson, A. A., & Harshman, L. A. (2007). Age-related differences in adaptive decision making: Sensitivity to expected value in risky choice. *Judgment & Decision Making, 2*(4), 225-233.

Liau, A. K., Khoo, A., & Ang, P. H. (2005). Factors influencing adolescents engagement in risky internet behavior. *Cyberpsychology, Behavior & Social Networking, 8*(6), 513-520.

Linden-Andersen, S., Markiewicz, D., & Doyle, A. (2008). Perceived similarity among adolescent friends: The role of reciprocity, friendship quality, and gender. *Journal of Early Adolescence, 29*(5), 617-637.

Liu, C., Ang, R. P., & Lwin, M. O. (2013). Cognitive, personality, and social factors associated with adolescents' online personal information disclosure. *Journal of Adolescence, 36*(4), 767-776.

Livingstone, S., & Bober, M. (2004). *UK children go online: surveying the experiences of young people and their parents*. London: LSE Research Online. Retrieved from http://eprints.lse.ac.uk/archive/00000395.

Livingstone, S., Haddon, L., Görzig, A., & Ólafsson, K. (2011). *Risks and safety on the internet: The perspective of European children. Full Findings*. LSE, London: EU Kids Online. Retrieved from http://www.lse.ac.uk/media%40lse/research/EUKidsOnline/EU%20Kids%20II%20(2009-11)/EUKidsOnlineIIReports/D4FullFindings.pdf.

Livingstone, S., & Helsper, E. (2007). Taking risks when communicating on the internet: the role of offline social-psychological factors in young people's vulnerability to online risks. *Information, Communication & Society, 10*(5), 619-643.

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

Livingstone, S., Mascheroni, G., Olafsson, K., & Haddon, L. (2014). *Children's online risks and opportunities: Comparative findings from EU Kids Online & Net Children Go Mobile.* London: London School of Economics and Political Science. Available from http://eprints.lse.ac.uk/60513/1/__lse.ac.uk_storage_LIBRARY_Secondary_libfile_sh ared_repository_Content_EU%20Kids%20Online_EU%20Kids%20Online-Children%27s%20online%20risks_2014.pdf.

Logis, H. A., Rodkin, P. C., Gest, S. D., & Ahn, H. (2013). Popularity as an organizing factor of preadolescent friendship networks: Beyond prosocial and aggressive behavior. *Journal of Research on Adolescence, 23*(3), 413-423.

Maccoby, E. E. (1998). *The two sexes: Growing up apart, coming together*. (Vol. 4). Harvard University Press.

Macfayden, L. P., Roche, J., & Dof, S. (2004). *Communication across cultures in cyberspace: A bibliographical review of intercultural communication online*. Munster: LIT Verlag. Retrieved from https://core.ac.uk/download/pdf/12174297.pdf

Madden, M., Lenhart, A., Duggan, M., Cortesi, S., & Gasser, U. (2013). *Teens and technology 2013*. Pew Research Center. Retrieved from http://www.pewinternet.org/2013/03/13/teens-and-technology-2013/.

Marder, B., Joinson, A., Shankar, A., & Thirlaway, K. (2016). Strength matters: Self-presentation to the strongest audience rather than lowest common denominator when faced with multiple audiences in social network sites. *Computers in Human Behavior, 61,* 56-62.

Mason, W., & Suri, S. (2012). Conducting behavioral research on Amazon's Mechanical Turk. *Behavioral Research Methods, 44,* 1-23.

Mata, R., Josef, A. K., Samanez-Larkin, G. R., & Hertwig, R. (2011). Age differences in risky choice: A meta-analysis. *Annals of the New York Academy of Sciences, 1235*, 18-29.

Mazur, E., & Richards, L. (2011). Adolescents' and emerging adults' social networking online: Homophily or diversity? *Journal of Applied Developmental Psychology, 32*(4), 180-188.

McCall, C. (2013). Social cognition in the cyborg age: Embodiment and the internet. *Psychological Inquiry, 24*, 314-320.

McCroskey, J. C., & McCain, T. A. (1974). The measurement of interpersonal attraction. *Speech Monographs, 41,* 261-266.

McDonald, H. (2013, October). Online fraud costs global economy 'many times more than $100bn'. *The Guardian Online.* Retrieved from http://www.theguardian.com/technology/2013/oct/30/online-fraud-costs-more-than-100-billion-dollars

McPherson, M., Smith-Lovin, M., & Cook, J. M. (2001). Birds of a feather: Homophily in social networks. *Annual Review of Sociology, 27,* 415-444.

Measham, F., & Brain, K. (2005). 'Binge' drinking, British alcohol policy and the new culture of intoxication. *Crime, Media & Culture, 1,* 262-283.

Milligan, C., & Passey, D. (2011). *Ageing and the use of the Internet: Current engagement and future needs.* Report for the Nominet Trust. Retrieved from

https://www.nominettrust.org.uk/sites/default/files/NT%20SoA%20-%20Ageing%20and%20the%20use%20of%20the%20internet_0.pdf

Million Dollar Dating Scam Mum and Daughter Jailed. (29 August 2013). *BBC News Online.* Retrieved from http://www.bbc.co.uk/news/technology-23884241.

Mills, B., Reyna, V. F., & Estrada, S. (2008). Explaining contradictory relations between risk perception and risk taking. *Psychological Science, 19*(5), 429-433.

Ministry of Justice. (2017). *Youth Justice Statistics 2015/16. England & Wales*. Youth Justice Board Statistical Bulletin. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/585897/youth-justice-statistics-2015-2016.pdf.

Mitchell, K. J., Jones, L., Finklehor, D., & Wolak, J. (2014). *Trends in unwanted online experiences and sexting. Final Report.* Crimes Against Children Research Center. Retrieved from http://www.unh.edu/ccrc/pdf/Full%20Trends%20Report%20Feb%202014%20with%20tables.pdf.

Moll, R., Pieschl, S., & Broome, R. (2014). Trust into collective privacy? The role of subjective theories for self-disclosure in online communication. *Societies, 4,* 770-784.

Moorhead, S. A., Hazlett, D. E., Harrison, L. H., Carroll, L. K., Irwin, A., & Hovig, C. (2013). A new dimension of healthcare: Systematic review of the uses, benefits, and limitations of social media for health care. *Journal of Medical Internet Research, 15*(4), e85.

Moreno, M. A., Brockman, L., Rogers, C. B., & Christakis, D. A. (2010). An evaluation of the distribution of sexual references among "top 8" MySpace friends. *Journal of Adolescent Health, 47*(4), 418-420.

Moreno, M. A., Parks, M. R., Zimmerman, F. J., Brito, T. E., & Christakis, D. A. (2009). Display of health risk behaviors on MySpace by adolescents: Prevalence and assocations. *Archives of Pediatrics & Adolescent Medicine, 163*(1), 27-34.

Moreno, M. A., Swanson, M. J., Royer, H., & Roberts, L. J. (2011). Sexpectations: male college students' views about displayed sexual references on females social networking web sites. *Journal of Pediatric and Adolescent Gynaecology, 24*(2), 85-89.

Morgan, E. M., Snelson, C., & Elison-Bowers, P. (2010). Image and video disclosure of substance use on social media websites. *Computers in Human Behavior, 26,* 1405-1411.Mottram, A. J., & Fleming, M. J. (2009). Extraversion, impulsivity and online group membership as predictors of problematic internet use. *Cyberpsychology & Behavior, 12,* 319-321.

National Council on Aging. (n.d.). *Top 10 financial scams targeting seniors.* Retrieved from https://www.ncoa.org/economic-security/money-management/scams-security/top-10-scams-targeting-seniors/

National Institute of Aging (2014). *Planning meeting on economic decision making in aging populations.* Retrieved from https://www.nia.nih.gov/about/events/2015/expert-planning-meeting-economic-decision-making-aging-populations

Newiss, G. (2014). *Beyond stranger danger: teaching children about staying safe from stranger child abduction*. London: Parents and Abducted Children Together. Retrieved from http://www.childabduction.org.uk/images/Beyond_Stranger_Danger.pdf

Newman, G. R., & Clarke, R. V. (2003). *Superhighway robbery: Preventing e-commerce crime.* Devon, England: Willan.

Nosko, A., Wood, E., & Molema, S. (2010). All about me: Disclosure in online social networking profiles: The case of Facebook. *Computers in Human Behavior, 26,* 406-418.

OECD. (2010). *The protection of children online: Report on risks faced by children online and policies to protect them.* Retrieved from https://www.oecd.org/sti/ieconomy/childrenonline_with_cover.pdf.

Ofcom. (2016). *Children and parents: Media use and attitudes report 2016.* Retrieved from https://www.ofcom.org.uk/research-and-data/media-literacy-research/childrens/children-parents-nov16.

Office for the Children's Commissioner England. (2017). *Growing up digital: A Report of the growing up digital taskforce.* Retrieved from http://www.childrenscommissioner.gov.uk/sites/default/files/publications/Growing%20Up%20Digital%20Taskforce%20Report%20January%202017_0.pdf.

Office for National Statistics. (2016). *Adults internet users in the U.K.: 2016.* Retrieved from https://www.ons.gov.uk/businessindustryandtrade/itandinternetindustry/bulletins/internetusers/2016.

Office for National Statistics. (2017). *Statistical Bulletin. Crime in England & Wales: year ending December 2016.* Retrieved from https://www.ons.gov.uk/peoplepopulationandcommunity/crimeandjustice/bulletins/crimeinenglandandwales/yearendingdec2016.

Ofsted (2015). *Child internet safety summit.* Retrieved from

> https://www.slideshare.net/Ofstednews/childinternetsafetysummitonlinesafetyinspectio
>
> n.

Palmer, T. (2015). *Digital dangers: The impact of technology on the sexual abuse and*

> *exploitation of children and young people.* Barnardo's: Barkingside. Retrieved from
>
> http://www.barnardos.org.uk/onlineshop/pdf/digital_dangers_report.pdf.

Paolacci, G., Chandler, J., & Ipeirotis, P.G. (2010). Running experiments on Amazon

> Mechanical Turk. *Judgment & Decision Making, 5,* 411-419.

Peluchette, J., & Karl, K. (2008). Social networking profiles: An examination of student

> attitudes regarding use and appropriateness of content. *Cyberpsychology & Behavior,*
>
> *11,* 95-97.

Peluchette, J., & Karl, K. (2010). Examining students' intended image on Facebook: "What

> were they thinking?" Journal of Education for Business, 85, 30-37.

Petronio, S. (2002). *Boundaries of privacy: Dialectics of disclosure.* New York State:

> University of New York Press.

Pew Internet Research Center. (2015). The demographics of social media users. Retrieved

> from http://www.pewinternet.org/2015/08/19/the-demographics-of-social-media-
>
> users/

Poley, M. E., M., & Lao, S. (2012). Social compensation or Rich-get-richer? The role of

> social competence in college students' use of the internet to find a partner. *Computers*
>
> *in Human Behavior, 28,* 414-419.

Poulin, F., & Pedersen, S. (2007). Developmental changes in gender composition of

friendship networks in adolescent girls and boys. *Developmental Psychology, 43*(6),

1484-1496.

Pratt, T. C., Holtfreter, K., & Reisig, M. D. (2010). Routine online activity and internet fraud

targeting: Extending the generality of routine activity theory. *Journal of Research in

Crime & Delinquency, 47*, 267-296.

Prisacari, A. A., & Danielson, J. (2017). Computer-based versus paper-based testing:

Investigating testing mode with cognitive load and scratch paper use. *Computers in

Human Behavior, 77,* 1-10.

Pulford, B. D., & Colman, A. M. (1996). Overconfidence, base rates, and outcome

positivity/negativity of predicted events. *British Journal of Psychology, 87,* 431-445.

Pulford, B. D., Colman, A. M., Lawrence, C. L., & Krockow, E. M. (2017). Reasons for

cooperating in repeated interactions: Social values orientations, fuzzy traces,

reciprocity, and activity bias. *Decision, 4*(2), 102-122.

Quinn, P. D., & Fromme, K. (2011). Subjective responses to alcohol challenge: a quantitative

review. *Alcoholism: Clinical & Experimental Research, 35*(10), 1759-1770.

Rakow, T., & Rahim, S. B. (2010). Developmental insights into experience-based decision

making. *Journal of Behavioral Decision Making, 23*(1), 69-82.

Rashtian, H., Boshmaf, Y., Jaferian, P., & Beznosov, K. (2014). To befriend or not? A model

of friend request acceptance on Facebook. *Symposium on Usable Privacy & Security.*

Retrieved from https://www.usenix.org/system/files/conference/soups2014/soups14-

paper-rashtian.pdf

Recabarren, M., Nassbaum, M., & Leira, C. (2008). Cultural divide and the internet. *Computers in Human Behavior, 24,* 2917-2926.

Reisig, M. D., Pratt, T. C., & Holtfreter, K. (2009). Perceived risk of internet theft victimization: Examining the effects of social vulnerability and financial impulsivity. *Criminal Justice and Behavior, 36*, 369-384.

Reyna, V. F. (2004). How people make decisions that involve risk: A dual process approach. *Current Directions in Psychological Science, 13,* 60-66.

Reyna, V. F. (2008). A theory of medical decision making and health: Fuzzy-trace theory. *Medical Decision Making, 28*, 850-865.

Reyna, V. F. (2012). A new intuitionism: Meaning, memory, and development in fuzzy trace theory. *Judgment and Decision Making, 7*, 332–259

Reyna, V. F., & Adam, M. B. (2003). Fuzzy trace theory, risk communication, and product labelling in sexually transmitted diseases. *Risk Analysis, 23*(2), 325-342.

Reyna, V. F., & Brainerd, C. J. (1995). Fuzzy-trace theory: An interim synthesis. *Learning and Individual Differences, 7*, 1–75.

Reyna, V. F., & Brainerd, C. J. (2011). Dual processes in decision making and developmental neuroscience: A fuzzy-trace model. *Developmental Review, 31*, 180–206.

Reyna, V. F., Chick, C. F., Corbin, J. C., & Hsia, A. N. (2014). Developmental reversals in risky decision making: Intelligence agents show larger decision bias than college students. *Psychological Science, 25*, 76-81.

Reyna, V. F., & Ellis, S. C. (1994). Fuzzy-trace theory and framing effects in children's risky decision making. *Psychological Science, 5*(5): 275-279.

Reyna, V. F., Estrada, S. M., DeMarinis, J. A., Myers, R. M., Stanisz, J. M., & Mills, B. A. (2011). Neurobiological and memory models of risky decision making in adolescents versus young adults. *Journal of Experimental Psychology, 37*, 1125–1142.

Reyna, V. F., & Farley, F. (2006). Risk and rationality in adolescent decision making: Implications for theory, practice and public policy. *Psychological Science in the Public Interest, 7*(1), 1-44.

Reyna, V. F., & Lloyd, F. (2006). Physician decision making and cardiac risk: Effects of knowledge, risk perception, risk tolerance, and fuzzy processing. *Journal of Experimental Psychology: Applied, 12,* 179-195.

Reyna, V. F., & Mills, B. A. (2014). Theoretically motivated interventions for reducing sexual risk taking in adolescence: A randomized controlled experiment applying fuzzy-trace theory. *Journal of Experimental Psychology: General, 143*, 1627–1648.

Reyna, V. F., Weldon, R. B., & McCormick, M. J. (2015). Educating intuition: Reducing risky decisions using fuzzy trace theory. *Current Directions in Psychological Science, 24*(4), 392-398.

Reyna, V. F., Wilhelms, E. A., McCormick, M. J., & Weldon, R. B (2015). Development of risky decision making: Fuzzy-trace theory and neurobiological perspectives. *Child Development Perspectives, 9*(2), 122-127.

Rivers, S. E., Reyna, V. F., & Mills, B. (2008). Risk taking under the influence: A fuzzy-trace theory of emotion in adolescence. *Developmental Review, 28*, 107–144.

Rolison, J. J., Hanoch, Y., Wood, S., & Liu, P. J. (2014). Risk-taking differences across the adult life span: A question of age and domain. *Journals of Gerontology, Series B: Psychological Science and Social Sciences, 69*(6), 870-880.

Ronnlund, M., Karlsoon, E., Laggnas, E., Larsson, E., & Lindstrom, T. (2005). Risky
decision making across three arenas of choice: Are younger and older adults
differently susceptible to framing effects? *Journal of General Psychology, 132*, 81–
92.

Ross, M., Grossman, I., & Schryer, E. (2014). Contrary to psychological and popular opinion,
there is no compelling evidence that older adults are disproportionately victimized by
consumer fraud. *Perspectives on Psychological Science, 9,* 427-436.

Sarabia, I., & Estevez, A. (2015). Sexualized behaviors on Facebook. *Computers in Human
Behavior, 61,* 219-226.

Scott, J. (2000). Rational choice theory. In *Understanding contemporary society: Theories of
the present*. G. Browning, A. Halcli, & F. Webster (Eds). London: Sage.

Scott, G. G., & Hand, C. J. (2016). Motivation determines Facebook viewing strategy.
Computers in Human Behavior, 56, 267-280.

Seidman, G., & Miller, O. S. (2013). Effects of gender and physical attractiveness on visual
attention to Facebook profiles. *Cyberpsychology, Behavior, & Social Networking,
16*(1), 20-24.

Shaw D. (2013, April 9). Paris Brown: Kent PCC resigns after Twitter row. Retrieved from
http://www.bbc.co.uk/news/uk-england-22083032

Shrum, W., Cheek, N. H., & Hunder, S. M. (1988). Friendship in school: Gender & racial
homophily. *Sociology of Education, 61*(4), 227-239.

Shulman, E. P., Smith, A. R., Silva, K., Icenogle, G., Duell, N., Chein, J., & Steinberg, L.
(2016). The dual systems model: Review, reappraisal, and reaffirmation.
Developmental Cognitive Neuroscience, 17, 103-117.

Simon, H. A. (1955). A behavioral model of rational choice. *Quarterly Journal of Economics, 69*, 99–118.

Simon, H. A. (1979). Rational decision-making in business organizations. *American Economic Review, 69*, 493–513.

Simpson I. (2015, February 20). Maryland prison officials fired for Facebook joke about being groped. Huffington Post. Retrieved from http://www.huffingtonpost.com/2015/02/20/maryland-prisons-official_n_6722366.html

Slovic, P., Finucane, M., Peters, E., & MacGregor, D. G. (2002). The affect heuristic. In T. Gilovich, D. Griffin, & D. Kahneman (Eds). *Heuristics and biases: The psychology of intuitive judgment*. New York: Cambridge University Press

Smahel, D., & Wright, M. F. (2014). The meaning of online problematic situations for children: results of qualitative cross-cultural investigation in nine European countries. *EU Kids Online, London School of Economics and Political Science, London, UK*. Retrieved from http://eprints.lse.ac.uk/56972/

Smith, S. G., Raine, R., Obichere, A., Wolfe, M. S., Wardle, J., & von Wagner, C. (2015). The effect of supplementary ('gist-based') information leaflet on colorectal cancer knowledge and screening intervention: A randomised control trial. *Journal of Behavioral Medicine, 38*(2), 261-272.

Snyder, M. (1987). *Public appearances/private realities: The psychology of self-monitoring*. New York: Freeman.

Snyder, M., & Gangestad, S. (1986). On the nature of self-monitoring: Matters of assessment, matters of validity. *Journal of Personality & Social Psychology, 51,* 125-139.

Social Media. (2017). In Oxforddictionaries.com. Retrieved from
https://en.oxforddictionaries.com/definition/social_media.

Sparrow, B. & Chatman, L. (2013). Social cognition in the internet age: Same as it ever was?
Psychological Inquiry, 24(4), 273-292.

Spielhofer, T. (2010). *Children's online risks and safety: A review of the available evidence.*
Slough. NFER.

Stanovich, K. E., & West, R. F. (2000). Individual differences in reasoning: Implications for
the rationality debate. *Behavioral and Brain Sciences, 23*, 645–665.

Steinberg, L. (2008). A social neuroscience perspective on adolescent risk taking.
Developmental Review, 28, 78-106.

Steinberg, L., Albert, D., Cauffman, E., Banich, M., Graham, S., & Woolard, J. (2008). Age
differences in sensation seeking and impulsivity as indexed by behaviour and self-
report: Evidence for a dual-systems model. *Developmental Review, 44*(6), 1764-1778.

Steinfield, C., Ellison, N. B., & Lampe, C. (2008). Social capital, self-esteem, and use of
online social network sites: A longitudinal analysis. *Journal of Applied Developmental
Psychology, 29*(6), 434-445.

Steptoe, A., Shankar, A., Demakaos, P., & Wardle, J. (2013). Social isolation, loneliness, and
all-cause mortality in older men and women. *Proceedings of the National Academy of
Sciences of the United States of America, 100*, 5797-5801.

Strough, J., Karns, T. E., & Schlosnagle, L. (2011). Decision making heuristics and biases
across the lifespan. *Annals of New York Academy of Science, 1235*, 57-74.

Subrahmanyam, K., Reich, S. M., Waechetr, N., & Espinoza, G. (2008). Online and offline

    social networks: Use of social networking sites by emerging adults. *Journal of Applied*

    Developmental Psychology, 29, 420-433.

Suler, J. (2004). The online disinhibition effect. *Cyberpsychology & Behavior, 7,* 321-326.

Sunstein, C. (2008). Adolescent risk taking and social meaning: A commentary.

    Developmental Review, 28, 145-152.Takemura, K. (1994). Influence of elaboration on

    the framing of decision. *Journal of Psychology: Interdisciplinary and Applied, 128*,

    33–39.

Ten most searched for social networking sites by country. (2015). Retrieved from

    http://www.digitalstrategyconsulting.com/intelligence/2013/12/top_10_most_searched_

    for_social_networks_by_country.php

Terpstra, T., Zaalberg, R., de Boer, J., & Botzen, W. J. W. (2014). You have been framed!

    How antecedents of information need mediate the effects of risk communication

    messages. *Risk Analysis, 34*(8), 1506-1520.

Tong, S. T., Van Der Heide, B., Langwell, L., & Walther, J. B. (2008). Too much of a good

    thing? The relationship between number of friends and interpersonal impressions on

    Facebook. *Journal of Computer Mediated Communication, 13,* 531-549.

Toplak, M. E., West, R. F., & Stanovich, K. E. (2014). Assessing the development of

    rationality. In H. Markovits (Ed). *Developmental Psychology of Reasoning & Decision*

    Making. Hove: Psychological Press.

Topping, A., & Coyne, E. (7 August 2013). Hannah Smith suicide: MPs call for education in

    social-media awareness. *The Guardian.* Retrieved from

http://www.theguardian.com/society/2013/aug/07/hannah-smith-suicide-cyberbullying-ask-fm-twitter

Tufekci, Z. (2010). *Who acquires friends through social media and why? "Rich-get-richer" versus "seek & ye shall find".* Proceedings of the Forth International AAAI Conference on Weblogs & Social Media (ICWSM 2010). Washington, D. C., USA.

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science, 185*, 1124–1131.

Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science, 211*, 453–458.

Tversky, A., & Kahneman, D. (1983). Extensional vs. intuitive reasoning: The conjunction fallacy in probability judgment. *Psychological Review, 90*, 293–3l5.

Tversky, A., & Kahneman, D. (1986). Rational choice and the framing of decisions. *The Journal of Business, 59*, 251–278.

Utz, S. (2010). Show me your friends and I will tell you what type of person you are: How one's profile, number of friends, and type of friends influence impression formation on social network sites. *Journal of Computer Mediated Communication, 15*(2), 314-335.

Valkenburg, P. M., & Peter, J. (2011). Online communication among adolescents: An integrated model of its attraction, opportunities and risks. *Journal of Adolescent Health, 48*(2), 121-127.

Van der Heide, B., D'Angelo, J. D., & Schumaker, E. M. (2012). The effects of verbal versus photographic self-presentation on impression management in Facebook. *Journal of Communication, 62*(1), 98-116.

Van Gool, E., Van Ouytsel, J., Ponnet, K., & Walgrave, M. (2015). To share or not to share? Adolescents' self-disclosure about peer relationships on Facebook: An application of the Prototype Willingness Model. *Computers in Human Behavior, 44,* 230-239.

Van Wilsem, J. (2011). 'Bought it but never got it'. Assessing risk factors for online consumer fraud victimization. *European Sociological Review, 29*, 168-178.

Verruen, S., Gutteling, J. M., & de Vries, P. W. (2013). Enhancing self-protective behaviour: Efficacy beliefs and peer feedback in risk communication. *Risk Analysis, 33*(7), 1252-1264.

Visschers, V. H. M., Meertens, R. M., Passchier, W. W. F., & de Vries, N. N. K. (2009). Probability information in risk communication: A review of the research literature. *Risk Analysis, 29*(2), 267-287.

Walther, J. B., Van Der Heide, B., Hamel, L. M., & Shulman, H. C. (2009). Self-generated versus other-generated statements and impressions in computer-mediated communication: A test of warranting theory using Facebook. *Communications Research, 36*(2), 229-253.

Wang, X. T. (1996). Framing effects: Dynamics and task domains. *Organizational Behavior & Human Decision Processes, 68*, 145–157.

Wang, J., Herath, T., Chen, R., Vishwanath, A., & Rao, H. R. (2012). Phishing susceptibility: An investigation into the processing of a targeted spear phishing email. *IEEE Transaction on Professional Communication, 55*, 345-362.

Wang, Y., Leon, P. G., Chen, X., Komandur, S., & Norice, G. (2013). From Facebook regrets to Facebook privacy nudges. *Ohio State Law Journal, 74,* 1307-1355.

Wang, S. S., Moon, S., Kwon, K. H., Evans, C. A., & Stefanone, M. A. (2010). Face-off: Implications of visual cues on initiating friendships on Facebook. *Computers in Human Behavior, 26*, 226-234.

Wargo, E. (2007). *Adolescents and risk: Helping young people make better choices.* Cornell University College of Human Ecology. Retrieved from http://www.human.cornell.edu/hd/outreach-extension/upload/reyna-rtr.pdf

Weathers H. (12 August 2008). The innocent victim, 12, of an internet paedophile describes: "The abduction that ruined my life". *Mail Online.* Retrieved from http://www.dailymail.co.uk/femail/article-1044150/The-innocent-victim-12-internet-paedophile-describes-The-abduction-RUINED-life.html

Weisbuch, M., Ivcevic, Z., & Ambady, N. (2009). On being liked on the web and in the ''real world'': Consistency in first impressions across personal webpages and spontaneous behaviour. *Journal of Experimental Social Psychology, 45,* 573-576.

White, C. M., Gummerum, M., & Hanoch, Y. (2015). Adolescents' and young adults' online risk taking: The role of gist & verbatim representations. *Risk Analysis, 35*(8), 1407-1422.

White, C. M., Gummerum, M., & Hanoch, Y. (2016). Framing of online risk: Adolescents' and young adults' representations of risky gambles. *Decision,* DOI: 10.1037dec0000066

White, C. M., Gummerum, M., Wood, S., & Hanoch, Y. (in press). Internet safety and the Silver Surfer: The relationship between gist reasoning and adults' risky online behaviour. *Journal of Behavioral Decision Making,* DOI: 10.1002/bdm.2003

Wiesiolek, C. C., Foss, M. P., & Beserra Diniz, P. R. (2014). Normal aging and decision-making: A systematic review of the literature of the last 10 years. *Jornal Brasileiro de Psiquiatrica, 63*(3), 255-259.

Williams, A. L., & Merten, M. J. (2008). A review of online social networking profiles by adolescents: Implications for future research and intervention. *Adolescence, 43*(170), 253-274.

Wolak, J., Finkelhor, D., Mitchell, K. J., & Ybarra, M. L. (2008). Online "predators" and their victims: Myths, realities, and implications for prevention and treatment. *American Psychologist, 63*(2), 111-128.

Wolak, J., Mitchell, K., & Finkelhor, D. (2007). Unwanted and wanted exposure to online pornography in a national sample of youth internet users. *Pediatrics, 119*(2), 247-257.

Wolfe, C. R., Reyna, V. F., & Widmer, C. L. (2014). Efficacy of a web-based intelligent tutoring system for communicating genetic risk of breast cancer. A fuzzy trace theory approach. *Medical Decision Making, 35*(1), 46-59.

Wood, S. A., Liu, P. J., Hanoch, Y., & Estevez-Cores, S. (2015). Importance of numeracy as a risk factor for elder financial exploitation in a community sample. *Journal of Gerontology: Psychological Sciences*, *71*(6), 978-986.

Yan, Z. (2012). *Encyclopedia of cyber behavior (3 Volumes)*. Hershey, PA: IGI Global.

Yang, C. C., & Brown, B. B. (2016). Online self-presentation on Facebook and self-development during college transition. *Journal of Youth & Adolescence, 45*, 402-416.

Ybarra, M. L., Mitchell, K. J., Finkelhor, D., & Wolak, J. (2007). Internet prevention messages: Targeting the right online behaviors. *Archives of Pediatrics & Adolescent Medicine, 161*(2), 138-145.

York Cornwell, E., & Waite, L. J. (2009). Social disconnectedness, perceived isolation and health among older adults. *Journal of Health and Social Behavior, 50*, 31-48.

Zhang, Y., Mei, S,, Jingxin Chae, L. L., Li, J., & Du, H. (2015). The relationship between impulsivity and internet addiction in Chinese college students. A moderated analysis of meaning in life and self-esteem. *PLOS One, 10,* 1-13.

Zuckerman, M., & Kuhlman, D. M. (2000). Personality and risk-taking: Common biosocial factors. *Journal of Personality, 68,* 999-1029.

Zweig, J. M., Durbenstein-Lindberg, L., & Alexander McGinley, K. (2001). Adolescent health risk profiles: The co-occurrence of health risks among females and males. *Journal of Youth & Adolescence, 30*(6), 707-728.