

Adolescent Online Risk-Taking: An Experimental Analysis of Posting Behaviour

by

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## **Abstract**

The purpose of this experimental study was to investigate online risk-taking behaviour among adolescents. A total of 189 adolescents were given an online self-report questionnaire containing 20 examples of possible online posts. Half of the participants were presented with an application prior to the questionnaire that provided relevant, in-the-moment information about how their posts might be used and seen by others, and the other half were given an irrelevant Internet facts application. The likelihood of posting online content was assessed based on the type of post (emotionally evocative versus personal information), the nature of the post (public versus private), the gender of the participant (boy, girl), the type of app received (PostFire versus GhostFire), as well as the interaction of these variables. Results showed that while boys and girls were more likely to report that they would post or send content privately than publicly, girls were even more likely than males to report that they would send all types of information privately. Findings indicate that adolescents, particularly girls, are unlikely to discriminate between types of content online when privately messaging with others.

## **Preface**

Ethics approval through the University of British Columbia Research Ethics Board was obtained. The certificate number is H14-1432.

The following thesis is an original, unpublished work created by the author, Rachel Baitz, in collaboration with supervisor Dr. Jennifer Shapka and Dr. Shelley Hymel.

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## **Chapter 1: Introduction**

Adolescence is a developmental phase characterized by increased risk-taking and sensation-seeking behaviours (Arnett, 1992). Many risk-taking behaviours can put adolescents at risk for poor developmental outcomes, such as aggressive behaviour (Swaim, Henry, & Baez, 2004), serious health problems, such as sexually transmitted infections (STIs; Byrnes, Miller, & Schafer, 1999), as well as other detrimental social and emotional outcomes (Kashdan, Collins, & Elhai, 2006). As we move into an increasingly digital age, adolescents have increasingly relied on mobile devices as their primary method of social interaction (Madden, Duggan, Cortesi, Gasser, & Lenhart, 2013). This increases the likelihood that they will engage in online risk-taking behaviours, such as publicly posting or privately sending sexualized information or images of themselves online (Wolak et al., 2008), which are behaviours that jeopardize adolescent privacy. Indeed, the sharing of sexualized images, known as sexting, has become one of the top 10 major health concerns for adolescents in the United States (Davis, 2011), with as many as 10% of teens admitting to having participated in, created, or received nude or provocative photographs in the last year (Mitchell, Finkelhor, Jones, & Wolak, 2012). These images often leave adolescents at increased risk of being victimized in incidents of cyberbullying (defined as the harassment of an individual through electronic forms of contact; Srinivas, White, & Omar, 2011), by having others save, share, or use the images for other inappropriate purposes. It is important to note that this risk exists regardless of whether the images were originally posted publicly, or sent privately to another person.

Although the maladaptive outcomes associated with online risk behaviours (cyberbullying, cyberstalking) are well known in the media and recent research literature (Hinduja & Patchin, 2010; Schneider et al., 2012) little is understood about the factors underpinning adolescents' online posting behaviour. The objective of the current study is to do just this by exploring whether the provision of in-the-moment information about how quickly their posts may be viewed and used by others can impact posting behaviour. To this end, a mobile app designed for smartphones was developed (Baitz, 2013), which provides person-specific, in-the-moment statistics about how quickly and by whom, information (such as images or words) that is posted or sent online may be seen and forwarded by others. The app was created using user statistics for Facebook, and ideally it would be used prior to posting images or information online. The current study assessed adolescents' reported online posting behaviours under different conditions. Specifically, adolescents were asked how likely they would be to post several different types of posts (e.g., emotionally evocative posts or posts containing personal information). Through experimental manipulations, half of the sample was given information from the PostFire app in order to determine whether information about what might happen to their post would deter adolescents from posting personal information or images.

### **Adolescent Risk-Taking**

Research on risk-taking behaviours has consistently found that the number and frequency of risk-taking behaviours peak during adolescence (Xie, Cairns, & Cairns, 2002) and that risk-taking behaviours among adolescents are largely influenced by peers

(Selfhout, Branje, & Meeus, 2008). Adolescents spend a substantial amount of time socializing online, accounting for the greatest number of users for sites such as Facebook and Google+ (Lenhart et al., 2010). Given that nine out of 10 teenagers (ages 13 to 19) in North America report having their own mobile phone number (Lenhart, 2012), there is a high concern for risk-taking behaviours to occur in digital contexts.

**Online Risk-Taking.** As noted above, adolescents are increasingly engaging in sexting behaviours, defined as youth-produced sexualized images (Lounsbury, Mitchell, & Finklehor, 2011) that may include nude or partially nude images (Boucek, 2009). Adolescents who take risks online, for example, by sending and posting sexualized images, may be simply exploring their sexual identities, as adolescents have done for centuries (Katzman, 2010). Unfortunately, these behaviours within a modern-day, high-tech context may be placing adolescents at much higher risk of exploitation. For example, the Internet provides a place where sexualized images can more easily be shared, saved, or sent to others. Most troubling, however, is the fact that these images, once shared online, become permanently available in perpetuity (Runions, Shapka, Dooley, & Modecki, 2013). Furthermore, technological developments have given adolescents a false sense of security in this regard. For example, applications such as Snapchat (<http://www.snapchat.com>), allow users to send images to other users, but gives a user-determined number of seconds for the viewer to see an image before it disappears (Gross, 2013). Unfortunately, many users have uncovered ways to bypass the security features and retrieve the images after they have (supposedly) been deleted (Gross, 2013). Others

have avoided deletion by screen-capturing the image or taking a picture of the image with a secondary device before it disappears.

Researchers have linked the sending and posting of sexualized images with other risks as well, such as early engagement in sexual intercourse (and the associated risk of STIs and unplanned pregnancies) (Diliberto & Matthey, 2009), substance use (Benotsch, Snipes, Martin, & Bull, 2013), and cyberbullying victimization (Dake, Price, Maziarz, & Ward, 2012). The sending and the posting of sexualized images has also been linked to the intention to initiate sexual intercourse (Moreno, Brockman, Wasserheit & Christakis, 2012), indicating that sexual development is similar to that of romantic relationships (Young, Dutta & Dommety, 2009) in that adolescents experiment with their intentions online. In particular, the posting of sexual images of oneself may indicate an “intention interval” between the posting of sexual content and engagement in sexual activity (Moreno, Brockman, Wasserheit & Christakis, 2012), suggesting that adolescents who post or send sexualized images online may also be contemplating taking sexual risks in person. Taken together, online sexual risk-taking exposes youth to two potential risk-taking situations – the first is that it may act as a precursor to engagement in sexual contact (which will expose them to risks such as transmitted infections, unplanned pregnancy, etc.; Benotsch, Snipes, Martin, & Bull, 2013); the second risk is the loss of control over images and information that they post publicly or send privately to another.

**Cyberbullying.** Bullying has been a consistent problem among school-aged children and adolescents for decades (Olweus, 1978), and researchers agree that traditional forms of bullying can be characterized by the intentionality of the perpetrator,

repetition over time, and an imbalance of power between bully and victim (Olweus, 1978; NASP, 2012; Vandebos, 2007). Cyberbullying (also referred to as cyber-aggression, online aggression, electronic bullying, or internet harassment) refers to bullying that occurs via electronic mediums, such as mobile phones or the Internet (Tokunaga, 2010). Cyberbullying differs from traditional forms of bullying in that the Internet provides a unique venue for bullying to occur (Runions, Shapka, Dooley, & Modecki, 2013). For example, adolescents are more likely to distinguish between modes of cyberbullying, rather than as individuals who played a specific role in cyberbullying (e.g., victim or bully; Law, Shapka, Hymel, Olson, & Waterhouse, 2012), and in contrast to physical types of bullying, few differences have been found between boys and girls and their rates of cyberbullying perpetration (Mishna, Khoury-Kassabri, Gadalla & Daciuk, 2012).

As noted above, a known mechanism for cyberbullying is using images or information that has been posted publicly or sent privately against a victim, due to the loss of control the victim has once a post has been made or sent (Dake, Price, Maziarz, & Ward, 2012). Indeed, some of the most highlighted cases in the media, such as Amanda Todd and Rehtaeh Parsons, were cyberbullied in response to sexualized images that they or other adolescents had originally posted online (“Rehtaeh Parsons, Amanda Todd Deaths Share Similarities”, 2013). Although not all adolescents become suicidal in response to being cyberbullied, cyberbullying is a very pervasive problem, with 20% to 40% of US the adolescents reporting being the victim of cyberbullying (Tonkunaga, 2010), and indeed cybervictimized adolescents are found to be indeed at increased risk

for suicidal thoughts and suicide attempts compared to peers who are not victimized online (Hinduja & Patchin, 2010; Schneider et al., 2012). Cybervictimization has also been linked with other social and emotional difficulties, such as depression (Olenik-Shemesh et al., 2012; Perren et al., 2010; Ybarra & Mitchell, 2004), anxiety (Juvoven & Gross, 2008), emotional distress (Patchin and Hinduja, 2006), and low self-esteem (Didden et al., 2009). Victimized adolescents often have a difficult time distancing themselves from the online threats and harassment, further increasing the emotional turmoil (Tokunaga, 2010). Research also suggests that time spent online may predict cyberbullying behaviours and cybervictimization (Law, Shapka, & Olson, 2010), a growing concern given the increasing amounts of time adolescents spend online.

Regarding gender, research suggests that, while boys and girls report similar rates of cyberbullying, adolescent girls report more involvement in cybervictimization than boys (Mishna, Khoury-Kassabri, Gadalla & Daciuk, 2012). This contrasts with findings regarding sex differences in traditional forms of bullying, which suggests that boys not only report greater incidences of bullying behaviour than girls, but also report greater incidences of victimization (Cappadocia, Craig, & Pepler, 2013). In online contexts, then, an important gender difference may exist that may not be present in face-to-face interactions.

Although not directly pertinent to cyberbullying, the current study was one of the first to explore adolescent posting behaviour (separately for boys and girls), as well as to one of the first to begin to explore what types of interventions might predict posting

behaviour. Ideally, this will help our efforts to reduce a youth's risk of engagement in cyberbullying.

**Adaptive Risk-Taking.** Despite the numerous risks associated with online social interaction, research also suggests that taking risks online may not be totally maladaptive, and may in fact help with adolescent identity development by providing the opportunity to explore several identities through social media sites, avatars and virtual representations of personal spaces, such as online games (Beals, 2010). Historically, it has been hypothesized that risk-taking during adolescence serves an evolutionary purpose, as adolescents must take risks in order to pursue new non-familial relationships and seek out life partners outside of their clan (Casey, Jones, & Hare, 2008; Spear, 2009; Steinberg, 2008). Based on this, researchers argue that sending sexualized images of oneself during adolescence may be a lawful and healthy digital exploration of sexuality, as long as the images are sent between consenting adolescents (Gillespie, 2013). Therefore, it may not be necessary to attempt to eradicate all exploratory behaviours among adolescents, as self-exploration may serve an important developmental purpose. The challenge remains in understanding when and why adolescents are engaging in online behaviours that squarely put them at risk, and how to create opportunities for self-expression and exploration online that do not threaten their future developmental wellbeing.

The current study seeks to address this through the PostFire app. In comparing differences in posting behaviours between adolescents who have been informed of possible consequences by the app and those who have not, we can more closely determine when and why adolescents may post personal images or self-identifying

information, and under what circumstances they may be motivated to refrain from doing so (for example, in emotionally evocative versus non-emotionally evocative situations).

In understanding when and why adolescents take risks online, it is crucial to note that adolescents are able to understand and comprehend risks at similar levels as adults (Reyna & Farley, 2006). Thus, other mechanisms, outside of their ability to comprehend risks, must be at play in risk-taking behaviours. In addition, older adolescents, compared to younger adolescents, generally perceive more risk in engaging in problem behaviours such as smoking, using drugs, engaging in unprotected sex, and drinking alcohol, suggesting that a developmental mechanism may be at work (Irwin & Millstein, 1991).

### **Dual Processing Theory of Risk Behaviour**

During adolescence, the brain undergoes vast changes in structure (Paus, 2005), and recently, mechanisms in brain development have been implicated in understanding the increased risk-taking behaviours that adolescents engage in (Casey, Getz, & Galvan, 2008). Neural research has shown that many brain and developmental processes may influence engagement in risk-taking behaviours (defined by behaviours such as seeking out novel stimuli and the exploration of the unknown; Spear, 2000). For example, the dopamine system (Andersen, Thompson, Rutstein, Hostetter, & Teicher, 2000), oxytocin receptors (Chibbar, Toma, Mitchell, & Miller, 1990) and connections between the prefrontal cortex (PFC) and limbic systems (Hare et al., 2008) have all been implicated as contributing factors for the increased levels of risk-taking behaviours in adolescents. During the developmental period of adolescence, the speed and timing of the maturation of brain regions varies greatly (Gogtay et al, 2004) based on levels of neural activity



(Tamm, Menon, & Reiss, 2002). Specifically, at the onset of puberty, major developments occur in areas of the brain responsible for emotional processing, such as the hypothalamus, accumbens, dorsal and ventral striata, and amygdala (Sowell et al., 2003; Casey, Tottenham, Liston, & Durston, 2005). Specifically, the accumbens functions to pass information on to the orbitofrontal cortex from the limbic system (Clark, Cools, & Robbins, 2004), and has been found to increase in activity immediately prior to risk-taking behaviours (Kuhnen & Knutson, 2005). In contrast, the development of neural areas responsible for cognitive authority over behaviour, such as the prefrontal cortex, develops in a slower, more linear pattern into adulthood (Sowell et al., 2003; Giedd, 2004). As such, the dual processing model of risk-taking argues that adolescents are more likely drawn to risk behaviours due to the lagging development of the prefrontal cortex (Casey, Getz, & Galvan, 2008). As the prefrontal cortex develops over time, it is better able to regulate the impulses put forward by the accumbens, therefore resulting in fewer risks being taken as adolescents reach young adulthood.

With this in mind, the PostFire app was developed to create opportunities for adolescents to receive in-the-moment information about how their posted images, posts, or information might be used by others, therefore facilitating their decision-making abilities in risk-taking situations. To this end, PostFire outputs are intended to provide youth with information about how quickly information can be spread online. They may already be largely aware of this, but are likely to forget or ignore (perhaps due in part to the highly active limbic system, as described above) in the moments before they are about to post or share an image of himself or herself or other information on a social

media site or through a private message. Theoretically, by giving the adolescent personally-specific, immediate information rather than a simple warning about posting images, facilitation of the development of the PFC can be achieved by allowing the adolescent agency in making the decision about whether or not to post the image online. In this way, the adolescent would be using their own reasoning and decision making, based on their own perceived consequences, as provided by PostFire, which taken together, would make decisions about posting online a rational decision, rather than an emotional one (Wolfram, 2013).

**Emotional Processing and Rewards.** The development of brain areas responsible for emotion processing may also play a role in other overt behaviours relating to emotions, such as insuppressible mood swings, impulsivity, and social interactions directed at peers (Orr & Ingersoll, 1995; Spear, 2000; Galvan, Hare, Voss, Glover, & Casey, 2007). During adolescence, dramatic behavioural changes occur (Dahl, 2004; Steinberg, 2005) as the brain transitions from emotional to more cognitive regulatory strategies of regulatory control (Perlman & Pelphrey, 2010). In effect, adolescents, compared to adults, have been found to have fewer strategies for regulating emotions (Zimmerman, 2014). Furthermore, research indicates that the ability to regulate emotions may be constructed through cognitive control and emotion discrimination skills (Tottenham, Hare, & Casey, 2011), further implicating relationships between the propensity for adolescents to engage in risky decision-making in highly emotional contexts.

The brains of adolescents may also be highly responsive to the social rewards gained through positive peer evaluation, and activation of similar brain areas may occur for both social and non-social rewards (Guyer, McClure-Tone, Shiffrin, Pine, & Nelson, 2009). In online contexts, social rewards may be received through an adolescents' posting behaviours, for example, when an adolescent posts an update, photo, video, or other information, and a peer "likes", "retweets," or "reposts" that information by other adolescents. Given that the adolescent brain is so susceptible to cues present in emotional contexts, as well as the role the brain may play in risk-taking behaviours, it may be necessary to further understand factors that influence adolescent posting in order to better understand how risks are being taken by adolescents online. The current study aims to address this by comparing adolescents' reported rates of posting personalized information versus reported posting of non-personalized information.

### **Adolescent Self-Regulation**

The accumbens has also been associated with emotional states (Casey, Getz & Galvan, 2008). Adolescents, over adults, often have difficulty regulating their emotional states (Steinberg & Cauffman, 1996), and researchers argue that a similar dual processing model may explain adolescent self-regulated behaviour (Steinberg, 2004), which has been defined as "exertion of control over the self by the self" (Muraven & Baumeister, 2000, pp. 247). Similar to the mechanisms at play in risk-taking behaviours, maturity of both the PFC and the accumbens results in self-regulated decision-making (Albert, Chein, & Steinberg, 2013), indicating that links may exist between self-regulated behaviour and

risk-taking behaviours, and that interventions targeted at one behaviour may also positively impact the other.

Facilitating the development of self-regulation in adolescence may serve several adaptive functions. For example, adolescent self-regulation has been linked to several behaviours that counter risk-taking behaviour, such as academic achievement (Blair & Diamond, 2008), reduced substance use (Kirby, Petry, & Bickel, 1999; Wills, Walker, Mendoza, & Ainette, 2006), and prosocial behaviours (Bandura, Caprara, Barbaranelli, Pastorelli, & Regalia, 2001). Further research also implicates self-regulation in reward-seeking behaviours. For example, research suggests that self-regulation involves inhibiting or changing dominant thoughts, impulses, feelings, or behaviours in order to achieve long-term rewards (Baumeister & Alquist, 2009; Muraven & Baumeister, 2000). Understanding the mechanisms at play in the development of self-regulatory behaviour may be just as important as understanding the mechanisms behind risk-taking, as facilitating the development of self-regulation in adolescents may be also impact the propensity for some adolescents to take risks, given that these mechanisms share many pathways in the brain.

In order to reduce certain risk-taking behaviours and increase self-regulated behaviours, it may be necessary to create interventions that assist in decreasing the number of certain types of risk-taking behaviours that are maladaptive, such as posting personal images or self-identifying information online. Targeting a single brain area, such as the accumbens, may not achieve desired effects, as this type of intervention may effectively reduce all risk-taking behaviours, which could therefore reduce their adaptive

mechanisms (Casey, Getz, & Galvan, 2008). Instead, targeting adolescent decision-making with specific interventions may serve to increase the ability of adolescents to make informed, rational, top-down decisions about online risks, while simultaneously encouraging the development of the PFC. In the context of adolescent online posting, adolescents may be at increased risk of sharing self-identifying, sexualized, or personal information with others, particularly in situations of heightened emotions, such as a boyfriend requesting elicited photos from his girlfriend. In this type of context, the girlfriend may be more likely to send the requested photos given that her emotions are high (she loves him and wants to make him happy). If, however, her decision-making processes are targeted before she sends the photos, she may be less likely to do so, therefore protecting her personal images.

### **The Current Study**

Given that adolescents are taking an increased number of risks online, the current study created and assessed the effectiveness of an intervention that was aimed to reduce online risk-taking behaviours in adolescents. The intervention aimed to increase in-the-moment, relevant information that is related to a risk-taking decision (e.g., online posting) in an attempt to isolate and target adolescent decision making, so that adolescents are able to evaluate and make self-regulated choices about whether or not to take certain risks, particularly in emotionally evocative online situations. More specifically, the present study was designed to evaluate the self-reported posting behaviour of adolescents after they were provided with detailed information about how their publicly shared and privately sent information may be viewed and/or used by others.

This information was provided to adolescents via a mobile phone application, PostFire, which utilized participants own social media posting behaviour to determine how many people could see/use something they post or send privately online.

**PostFire Description.** The PostFire app was created by the author for the purpose of this study (Baitz, 2013). This app is intended to be used just prior to the moment an adolescent hits ‘send’ or ‘post’ to share something online (e.g., images, comments or videos). Based on simple inputs about the size of the adolescent’s friendship group on the social media site (e.g., Facebook) where the adolescent is contemplating posting, the app provides information about how his or her images may be used by others and how many others may view the images, as well as a timeline for when this might take place. This information was derived using algorithms based on information provided by Facebook about usage statistics (see Appendix A).

### **Research Question**

The research question that guides this work is whether participants who are experimentally exposed to an online app that gives information about how quickly their posts can be seen and/or used by others less likely to indicate that they would post or send information online. The research question also asks whether posting behaviour varies as a function of the type of post (emotionally evocative versus personal information), the nature of the post (public versus private), the gender of the participant (boy, girl), or the interaction of these variables.

It was hypothesized that participants who were experimentally exposed to the online app would be more likely to report that they are unlikely to post information online, as the PostFire app is hypothesized to make the decision to post online a rational one rather than an emotional one (Wolfram, 2013). It was also hypothesized that the experimental effect would be stronger for public posts, for emotionally charged or evocative types of posts, and for girls. Research suggests that the presence of peers may influence risk-taking behaviour (Steinberg, 2008). To accommodate this, collection of data occurred groups of participants, ensuring that peers were present.

## Chapter 2: Method

### Participants

This study involved 189 adolescents between the ages of 12 and 18 (males = 91; Age,  $M = 14.7$ ,  $SD = 1.39$ ). Ninety-three participants were randomly assigned to the PostFire condition, and 96 were in the control (GhostFire) condition. The sample was ethnically diverse, with 45% of the participants identifying as European descent, 28% South Asian descent (East Indian, Sri Lankan, Pakistani), and the remaining ethnic groups included West and East Asian (Chinese, Vietnamese, Filipino), Aboriginal, African/Caribbean, Latin American, Middle Eastern, and mixed background. Approximately four adolescents had parental assistance with the survey (three due to ability to read English, one due to age). All but five adolescents were in the company of peers during the completion of the questionnaire. Two adolescents responded that they identified with a gender other than male or female, which is in line with current research suggesting that approximately 1.2% of adolescents report identifying as transgendered (Clark, et al., 2014).

**Recruitment.** To collect data, during August of 2014, booths were set up and bags of fresh popcorn were handed out to all passersby at various locations in the Lower Mainland of British Columbia (YMCA, Abbotsford Youth Commission, public beaches). A large sign indicating our search for adolescents was placed in front of the booth to solicit potential participants. When adolescents approached, they were asked if they would like to participate in a short 10-minute study using iPad Minis. A small number of adolescents ( $n = 7$ ) were solicited through personal networks.



Eligibility for this study required adolescents to be between the ages of 12 and 18 and either have a parent or guardian present, or for them or a friend to possess a mobile device capable of accessing the internet (in order to send passive consent forms to their parent or guardian). Adolescents were also required to possess a social media account, such as Facebook, Instagram, Twitter, or accounts accessing online games.

### **Procedure**

This study employed a randomized control experimental design to understand whether there were statistically significant differences in reported posting behaviour for participants who were given information about who could see their posts (via PostFire). Differences were also examined for private versus public posting, gender, as well as for emotionally evocative (versus non-emotionally evocative) and personal (versus non-personal) information.

Regarding consent, adolescents who agreed to participate were given a consent form (Appendix B) to either give to their parents physically, or electronically (via text message). Research assistants waited for the parent to text back “yes” (potential participants were invited to call their parent to ensure the text arrived and that they could proceed with the study).

After obtaining parental consent, participants were given an assent form (Appendix C) to be signed, after which they were randomly assigned an iPad Mini that had been pre-loaded with either the PostFire app or the GhostFire control app. On the first screen, they were asked to input how many Facebook friends they currently had and to indicate their current privacy settings (PostFire condition), or to input how many social

media sites they currently use and to indicate their favorite social media site (GhostFire condition). After clicking the “next” button, they were presented with one of two outputs; in the PostFire condition, they were presented with statistics specific to their responses on the previous page (Appendix A); In the GhostFire condition, they were presented with random Internet facts (Appendix D). Each participant was given the app only once, but was presented with the statistical outputs multiple times throughout the questionnaire (described below).

Participants were instructed to read their output and to remember the numbers for later. Upon clicking next, participants were asked to re-enter the information given in the app on the next page (to assist in deeper encoding of the information). Participants were provided a “back” button in order to toggle back and forth between the output page and the re-entry page without losing information already keyed in. Participants were then presented with a series of 20 examples of posts (Possible Posts) one at a time, and after random intervals of answering either three or four Possible Posts at a time; each participant was presented with a screen showing their app output as a reminder of the app (to further assist in encoding the information). To get past the popup screen, participants were required to click a “next” button. There were four categories of posts; five from each of the four different categories – Emotionally Evocative, Non-Emotionally Evocative, Personal Information, Non-Personal Information (See Table 1). The presentation of the 20 posts was counterbalanced to reduce any potential order or learning effects that may impact participant responses. For each possible post, participants were asked a series of questions to assess how likely they would be to post the statement

publicly, how likely they would be to send the statement privately to somebody else, and how likely they believed that other kids their age would share the possible posts. These questions provided the dependent variables. Participants responded using a 5-point Likert scale that ranged from 1 ('Very Unlikely') to 5 ('Very Likely') (see Appendix E for questions). After completing the questions for each possible post, the participants responded to more general questions about perceived usefulness of the app, whether the app would impact their future posting behaviour, as well as demographic information, such as questions about participants' age, gender, ethnicity, and parent education (as a proxy for socio-economic status). The questionnaire took an average of 8-10 minutes to complete. Within-subject variables included likelihood of posting all possible posts either publicly or privately (Table 1), as well as Emotionally Evocative, Non-Emotionally Evocative, Personal Information, Non-Personal Information posts. Between-subject variables included gender (male, female, and other) and type of app randomly assigned to the participant (PostFire or GhostFire).

Table 1.

*Possible Posts*

Type of Post	Possible Posts
Evocative	<ol style="list-style-type: none"> <li>1. “My new boy/girl friend is super hot!”</li> <li>2. “OMG! Tracy slept with Cindy’s boyfriend last night!”</li> <li>3. “Did you see the hideous shirt Ryan was wearing? What was he thinking?”</li> <li>4. “Did you see how wasted Jack was last night?”</li> <li>5. “I just want to scream at Mrs. Parker! She’s so mean!”</li> </ol>
Non Evocative	<ol style="list-style-type: none"> <li>1. “My new kitten is super cute!”</li> <li>2. “OMG! I hung out with Cindy and her boyfriend last night. So fun!”</li> <li>3. “Did you see the hideous shirt Ryan Seacrest was wearing last night? What was he thinking?”</li> <li>4. “Did Jack go to the party last night?”</li> <li>5. “I’m in Mrs. Parker’s science Class! Are you?”</li> </ol>
Personal Info	<ol style="list-style-type: none"> <li>1. Image of yourself in a swimsuit.</li> <li>2. “I go to Fraser Heights!”</li> <li>3. “Oh! My address is...”</li> <li>4. “My birthday is _____, so my sign is _____”</li> <li>5. “I have a secret about Jessica!”</li> </ol>
Non-Personal Info	<ol style="list-style-type: none"> <li>1. Image of your new puppy</li> <li>2. “Metrotown is the best!”</li> <li>3. “The address of the library is...”</li> <li>4. “It’s the year of the horse!”</li> <li>5. “I have a pimple!”</li> </ol>

**Measures**

**Demographics.** Demographic information was collected via self-report questionnaire (See Appendix E). Specific questions asked included: a) the month and year of birth; b) gender; c) ethnicity; d) maternal and paternal education level; and e) social networks most regularly used.

**Posting Behaviour.** As described above, a list of possible posts was created based on four themes - Emotionally Evocative, Non-Emotionally Evocative, Personal

Information, Non-Personal Information (See Table 1). The individual posts were created based on possible topics that adolescents may or may not share with others online, and reflect physical locations in the lower mainland of British Columbia (Metrotown, Fraser Heights). The posts were developed with help from the Developmental Change and Technology research lab, led by Dr. Jennifer Shapka, at the University of British Columbia in April of 2014, and later refined for content based on the preference of the schools and community centres in which data was collected. Initial topics for the posts were first confirmed with adolescents within personal networks. In order to evaluate student posting behaviour, after the presentation of each of the 20 posts, participants were asked the degree to which they were likely to post or send the Possible Post both publicly and privately (in a 5-point Likert scale, described above). Participant responses were averaged within each of the post types categories (Emotionally Evocative, Non-Emotionally Evocative, Personal Information, Non-Personal Information), with higher scores indicating greater likelihood of posting the Possible Post. This was done for each of the responses for both publicly and privately posted information. Thus, each participant received eight composite scores (publicly the four types, privately the four types), resulting in four scores for privately posted information, and four scores for publicly posted information.

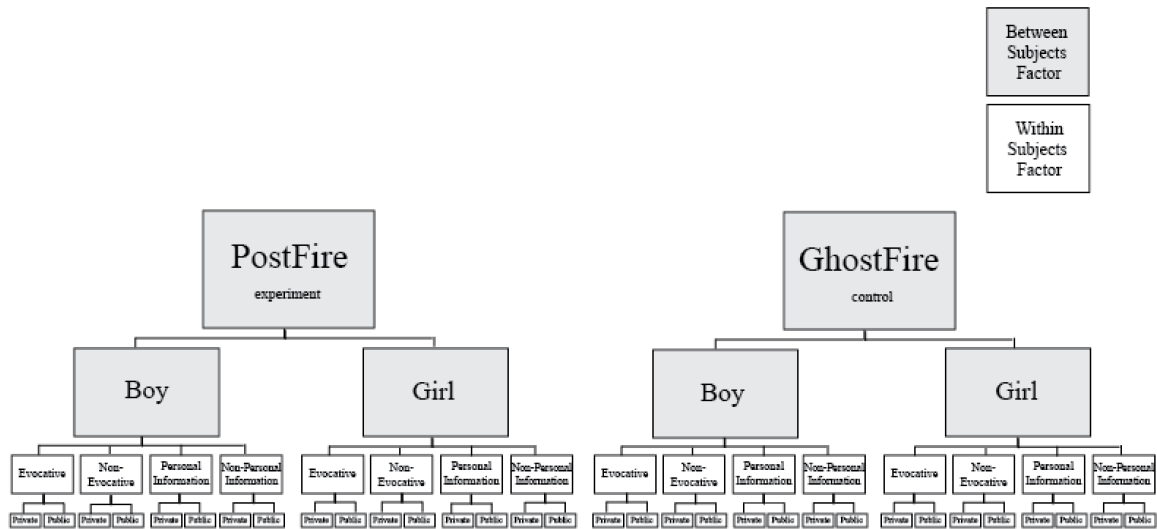
**Future Posting Behaviour.** At the end of the questionnaire, adolescents were asked whether the information provided by the application would impact their future behaviour. They were asked to assess this based on a 5-point Likert scale, described

above. Higher scores indicated that the information from the application would likely have an impact on their future posting behaviour.

### **Research Design and Analysis**

Participants were randomly assigned to either the experimental (PostFire) condition, or the control (GhostFire) condition based on the iPad that was randomly assigned to them by the researchers (double blind). The design contained two 2-level between subject factors (Gender; PostFire/GhostFire), one 4-level within-subject variables (Type of Post: Emotionally Evocative, Non-Emotionally Evocative, Personal Information, Non-Personal Information) and one 2-level within-subject variable (Public versus Private), resulting in a two by two by four by two Analysis of Variance (ANOVA) design, with Type of Post and Privacy as the repeated measures. See Figure 1 for a graphical depiction of this.

Figure 1. Organizational chart of ANOVA design illustrating between and within subject groups



## Chapter 3: Results

### Descriptives

Overall, adolescents widely reported that they owned a device capable of accessing the Internet (185 out of 189, or 97.9%), and that they carried their devices with them at all times (159 out of 189, or 84.1%). There was no difference in reported posting behaviour depending of the time of day when the data was collected, nor the location (context) of the data collection.

The descriptive data was first analyzed (means, correlations) for the dependent variables of posting behaviour in both the PostFire and GhostFire conditions. Means and Standard Deviations for the likelihood of posting for the overall sample, as well as for boys and girls, are summarized in Table 2 based on a Likert scale of 1 ('Very Unlikely') to 5 ('Very Likely').

A preliminary two-way between-subjects (gender, survey type) ANOVA was conducted to assess whether participants believed the application would have an impact on their future posting behaviour. Results indicated that while males and females in the GhostFire app reported that the statistics provided in the app would be "Somewhat Likely" to impact their future posting behaviour, females in the PostFire condition were significantly more likely than males to report that the information provided would "Likely" impact their future posting behaviour  $F(1, 183) = 6.94, p = .009$ ; partial eta squared = .037.



It should be noted that no mean differences were found for age or ethnicity of participants on any of the eight outcomes or as a covariate in the analysis, which allowed for the elimination of age and ethnicity as factors from the main analysis.

Table 2.

*Means and Standard Deviations for frequency of public posts by gender, type of post, public versus private, and condition*

	Public Posting				Private Posting			
	Males		Females		Males		Females	
	PostFire							
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Evocative	1.71	.587	1.98	.863	2.16	.747	2.42	.912
Non Evocative	1.92	.763	1.92	.763	2.16	.831	2.40	.846
Personal Information	1.75	.751	1.75	.751	2.10	.876	2.34	.869
Non Personal Information	1.76	.784	1.86	.875	2.07	.863	2.35	1.05
	GhostFire							
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Evocative	1.92	.803	1.96	.696	2.26	.881	2.67	.837
Non Evocative	1.75	.735	1.86	.817	2.21	.965	2.54	.946
Personal Information	1.78	.751	2.07	.837	2.24	.889	2.66	.954
Non Personal Information	1.83	.800	1.67	.860	2.18	.930	2.24	1.07

As shown in Table 2, adolescents generally report similar amounts of posting information publicly online. Scores are fairly low, which suggests that adolescents report that, on average, they are “Unlikely” to post most examples of posts online.

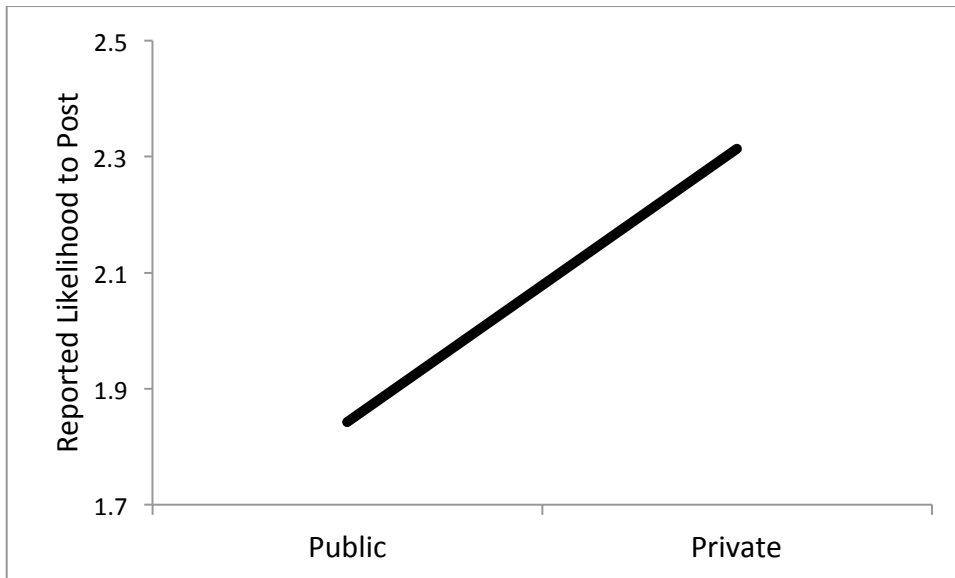
### **Posting Behaviour**

To address the research question of the study, a 2X2X4X2 repeated measures ANOVA was conducted, with two between-subjects factors (gender, condition) and two within-subjects factors (type of post and public/private posting), as described above. For these analyses, the dependent variable was the composite index of the likelihood of posting (on 1-5 Likert scale, averaging across post examples; see Table 2 for means and standard deviations).

To answer whether there was a main effect for the experimental condition (PostFire/GhostFire), results of the 2X2X2X4 repeated measures analysis indicated a non-significant main effect for condition,  $F(1, 184) < 1, p = .378$ . However, there was a significant main effect for Public versus Private posting,  $F(1, 184) = 162.96, p < .001$ ; partial eta squared = .470, indicating a large effect size (Cohen, 1988)

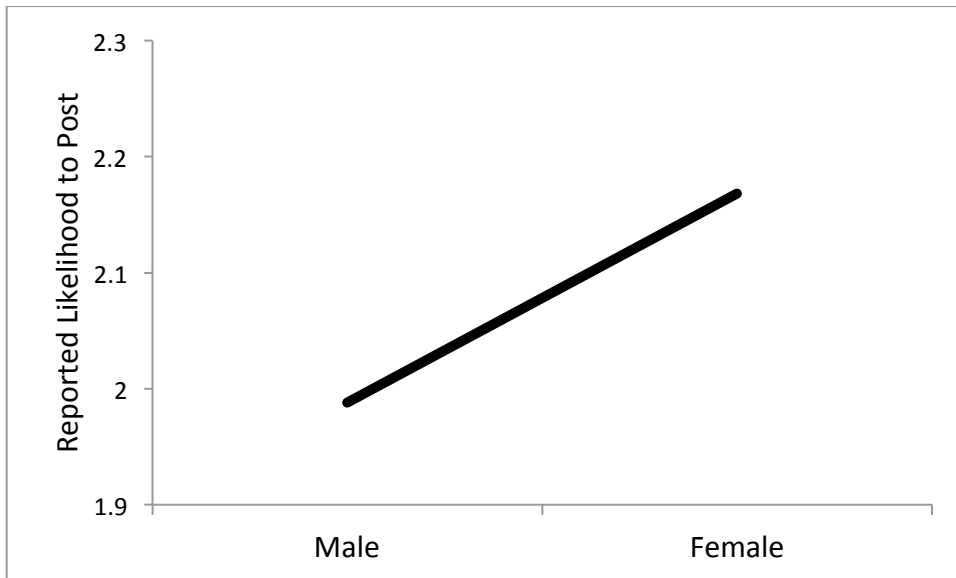
As can be seen from Figure 2, participants indicated that they were more likely to post information privately than publicly.

Figure 2. Average Likelihood of Posting Publicly Versus Privately



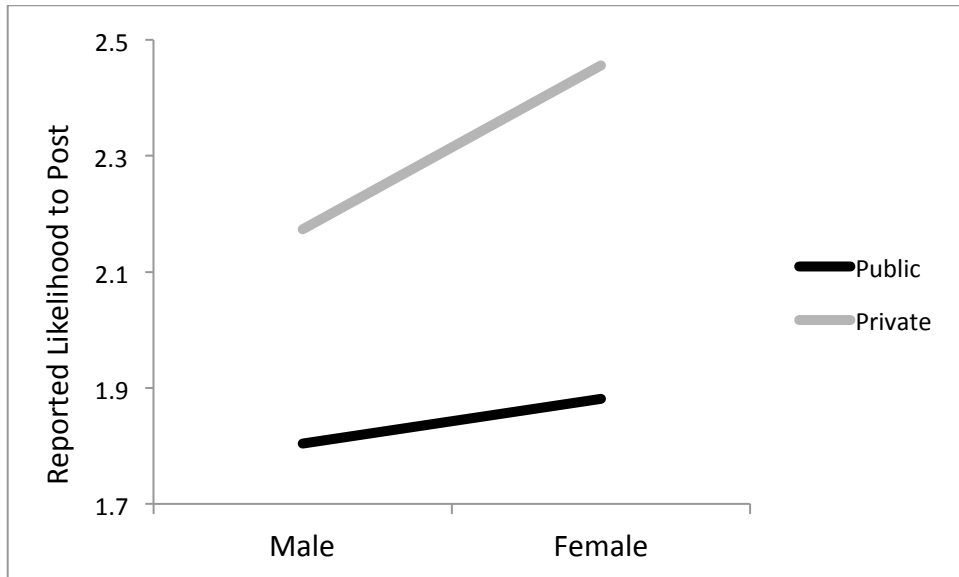
To answer whether there were differences for girls and Type of Post (evocative, non-vocative posts, personal, non-personal). There was a significant main effect for gender,  $F(1, 184) = 4.14, p = .043$ ; partial eta squared = .022, indicating a small effect size (Cohen, 1988), with girls reporting greater likelihood of posting (females,  $M = 2.17, SD = .062$ ; males,  $M = 1.99, SD = .064$ ); see Figure 3). The main effect for Type of Post,  $F(3, 182) = 1.75, p = .158$ , was not significant.

Figure 3. Average Likelihood of Posting for Males and Females



The main effect observed for gender of subject was qualified by a significant interaction between gender and the public/private nature of the post,  $F(1, 184) = 7.82, p = .006$ ; partial eta squared = .041, indicating a small effect size (Cohen, 1988). As can be seen in Figure 4, both boys and girls were more likely to report that they would post information privately than publicly, although the effect was much stronger for girls, who were significantly more likely to post things privately than publicly.

Figure 4. Interaction between males versus females and public versus private posting in likelihood to post.



## Chapter 4: Discussion

The main objective of this study was to explore how an online application might affect adolescents reported posting behaviour – whether they would be less likely to send/post emotionally evocative or personal information, and whether there were any gender differences in their reported behaviour. Overall, PostFire appeared to have little effect on adolescents reports of how likely they would be to post most types of information online, with the exception of future posting behaviour, which adolescent females reported would likely be impacted by the PostFire application. There were also several other interesting findings that provided insight into adolescent posting behaviour and offers directions for future research efforts.

One of the most prominent findings of this study was the fact that participants indicated that they were significantly more likely to post information privately than publicly. Although this is the first study to empirically show this, it is not surprising given that from a very young age, boys and girls are warned about the risks of exposure from posting information online. Interestingly, there were no significant differences for type of post, which means that they do not alter their private versus public posting behaviour according to the content of the post (e.g., whether the post is of a personal or evocative nature). This is worrisome, given that real-life posts of a personal nature might make them vulnerable to Internet predators or to cyberbullying.

Perhaps more concerning, however, is the fact that adolescents are more comfortable posting privately than publicly, which suggests that they may have a false sense of security about who may have access to a privately sent message. Given the

permanent nature of digital information (Runions, Shapka, Modecki, & Dooley, 2013), it is very possible that posts that are sent privately at one point may become public later. This may be due to the breakdown of a relationship (e.g., an ex-boyfriend sharing naked pictures that had been shared privately) or due to security breaches (e.g., somebody else accessing stored private messages). More education is needed in order for adolescents (particularly girls) to better understand the risks of privately sent information.

The results of this study also showed that, overall, girls were more likely to post online, and also that the likelihood of posting private information was significantly higher for girls. This is consistent with current research, indicating that as many as 30% of adolescents report perceiving online communication as more effective for disclosing intimate information as compared to offline types of communication (Valkenburg & Jochen, 2007). More specifically, girls, compared to boys, who primarily talk with existing friends online (compared to girls who talk to strangers) often report greater feelings of closeness with friends (Valkenburg & Jochen, 2007). It seems that the desire to gain closeness with one's friends partnered with the perceived safety of sharing through a technological medium online creates an environment that encourages adolescents to share personal or intimate information with others. Given increasing importance of peer relationships during adolescence (Collins & Steinberg, 2006) with girls reporting larger Facebook friend networks than boys (Madden et al., 2013), this may serve an important mechanism for strengthening friendships in an increasing technological age.

While many adolescents may use online communications as a way to maintain existing relationships with friends (Gross, 2004), many other adolescents utilize online communications to seek new relationships with strangers (Wolak, Mitchell, & Finkelhor, 2003). Approximately 33% of adolescents report having Facebook friends whom they have not met in person (Madden et al., 2013), and as many as 24% of girls report having been contacted by someone they did not know that made them feel uncomfortable or scared (Madden et al., 2013). While not all strangers pose great risk to adolescents online, predators do perpetrate adolescents with approximately one in five adolescents solicited for sex online annually (Finkelhor, Mitchell, & Wolak, 2000; Mitchell, Finkelhor, & Wolak, 2001). Taken together, the risk of being solicited by a stranger combined with adolescent girls' propensities to disclose personal information online (even when done through private messages) may serve as a great risk to the safety and privacy of adolescent girls. Outside of predatory behaviour of a sexual nature, adolescent girls are also more likely to report incidences of cybervictimization (Mishna, Khoury-Kassabri, Gadalla & Daciuk, 2012). Given that a known mechanism of cyberbullying is utilizing images for inappropriate purposes (Srinivas, White, & Omar, 2011), girls may be putting themselves at increased risk by sharing personal information with others, regardless of how much they might trust the individual receiving the private messages.

### **Strengths and Limitations**

In this study, adolescents generally reported a low likelihood of posting information online for all types of posts. Thus, on the whole, it appears that adolescents would not be quick to share information privately or publicly. However, posting



behaviours were measured using adolescent reports of posting, rather than their actual real-life posting behaviours. Although these may be an indicator for their actual behaviour, it is possible that adolescents were motivated to answer in a favorable light due to socially desirable responding (Jackson & Messick, 1962). Due to the fact that the accumbens may be more likely to respond to real-life risk-taking posts, the low likelihood of posting overall may represent a floor effect. That is, adolescents generally reported that they would be unlikely to post the examples presented to them. Posts containing risky subject matter, such as the consumption of alcohol or sexual activity, may have resonated with adolescents as risk-taking behaviour, and they may have been more likely to report engaging in such online behaviour. The questions utilized in this study were chosen to satisfy the requirements and preferences of the schools, and later community centres, in which data was collected. Specifically, questions relating to the consumption of alcohol and engagement in sexual activity were removed, and replaced with similar, less provocative or self-recriminating images and examples of posts for adolescents to consider. A pilot test was conducted in conjunction with the study, instructing adolescents to rank all Possible Posts from “Least Dramatic” to “Most Dramatic” in an attempt to better understand which types of posts adolescents believed to be the most Evocative. Due to inconsistencies in responses, the pilot test did not inform the operationalizations used in this study. These inconsistencies could have been a result of the fact that adolescents did not find any of the posts particularly evocative or “dramatic”.

A second limitation involved the various social media sites that adolescents currently utilize. As a requirement for participation, adolescents were required to have an

active Facebook account. However, not all participants reported that they use Facebook on a regular basis, and were therefore invited to also consider their output in the context of other sites, such as Twitter and SnapChat. In some contexts, their output may not have been as relevant to other websites, despite the message of PostFire remaining the same, regardless of the site used.

A third limitation relates to the randomization of the sample studied. Due to a province-wide school strike, adolescents were not attending classes, and as such adolescents were pursued through community centres and in public areas such as public beaches. This approach may have limited access to certain groups of adolescents. This was controlled for through accessing a variety of youth through different channels, such as reaching at-risk youth at one community center in a low SES region, as well as reaching higher SES youth at another community centre in another region. Despite this, generalizability may be a limitation of this study due to these recruitment constraints.

A final limitation may be the approach used to alter adolescent behaviours. Using statistical outputs may elicit fear in the user, a tactic which has been shown to only have impact on behaviour changes in individuals who link a real threat with their behaviour (de Hoog, Stroebe, de Wit, 2005). Given that adolescents were asked to assess their likelihood to post a selection of possible posts as opposed to their actual posts, it may have been difficult for them to associate real risks with their reported posting.

Several strengths exist in this study. First, experimental analyses of the treatment group and a control group allowed for more diverse interpretations to be made about the effectiveness of PostFire over GhostFire. Our design of randomly assigning adolescents

to the treatment or control allow for the direct comparison of both groups to evaluate effectiveness. Moreover, this study included a large number of participants. The greater number of participants allowed for a larger and more diverse sample for this study, as well as greater power for all analyses completed. One caveat to this is the impact of small effect sizes, which may have been increased by a large sample.

A second strength of this study was the ecological validity. The this study was innovative in that it collected data using iPad Minis, which mimicked the real-life experience of posting online via adolescents own tablet computers or mobile phones.

A second strength of this study was the ecological validity. This study was innovative in that it collected data using iPad Minis, which mimicked the real-life experience of posting online via adolescents own tablet computers or mobile phones. In addition, data was collected among groups of peers for the majority of the participants. As stated in the research literature, the presence of peers may heighten the sensitivity of the accumbens to risk-taking situations (Selfhout, Branje, & Meeus, 2008; Steinberg, 2008). This may have created a more realistic setting for risk-taking behaviours.

### **Implications for Practice**

Given that adolescents heavily rely on their mobile devices as their main method of social interaction (Madden, Duggan, Cortesi, Gasser, & Lenhart, 2013), taking online risks remains of great concern. Taken together with current research on adolescent risk-behaviour, the current research supports the need for intervention programs that target adolescent online risk-taking. Intervention designs focused on creating more secure and private methods of message-sending may reduce risks of exploitation and cyberbullying

victimization (White, & Omar, 2011), but may not decrease intentions to engage in risky sexual contact with others (Diliberto & Matthey, 2009). To this end, student-led education programs that increase awareness about risks of posting online may further facilitate the development of decision-making processes in adolescents. Based on the dual processing model of risk-behaviour, it may also be necessary to utilize actual posts that adolescents plan to share or send to others. The accumbens may respond to the actual posts to a greater degree given that they are of increased relevance to adolescents as compared to possible post examples. Further investigation must be done to better understand the mechanisms of online posting that may be at play.

This work also provides implications for practice. First, the current study has provided evidence that adolescents, particularly adolescent girls, may benefit from receiving more information about the risks of sending intimate or sensitive information through private messages. This information could be included alongside warnings of sharing information publicly, for example, through intervention programs. A second implication for practice is that adolescents may not need to be discouraged from sharing information online with their friends, as they currently do not share information at very high rates. This may indicate that the large amount of time they spend on their devices may not pose a large threat to their personal information.

### **Future Directions**

Future research may explore various other aspects of online posting. First, a measure should be created in an effort to understand adolescent online behaviours and motivations for posting, how relationships are built and sustained online, as well as more

specifically how information is shared online between adolescents. The PostFire app could also be investigated using stronger, more evocative types of examples of posts (potentially garnered through qualitative research designs), or ideally, actual posting behaviours of adolescents. A more thorough PostFire analysis could occur on a longitudinal basis in order to determine whether or not the app is effective in reducing more realistic examples of posts over time, whether or not any effect is sustained, as well as whether or not it reduces the number of privately sent messages.

## **Conclusion**

The major findings of this study suggests that in-the-moment warnings about how online posts and messages may be used did not have any effect on adolescent hypothetical posting behaviour. However, this study did shed light on who and what information adolescents do share with others. For example, we know that girls and boys are more likely to share information through private channels of communication, and that this is more pronounced for girls. Future work needs to explore motivations for posting and sharing information for boys and girls, so that interventions that focus on boys and girls separately can be developed. Several impetuses, such as the availability of mobile screen devices in recent years, technology in educational environments, as well as online celebrity culture, have contributed to the ease of and desire to share information with others. Given that today's adolescents so heavily rely on social media as their primary form of social interaction (Madden, Duggan, Cortesi, Gasser, & Lenhart, 2013), and that adolescent brain development may be primed to engage in risk-taking behaviours (Casey,

Getz, & Galvan, 2008), it is more important than ever to create usable, effective interventions in reducing adolescent online risk-taking.

## References

- Ahern, N. R., & Mechling, B. (2013). Sexting: Serious problems for youth. *Journal of Psychosocial Nursing and Mental Health Services, 51*(7), 22.  
doi:10.3928/02793695-20130503-02
- Albert, D., Chein, J., & Steinberg, L. (2013). The teenage brain: Peer influences on adolescent decision making. (2013). *Current Directions in Psychological Science, 22*(2), 114-120. doi:10.1177/0963721412471347
- Andersen, S. L., Thompson, A. T., Rutstein, M., Hostetter, J. C., & Teicher, M. H. (2000). Dopamine receptor pruning in prefrontal cortex during the periadolescent period in rats. *Synapse, 37*(2), 167–169.
- Arnett, J. (1992). Reckless behaviour in adolescence: A developmental perspective. *Developmental Review, 12*, 339-373.
- Baitz, R. (May 30<sup>th</sup>, 2013). Online version of PostFire App. Retrieved from <http://www.rachelbaitz.com/postfire>
- Bandura, A., Caprara, G. V., Barbaranelli, C., Pastorelli, C., & Regalia, C. (2001). Sociocognitive self-regulatory mechanisms governing transgressive behaviour. *Journal of Personality and Social Psychology, 80*, 125e135.  
<http://dx.doi.org/10.1037/0022-3514.80.1.125>.
- Baumeister, R. F., & Alquist, J. L. (2009). Is there a downside to good self-control? *Self and Identity, 8*, 115-130. <http://dx.doi.org/10.1080/15298860802501474>.

- Beals, L. M. (2010). Content creation in virtual worlds to support adolescent identity development. *New Directions for Youth Development*, 2010(128), 45-53.  
doi:10.1002/yd.374
- Benotsch, E.G., Snipes, D.J., Martin, A.M. & Bull, S.S. (2013). Sexting, substance use, and sexual risk behaviour in young adults. *Journal of Adolescent Health*, 52, 307–313. doi:10.1016/j.jadohealth.2012.06.011
- Blair, C., & Diamond, A. (2008). Biological processes in prevention and intervention: the promotion of self-regulation as a means of preventing school failure. *Development and Psychopathology*, 20, 899-911.  
<http://dx.doi.org/10.1017/S0954579408000436>.
- Boucek, S.G. (2009). Dealing with the nightmare of ‘sexting.’ *The School Administrator*, 66, 10-16. Retrieved from <http://www.aasa.org/SchoolAdministratorArticle.aspx?id=4386> on January 12, 2014.
- Byrnes, J. P., Miller, D. C., & Schafer, W. D. (1999). Gender differences in risk-taking: A meta-analysis. *Psychological Bulletin*, 125(3), 367-383. doi:10.1037/0033-2909.125.3.367
- Cappadocia, M., Craig, W.M., & Pepler, D. (2013). Cyberbullying: Prevalence, stability, and risk factors during adolescence. (2013). *Canadian Journal of School Psychology*, 28(2), 171-192. doi:10.1177/0829573513491212
- Casey, B. J., Getz, S., & Galvan, A. (2008). The adolescent brain. *Developmental Review*, 28(1), 62-77. doi:10.1016/j.dr.2007.08.003



- Casey, B. J., Jones, R. M., & Hare, T. (2008). The adolescent brain. *Annals of the New York Academy of Sciences, 1124*, 111–126.
- Casey B.J., Tottenham N., Liston C., Durston S. (2005). Imaging the developing brain: What have we learned about cognitive development? *Trends Cognitive Science 9*, 104–110.
- Chibbar, R., Toma, J., Mitchell, B., & Miller, F. (1990). Regulation of neural oxytocin gene expression by gonadal steroids in pubertal rats. *Molecular Endocrinology, 4*, 2030-2038)
- Clark, L., Cools, R., & Robbins, T.W. (2004). The Neuropsychology of ventral prefrontal cortex: Decision-making and reversal learning. *Brain and Cognition, 55*, 41-53.
- Clark, T. C., Lucassen, M. F. G., Bullen, P., Denny, S. J., Fleming, T. M., Robinson, E. M., & Rossen, F. V. (2014). The health and well-being of transgender high school students: Results from the new zealand adolescent health survey (youth'12). *Journal of Adolescent Health, 55*(1), 93-99. doi:10.1016/j.jadohealth.2013.11.008
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, N.J: L. Erlbaum Associates.
- Collins, W. A., & Steinberg, L. (2006). Adolescent development in interpersonal context. In N.Eisenberg (Ed.), W. Damon, & R. Lerner (Series Ed.), *Handbook of child psychology: Vol. 3.Social, emotional and personality development* (6th ed., pp. 1003–1068). New York: Wiley.
- Dahl, R. E. (2004). Adolescent brain development: a period of vulnerabilities and opportunities. *Ann. N. Y. Acad. Sci. 1021*, 1–22.

- Dake, J.A., Price, J.H., Maziarz, L. & Ward, B. (2012). Prevalence and correlates of sexting behaviour in adolescents. *American Journal of Sexuality Education*, 7, 1–15. Advance online publication. doi:10.1080/15546128.2012.650959
- Davis, M. (2011). Drug abuse now equals childhood obesity as top health concern for kids. *C.S. Mott Children's Hospital*. Retrieved from <http://mottnpch.org/reports-surveys/drug-abuse-now-equals-childhood-obesity-top-health-concern-kids> on May 1, 2014.
- de Hoog, N., Stroebe, W., & de Wit, J. B. F. (2005). The impact of fear appeals on processing and acceptance of action recommendations. *Personality and Social Psychology Bulletin*, 31(1), 24-33. doi:10.1177/0146167204271321
- Didden, R., Scholte, R. H. J., Korzilius, H., de Moor, J. M. H., Vermeulen, A., & O'Reilly, M. (2009). Cyberbullying among students with intellectual and developmental disability in special education settings. *Developmental Neurorehabilitation*, 12, 146–151.
- Diliberto, G.M. & Matthey, E. (2009). Sexting: Just how much of a danger is it and what can school nurses do about it? *NASN School Nurse*, 24, 262–267.  
doi:10.1177/1942602X09348652
- Finkelhor, D., Mitchell, K. J., & Wolak, J. (2000). *Online victimization: A report on the nation's youth*. Alexandria, VA: National Center for Missing and Exploited Children.

- Furby, L., & Beyth-Marom, R. (1992). Risk-taking in adolescence: A decision-making perspective. *Developmental Review, 12*(1), 1-44. doi:10.1016/0273-2297(92)90002-J
- Galvan A., Hare T., Voss H., Glover G., Casey B.J. (2007). Risk- taking and the adolescent brain: Who is at risk? *Dev Sci 10*, F8–F14.
- Giedd J.N. (2004). Structural magnetic resonance imaging of the adolescent brain. *Annual NY Academic Science 1021*, 77 – 85.
- Gillespie, A. A. (2013). Adolescents, sexting and human rights. *Human Rights Law Review, 13*(4), 623.
- Gogtay N., Giedd J.N., Lusk L., Hayashi K.M., Greenstein D., Vaituzis A.C., Nugent T.F. III, Herman D.H., Clasen L.S., Toga A.W., et al. (2004). Dynamic mapping of human cortical development during childhood through early adulthood. *Proc Natl Acad Sci 101*, 8174–8179.
- Gross, E. F. (2004). Adolescent Internet use: What we expect, what teens report. *Journal of Applied Developmental Psychology, 25*, 633–649.
- Gross, D. (2013, January 13). *Snapchat: Sexting tool, or the next Instagram?* Retrieved from <http://www.cnn.com/2013/01/03/tech/mobile/snapchat/> on March 24, 2014
- Guyer, A., McClure-Tone, E., Shiffrin, N., Pine, D., & Nelson, E. (2009). Probing the neural correlates of anticipated peer evaluation in adolescence. *Child Development, 80*, 1000–1015.

- Hare, T. A., Tottenham, N., Galvan, A., Voss, H. U., Glover, G. H., & Casey, B. J. (2008). Biological substrates of emotional reactivity and regulation in adolescence during an emotional go-nogo task. *Biological Psychiatry*, *63*(10), 927-934.
- Hinduja, S., & Patchin, J. W. (2007). Offline consequences of online victimization. *Journal of School Violence*, *6*, 89-112.
- Irwin, C. E., & Millstein, S. G. (1991). Correlates and predictors of risk-taking behaviour. In L. P. Lipsitt & L. L. Mitnick (Eds.), *Self-regulatory behaviour and risk-taking: Causes and consequences* (pp. 3-21). Norwood, NJ: Ablex
- Jackson, D. N., & Messick, S. (1962). Response styles and the assessment of psychopathology. In S. Messick & J. Ross (Eds.), *Measurement in personality and cognition*. New York: Wiley.
- Jordan-Conde, Z., Mennecke, B., & Townsend, A. (2014). Late adolescent identity definition and intimate disclosure on facebook. *Computers in Human Behavior*, *33*, 356.
- Juvonen, J., & Gross, E. F. (2008). Bullying experiences in cyberspace. *Journal of School Health*, *78*, 496-505.
- Kashdan, T. B., Collins, R. L., & Elhai, J. D. (2006). Social anxiety and positive outcome expectancies on risk-taking behaviours. *Cognitive Therapy and Research*, *30*(6), 749-761. doi:10.1007/s10608-006-9017-x
- Katzman, D.K. (2010). Sexting: Keeping teens safe and responsible in a technologically savvy world. *Paediatrics and Child Health*, *15*, 41-42.

- Kirby, K. N., Petry, N. M., & Bickel, W. K. (1999). Heroin addicts have higher discount rates for delayed rewards than non-drug-using controls. *Journal of Experimental Psychology*, 128, 78-87. <http://dx.doi.org/10.1037/0096-3445.128.1.78>.
- Kirk, R.E. (1995). *Experimental design: Procedures for the behavioural sciences* (3<sup>rd</sup> ed.). Pacific Grove, CA: Brooks/Cole.
- Kuhnen, C. M., & Knutson, B. (2005). The neural basis of financial risk-taking. *Neuron*, 47, 763–770.
- Law, D. M., Shapka, J. D., & Olson, B. F. (2010). To control or not to control? parenting behaviours and adolescent online aggression. *Computers in Human Behaviour*, 26(6), 1651-1656. doi:10.1016/j.chb.2010.06.013
- Law, D. M., Shapka, J. D., Hymel, S., Olson, B. F., & Waterhouse, T. (2012). The changing face of bullying: An empirical comparison between traditional and internet bullying and victimization. *Computers in Human Behaviour*, 28(1), 226-232. doi:10.1016/j.chb.2011.09.004
- Lenhart, A., Purcell, K., Smith, A., & Zickuhr, K. (2010). Social media & mobile internet use among teens and young adults. Pew Internet and American Life Project. Retrieved from [http://www.pewinternet.org/~media/Files/Reports/2010/PIP\\_Social\\_Media\\_and\\_Young\\_Adults\\_Report\\_Final\\_with\\_toplevels.pdf](http://www.pewinternet.org/~media/Files/Reports/2010/PIP_Social_Media_and_Young_Adults_Report_Final_with_toplevels.pdf) on April 2, 2014.
- Lenhart, A. (2012) Teens, smartphones & texting. Pew Internet & American Life Project. Retrieved from <http://www.pewinternet.org/files/old->

media/Files/Reports/2012/PIP\_Teens\_Smartphones\_and\_Texting.pdf on April 2, 2014.

Lounsbury, K., Mitchell, K.J., & Finkelhor, D. (2011). The true prevalence of “sexting.” Retrieved from the Crimes Against Children Research Center website: [http://www.unh.edu/ccrc/pdf/Sexting%20Fact%20Sheet%204\\_29\\_11.pdf](http://www.unh.edu/ccrc/pdf/Sexting%20Fact%20Sheet%204_29_11.pdf) on January 18, 2014.

Madden, M., Lenhart, A., Cortesi, S., Gasser, U., Duggan, M., Smith, A., & Beaton, M. (2013). Teens, Social Media, and Privacy. Pew Internet & American Life Project. Retrieved from <http://www.pewinternet.org/2013/05/21/teens-social-media-and-privacy/> on February 9<sup>th</sup>, 2014.

Madden, M., Lenhart, A., Duggan, M., Cortesi, S., & Gasser, U. (2013). Teens and technology 2013. Pew Internet & American Life Project. Retrieved from <http://www.pewinternet.org/2013/03/13/teens-and-technology-2013/> on April 2<sup>nd</sup>, 2014.

Mishna, F., Khoury-Kassabri, M., Gadalla, T., & Daciuk, J. (2012). Risk factors for involvement in cyber bullying: Victims, bullies and bully-victims. *Children and Youth Services Review*, 34(1), 63-70. doi:10.1016/j.childyouth.2011.08.032

Mitchell, K. J., Finkelhor, D., Jones, L. M., & Wolak, J. (2012). Prevalence and characteristics of youth sexting: A national study. *Pediatrics*, 129(1), 13-20. doi:10.1542/peds.2011-1730

Mitchell, K. J., Finkelhor, D., & Wolak, J. (2001). Risk factors for and impact of online sexual solicitation of youth. *Journal of the American Medical Association*, 285,

3011–3014.

Moffitt, T. (1993) Adolescence-limited and life-course-persistent antisocial behaviour: A developmental taxonomy. *Psychol. Rev.* 100, 674–701

Moreno, M. A., Brockman, L. N., Wasserheit, J. N., & Christakis, D. A. (2012). A pilot evaluation of older adolescents' sexual reference displays on facebook. *Journal of Sex Research*, 49(4), 390-10. doi:10.1080/00224499.2011.642903

Muraven, M., & Baumeister, R. F. (2000). Self-regulation and depletion of limited resources: does self-control resemble a muscle? *Psychological Bulletin*, 126, 247-259. <http://dx.doi.org/10.1037/0033-2909.126.2.247>.

National Association of School Psychologists. (2012). Bullying prevention and intervention in schools (position statement). Bethesda, MD.

O'Doherty, J.P. (2004). Reward representations and reward-related learning in the human brain: insights from neuroimaging. *Current Opinion in Neurobiology*, 14, 769–776.

Olenik-Shemesh, D., Heiman, T., & Eden, S. (2012). Cyberbullying victimisation in adolescence: Relationships with loneliness and depressive mood. *Emotional & Behavioural Difficulties*, 17, 361–374.

Olweus, D. (1978). *Aggression in the schools: Bullies and whipping boys*. London: Hemisphere.

Orr, D. P., & Ingersoll, G. M. (1995). The contribution of level of cognitive complexity and pubertal timing to behavioural risk in young adolescents. *Pediatrics*, 95(4), 528.

- Patchin, J. W., & Hinduja, S. (2006). Bullies move beyond the schoolyard: A preliminary look at cyberbullying. *Youth Violence and Juvenile Justice*, 4, 148–169.  
doi:10.1177/1541204006286 288.
- Paus, T. (2005). Mapping brain maturation and cognitive development during adolescence. *Trends in Cognitive Sciences*, 9, 60–68
- Perlman, S. B., & Pelphrey, K. A. (2010). Regulatory brain development: Balancing emotion and cognition. *Social Neuroscience*, 5(5-6), 533-542.  
doi:10.1080/17470911003683219
- Perren, S., Dooley, J., Shaw, T., & Cross, D. (2010). Bullying in school and cyberspace: Associations with depressive symptoms in Swiss and Australian adolescents. *Child and Adolescent Psychiatry and Mental Health*, 4, 1–10.
- Public Health Agency of Canada. (2011). *Chapter 3, Table 3.5: Health behaviour and Well-being of Canadian Youth and Young Adults* [data file]. Retrieved from <http://www.phac-aspc.gc.ca> on January 24, 2014.
- Rehtaeh Parsons, Amanda Todd Deaths Share Similarities (2013, April 10<sup>th</sup>). *The Huffington Post*. Retrieved from [http://www.huffingtonpost.ca/2013/04/10/rehtaeh-parsons-amanda-todd-similarities\\_n\\_3052694.html](http://www.huffingtonpost.ca/2013/04/10/rehtaeh-parsons-amanda-todd-similarities_n_3052694.html) on April 25, 2014.
- 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, 1–44.
- Runions, K., Shapka, J.D., Dooley, J., Modecki, K. (2013). Cyber-aggression and



- victimization and social information processing: Integrating the medium and the message. *Psychology of Violence*, 3(1), 9-26.
- Schneider, S., O'Donnell, L., Stueve, A., & Coulter, R. S. (2012). Cyberbullying, school bullying, and psychological distress: A regional census of high school students. *American Journal of Public Health*, 102, 171–177.
- Selfhout, M.H.W., Branje, S.J.T., and Meeus, W.H.J. (2008). The development of delinquency and perceived friendship quality in adolescent beset friendship dyads. *Journal of Abnormal Child Psychology*, 36, 471-485.
- Sowell E.R., Peterson B.S., Thompson P.M., Welcome S.E., Hen-kenius A.L., Toga A.W. (2003). Mapping cortical change across the human life span. *Natural Neuroscience* 6, 309–315.
- Spear L.P. (2000). The adolescent brain and age-related behavioural manifestations. *Neuroscience Biobehaviour Review* 24, 417 – 463.
- Spear, L. P. (2000). Neurobehavioural changes in adolescence. *Current Directions in Psychological Science*, 9(4), 111-114. doi:10.1111/1467-8721.00072
- Spear, L. (2009). The behavioural neuroscience of adolescence. New York: Norton.
- Srinivas, A., White, M., & Omar, H.A. (2011). Teens texting and consequences: A brief review. *International Journal of Child and Adolescent Health*, 4, 327-331.
- Steinberg, L. (2004). Risk-taking in adolescence: What changes, and why? *Annals of the New York Academy of Sciences*, 1021(1), 51-58. doi:10.1196/annals.1308.005
- Steinberg, L. (2005). A social neuroscience perspective on adolescent risk-taking. *Dev. Rev.* 28, 78–106.

- Steinberg, L. (2008). A social neuroscience perspective on adolescent risk-taking. *Developmental Review, 28*, 78–106.
- Steinberg, L. (2010). A behavioural scientist looks at the science of adolescent brain development. *Brain and Cognition, 72*(1), 160-164.  
doi:10.1016/j.bandc.2009.11.003
- Steinberg, L. & Cauffman E. (1996). Maturity of judgement in adolescence: psychosocial factors in adolescent decision-making. *Law and Human Behaviour, 20*, 249-272.
- Swaim, R. C., Henry, K. L., & Baez, N. E. (2004). Risk-taking, attitudes toward aggression, and aggressive behaviour among rural middle school youth. *Violence and Victims, 19*(2), 157-170
- Tamm, L., Menon, V., & Reiss, A. L. (2002). Maturation of brain function associated with response inhibition. *Journal of the American Academy of Child and Adolescent Psychiatry, 41*, 1231–1238.
- Tokunaga, R. S. (2010). Following you home from school: A critical review and synthesis of research on cyberbullying victimization. *Computers and Human Behaviour, 26*, 277-287.
- Tottenham, N., Hare, T. A., & Casey, B. J. (2011). Behavioural assessment of emotion discrimination, emotion regulation, and cognitive control in childhood, adolescence, and adulthood. *Frontiers in Psychology, 2*, 39.  
doi:10.3389/fpsyg.2011.00039
- Valkenburg, P. M., & Peter, J. (2007). Preadolescents' and adolescents' online

communication and their closeness to friends. *Developmental Psychology*, 43(2), 267-277. doi:10.1037/0012-1649.43.2.267

Vandenbos, G.R. (Ed.). (2007). *APA dictionary of psychology*. Washington, DC: American Psychological Association.

Wills, T. A., Walker, C., Mendoza, D., & Ainette, M. G. (2006). Behavioural and emotional self-control: relations to substance use in samples of middle and high school students. *Psychology of Addictive Behaviours*, 20, 265-278.  
<http://dx.doi.org/10.1037/0893-164X.20.3.265>.

Wolak, J., Finkelhor, D., & Mitchell, K. (2008). Is talking online to unknown people always risky? Distinguishing online interaction styles in a nation sample of youth internet users. *Cyber Psychology Behaviour*, 3, 340-343.

Wolak, J., Mitchell, K. J., & Finkelhor, D. (2003). Escaping or connecting? Characteristics of youth who form close online relationships. *Journal of Adolescence*, 26, 105-119.

Wolfram, S. (April 24, 2013). Wolfram Alpha Blog. Retrieved from  
<http://blog.wolframalpha.com/2013/04/24/data-science-of-the-facebook-world/>

Xie, H., Cairns, R.B., and Cairns, B.D. (2002). The development of social aggression and physical aggression: A narrative analysis of interpersonal conflicts. *Aggressive Behaviour*, 28, 341-355.

Ybarra, M. L., Mitchell, K. J., Wolak, J., & Finkelhor, D. (2006). Examining characteristics and associated distress related to internet harassment: Findings from the Second Youth Internet Safety Survey. *Pediatrics*, 118, 1169-1177.

- Young, S. (2009). Determinants of online privacy concern and its influence on privacy protection behaviors among young adolescents. *Journal of Consumer Affairs*, 43(3), 389-418. doi:10.1111/j.1745-6606.2009.01146.x
- Young, S., Dutta, D., & Dommety, G. (2009). Extrapolating psychological insights from Facebook profiles: A study of religion and relationship status. *Cyberpsychology, Behaviour and Social Networking*, 12, 347-350.
- Zimmerman, P. (2014) Emotion regulation from early adolescence to emerging adulthood and middle adulthood: Age differences, gender differences, and emotion-specific developmental variations. *International Journal of Behavioural Development*, 38(2), 182-194. doi:10.1177/0165025413515405

## Appendices

### Appendix A

#### Application Inputs & Outputs

The example provided is based on the selection of Facebook as the most often used social media site.

The following two questions are required to calculate the outputs of the Application.

1. How many Facebook friends do you have?
2. What are your privacy settings set to?
  - a. Friends only
  - b. Friends of Friends
  - c. Public
  - d. I don't know

The outputs of the App depend on the number of friends and the privacy settings currently being used. The first example below outlines a condition in which the user has input 100 friends for the first question (1) and “Friends only” privacy setting for the second question (2).

- a. In approximately 30 seconds, up to **145 people** (many of whom you do not know) could have your image permanently saved on their computer or phone, even if you immediately delete your image.
- b. In less than **24 minutes** your image will have been seen, and could be shared by one of your friends to all of their friends

- c. In less than **41 minutes**, a friend of a friend (whom you may not know) could share your image with their friends on Facebook, even if you're not friends with them, do not know them, or you have blocked them.
- d. In less than **24 hours**, at least one of your grandparents could have seen your image.

The second example below outlines a condition in which the user has also input 100 friends for the first question (1), although their privacy settings are set to "Friends of friends" for the second question (2). In this condition, it is quickly apparent that many more people may have access to the information that the user is about to post.

- a. In approximately 30 seconds, up to **8665 people** (many whom you do not know) could have your image permanently saved on their computer or phone, even if you immediately delete your image.
- b. In less than **10.2 seconds**, your image will have been seen, and could be shared by one of your friends to all of their friends
- c. In less than **17 minutes**, a friend of a friend (whom you may not know) could share your image with their friends on Facebook, even if you're not friends with them, do not know them, or you have blocked them.
- d. In less than **24 hours**, at least one of your grandparents could have seen your image.

The third and final example outlines a condition in which the user has also input 100 friends for the first question (1), but has selected either "Public" or "I don't know" for the second question (2). This output remains the same for the last two of these privacy

setting input responses, as it may be more prudent to generate statistics that give the “I don’t know” privacy setting user the output that will evaluate the highest risk, as it cannot be assumed that privacy settings have set more strictly than they are. In this final condition, the statistics were generated based on the 1.11 billion Facebook subscribers. Due to the fact that the numbers contained within the output were too staggering to be meaningful, different outputs were created for this condition of privacy settings.

- a. In approximately 30 seconds, up to **666 million** people could have your image permanently saved on their computer or phone, even if you immediately delete your image.
- b. In **less than a second**, your image will have been seen by people you’ve never met and could be shared by millions of people you don’t know, including people you have blocked.
- c. In less than **24 hours**, at least one of your grandparents could have seen your image.

## Appendix B

### Passive Consent Form

THE UNIVERSITY OF BRITISH COLUMBIA



Department of Educational and **Counseling**  
Psychology, and Special Education  
The University of British Columbia  
Faculty of Education  
2125 Main Mall  
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#### Parental Consent Form

#### Adolescent Online Risk-Taking: An Experimental Analysis of Posting Behaviour

Your child has been invited to participate in a research study conducted by the University of British Columbia that will be occurring in the coming weeks. Please take a moment to review this information about the study.

**Principal Investigator:** Dr. Jennifer Shapka

**Purpose:** Adolescents are currently the largest users of the Internet. However, very little is known about the kinds of things young people are posting publicly or sending privately online. This study aims to examine how teenagers report posting private information online when their emotions might be slightly heightened, and whether or not a new mobile application might reduce the number of private posts adolescents share with others through the Internet, for example through email, social networking, or text messaging.

This study involves having your child complete, during class time, a questionnaire about his or her online posting behaviors. The questionnaire asks teens to make choices about what they are or are not willing to post online. Demographic questions such as age (year and month of birth), gender and ethnicity will also be asked, so that we can gain a better sense of who the participants are. The questionnaire will take about 10-15 minutes to complete.

Questionnaires will be completed during class time and there are no known risks associated with this study, however, should your teen feel uncomfortable, he/she has the right to withdraw from the study without any penalty, at any time. If you do not wish your child to participate in this study, you must return the second page of this letter, indicating this. If you would like to view the questionnaire that your child will be filling out, please contact Dr. Jennifer Shapka (email: \_\_\_\_\_; phone: \_\_\_\_\_) who will provide you with a copy of the questionnaire via mail or via email. The school also has a copy of the questionnaire available for you to look at.

**Confidentiality:** Every effort will be made to ensure the confidentiality of the participants. It is important to note that no identifying information will be collected and that all data collected will be kept securely. In all data files, participants will not be identified. In addition, all files will be password protected and will be accessible only to the core research team.

**Contact for information about the study:** If you have any questions or desire further information with respect to this study or to obtain a copy of the questionnaire, contact Dr. Jennifer Shapka at \_\_\_\_\_, or her research associate, Rachel Baitz at \_\_\_\_\_.



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**Contact for concerns about the rights of research subjects:** If you have any concerns about your child's treatment or rights as a research subject, you may contact the Research Subject Information Line in the UBC Office of Research Services at

**\*\*Please return the bottom of this page with your child if you DO NOT wish your child to participate in any part of this study\*\***

-----

**Consent:**

Your child's participation in this study is entirely voluntary and you may refuse to have him or her participate this study by returning this form, or have him or her withdraw from the study at any point without jeopardy to his or her class standing.

Your signature below indicates that you have received a copy of this consent form for your own records and that you DO NOT consent to your child's participation in the study.

**Part 1** (questionnaire administered at school during class time):

I DO NOT consent to my child's participation.

Name of Child (please print): \_\_\_\_\_

Your Name (please print): \_\_\_\_\_

\_\_\_\_\_  
Your Signature

\_\_\_\_\_  
Date

## Appendix C

### Participant Assent Form

THE UNIVERSITY OF BRITISH COLUMBIA



Department of Educational and Counselling  
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#### ADOLESCENT ONLINE RISK-TAKING: AN EXPERIMENTAL ANALYSIS OF POSTING BEHAVIOUR

#### STUDENT INFORMED ASSENT FORM

Dear student,

You and your classmates are being invited to help us, at the University of British Columbia (UBC), learn more about what teenagers are posting on the internet. Please read the information below to learn more about our study.

*People in charge of this project:* Dr. Jennifer Shapka (Associate Professor) from the Department of Educational and Counselling Psychology and Special Education is the principal investigator for this project. If you have any questions you can email them to her at [jshapka@ubc.ca](mailto:jshapka@ubc.ca). You can also call Dr. Shapka at 604-822-2222.

*Why we are doing this project:* You and your classmates are one of the first groups of people in the world to grow up using computers and internet. We want to learn more about what it is like for you to grow up using computers and the internet, and what we can do to make these things more safe and fun. To help us learn more about these things, we will be asking you questions about the types of things you post publicly or send privately on the internet (e.g. an image of yourself in a swimsuit).

*What this project means for you:* If you want to take part in this project, then we will ask you to use a mobile app and then fill out a 15-minute survey using an iPad Mini. The entire process should take no more than 20 minutes total.

*Your answers will be kept safe and private:* We want to make sure you feel safe answering question as honestly as you can, so we will be doing all we can to make sure your answers remain private and anonymous. This means that for the study, your name and personal information will never be connected at all with your answers to the survey. All your answers will be kept private and will never be shared with your parents, friends, or teachers.

*Questions or concerns:* If you have any concerns or complaints about your rights as a research participant and/or your experiences while participating in this study, contact the Research

THE UNIVERSITY OF BRITISH COLUMBIA

Participant Complaint Line in the UBC Office of Research Services at \_\_\_\_\_ or if long  
distance e-mail \_\_\_\_\_ or [call toll free](#)

*Consent:*

Your decision to take part in this study is completely up to you and your parents. This means that if you do not want to take part, or if you change your mind in the middle, you can stop at any time and it will not affect you in any way.

If you want to help us out and take part in this project, please fill out the form below:

---

Printed Name of Student \_\_\_\_\_ Grade \_\_\_\_\_

---

Email address \_\_\_\_\_ cell number \_\_\_\_\_

---

Student Signature \_\_\_\_\_ Date \_\_\_\_\_

## **Appendix D**

### GhostFire Output

#### *GhostFire Output – Random Internet Facts*

The first YouTube video was posted on April 23, 2005 and has been watched nearly 10 million times.

The state of Nevada provides wireless internet to all of its residents for free.

The Internet's first website went online on Aug. 6, 1991.

Garfield the cartoon cat once offered a free email service - gmail.com, later taken over by Google.

## Appendix E

### Participant Questionnaire

Keeping in mind the information you received from the app, please review the following quote:

“My new girl/boyfriend is super hot!”

1. How likely are you to post the following quote, or something similar, **publicly** on sites such as Twitter, Facebook, etc?

Very Unlikely      Unlikely      Somewhat likely      Likely      Very Likely

---

2. How likely are you to send the following quote, or something similar, **privately** using apps such as Snapchat, Kick, etc?

Very Unlikely      Unlikely      Somewhat likely      Likely      Very Likely

---

3. How likely are *other kids your age* to send the following quote, or something similar, **publicly** on sites such as Twitter, Facebook, etc?

Very Unlikely      Unlikely      Somewhat likely      Likely      Very Likely

---

4. How likely are *other kids your age* to send the following quote, or something similar, **privately** using apps such as Snapchat, Kick, etc?

Very Unlikely      Unlikely      Somewhat likely      Likely      Very Likely

---

Please answer the following questions:

1. Which Social Networks do you use regularly (at least once a month)?

Facebook

Twitter

Instagram

SnapChat

Kik

---

2. Which other Social Networks do you regularly use (at least once a month)?

---

3. How often do you use Facebook?

Very Often

Often

Sometimes

Not Usually

Never

---

4. What is your gender?

5. What is your month and year of birth?

---

6. What level of education has your mother completed?

---

7. What level of education has your father completed?

---

8. What is your ethnic background?

---

9. Do you think the app you completed before the questionnaire made a difference in your answers to the questionnaire?

Very Unlikely       Unlikely       Somewhat likely       Likely       Very Likely

---

10. Do you think the app you completed before the questionnaire will make a difference in what you post in the future?

Very Unlikely       Unlikely       Somewhat likely       Likely       Very Likely

---

End of Questionnaire.

THANK YOU!