

CHATTING, BEFRIENDING, AND BULLYING:
ADOLESCENT INTERNET EXPERIENCES AND ASSOCIATED PSYCHOSOCIAL
OUTCOMES

By

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Abstract

Over the past 10 years, internet use has become an integral part of adolescent socialization. Teenagers use the internet to communicate with known others as well as with strangers. They engage in online entertainment in the form of gaming and surfing the web. While adolescents mainly use the internet to maintain pre-existing friendships, some adolescents make close friendships online. They also encounter negativity online in the form of cyberbullying. Despite the pervasiveness of internet use, relatively little is known about long-term effects of internet activities on adolescent psycho-social adjustment. This group of studies aimed to identify change over time associated with various aspects of internet use. First, the long-term associations between different internet-based activities and adolescent social relationships were identified. Second, the differences between adolescents who form close internet-based friendships and those who do not were examined. Finally, the importance of internet-based bullying was identified. Overall, results suggest that while some internet-based activities are associated with increased positive effects, some internet activities are also associated with negative outcomes over the long term. Having close online friends as part of one's peer group is associated with negative psychosocial factors. Cyberbullying was identified as a form of bullying that is associated with many important outcomes. The implications of these findings call for an increase in monitoring, involving not only supervision but direct communication, of adolescents' internet activities, and increased communication in families about internet use.

Co-Authorship

I assumed primary responsibility for the conceptualization and analysis of the research described in this thesis. My supervisor, Dr. Wendy Craig, assisted in all aspects of the research and in the preparation of the manuscripts: she is co-author on all three manuscripts. The first study, “Adolescents online: The importance of online activity choices to salient relationships” was conducted using archival data from a study led by Wendy Craig, Debra Pepler, and Jennifer Connolly. They are therefore included as co-authors on the first manuscript.

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Table of Contents

Abstract.....	ii
Co-Authorship.....	iii
Acknowledgements.....	iv
Table of Contents.....	v
List of Tables.....	viii
List of Figures.....	ix
Chapter 1. General Introduction.....	1
References.....	11
Forward to Chapter 2.....	15
Chapter 2. Adolescents Online: The Importance of Internet Activities to Salient Relationships.....	16
Abstract.....	17
Introduction.....	18
Hypotheses.....	23
Method.....	25
Procedure.....	25
Sample.....	26
Measures.....	27
Results.....	29
Discussion.....	47
Conclusion.....	57
References.....	58

Forward to Chapter 3.....	65
Chapter 3. Something to Text About: The Longitudinal and Unique Effects of Cyberbullying.....	66
Abstract.....	67
Introduction.....	68
Hypotheses.....	76
Method.....	77
Procedure.....	77
Sample.....	77
Measures.....	78
Results.....	81
Discussion.....	86
Conclusion.....	92
References.....	94
Forward to Chapter 4.....	100
Chapter 4. Friend or Foe: The Negative Outcomes Associated with Internet- Based Friendships.....	101
Abstract.....	102
Introduction.....	103
Hypotheses.....	112
Method.....	113
Procedure.....	113
Sample.....	113

Measures.....	114
Results.....	116
Discussion.....	130
Conclusion.....	139
References.....	140
Chapter 5. General Discussion.....	148
References.....	157

List of Tables

Chapter 2

Table 1: Frequency count and percentage of sample who endorse participating in each internet activity by sex.....	29
Table 2: Descriptive statistics for relationship quality variables.....	30
Table 3: Correlations among key variables.....	33
Table 4: Best friendship quality as predicted by internet activities.....	36
Table 5: Best friendship quality as predicted by internet entertainment activities.....	39
Table 6: Romantic relationship quality as predicted by internet social activities.....	43
Table 7: Romantic relationship quality as predicted by internet entertainment activities.....	46
Table 8: Summary of the direction of relationships between internet activities and relationship quality variables.....	48

Chapter 4

Table 1: Correlations between forms of bullying and victimization.....	118
Table 2: Groups of students involved in different forms of bullying.....	119
Table 3: Gender composition of students who bully others.....	120
Table 4: Gender composition of students who are victimized by others.....	121
Table 5: Quality of life as predicted by internet victimization.....	125
Table 6: Hard drug use as predicted by internet victimization.....	127
Table 7: Substance use as predicted by internet bullying.....	130

List of Figures

Chapter 3

Figure 1: Interaction between online friends and age group on rejection sensitivity.....	85
Figure 2: Interaction between online friends and age group on social anxiety.....	85

Chapter 1:

General Introduction

General Introduction

The internet has become ingrained in North American adolescent culture. Ninety percent of Canadian adolescents use the internet (Statistics Canada, 2001), with similar numbers in American youth (Lenhart, Rainie, & Lewis, 2001). From a young age, children begin to use the internet to play games, to research information for school work, and to sometimes communicate with others (Lenhart, Rainie, & Lewis, 2001). As children grow into adolescents, internet use becomes commonplace. Email, instant messaging, and message boards become more important while entertainment continues to occupy a large part of adolescent online activities. Eventually, adolescents primarily log on to the internet to socialize (Lenhart, Rainie, & Lewis, 2001, Media Awareness Network, 2005). Despite the magnitude of internet use in adolescent socializing, there are few existing data on the psychosocial correlates of internet use in adolescence. To further our knowledge of adolescent internet use, this dissertation focuses on: 1) The internet activities in which adolescents engage; 2) the friendships adolescents form on the internet; and 3) the online bullying experiences of adolescents.

When compared to young people's development of interpersonal relationships in face-to-face contexts, internet-based socialization appears to follow a similar developmental trend. In other words, peers take on an increasingly important role as socialization agents in adolescence (Berndt, 1982; Sullivan, 1953). In adolescence, youth begin to spend more time with friends and develop increased intimacy (e.g., Berndt, 1982, 1986; Buhrmester & Furman 1986; Sullivan 1953). A similar trend is noted in internet use patterns of young people (Lenhart, Rainie, & Lewis, 2001, Media Awareness Network, 2005). Adolescents may be particularly attracted to the internet because it allows them to

engage in some important developmental tasks that usually occur through face-to-face contact. Notably, adolescence is a period characterized by expanding social networks into cliques and crowds (e.g., Brown, 1990; Dunphy, 1963), increased intimacy within friendships (e.g., Berndt, 1982; Buhrmester & Furman 1986; Sullivan 1953) forming romantic interests and relationships (e.g., Feiring, 1999; Furman, Brown, & Feiring, 1999), and experimenting with various identities (McKenna & Bargh, 1998). The internet can enable adolescents to pursue such developmental tasks in a less threatening context than face-to-face settings. With message boards, chat rooms, and other social utilities, adolescents are able to expand their social networks particularly by interacting with and befriending strangers (Wolak, Mitchell, & Finkelhor, 2003). The process of meeting strangers and adding online friends to one's social network can perhaps lead adolescents to more easily form cliques and crowds, due to the more widely available pool of friends. They also are able to maintain and increase intimacy within existing friendships (Gross, 2004; Valkenburg & Peter, 2007) by using email and instant messaging. Adolescents report that they feel more able to express their "true selves" online than they otherwise could in face-to-face settings (Bargh, McKenna, & Fitzsimons, 2002; Lenhart, Rainie, & Lewis, 2001). As a result, adolescents sometimes rely on the internet to initiate romantic contact, maintain existing romantic relationships, and discuss difficult topics with romantic partners, including terminating relationships (Lenhart, Rainie, & Lewis, 2001). Finally, the level of anonymity afforded by the internet allows many adolescents to experiment with various identities (Maczewski, 2002), and aggressive behaviour (e.g., Ybarra & Mitchell, 2004). In sum, the internet plays an important role in adolescent socialization. The

relationship between using this technology and overall psycho-social adjustment, however, is unclear.

To date, research that has investigated the use of internet technologies by youth suggests that internet use can represent both a negative (e.g., Kraut, Patterson, Lundmark, Kiesler, Mukophadyay, & Scherlis, 1998) and a positive (e.g., McKenna & Bargh, 2000) element in adolescent life. Early internet research suggests that merely spending time on the internet leads to increases in loneliness and depression (Kraut et al., 1998, Nie & Erbring, 2000). These studies supported the “reduction hypothesis” which postulates that spending time on the internet reduces the quantity of sources of social support and the quality of inter-personal relationships. Reduction theorists suggest that internet activities displace time that would otherwise be spent further developing face-to-face relationships (Locke, 1998) As a result, the quality of pre-existing friendships deteriorates. Hence, internet use is described as a risk factor for social isolation and poor quality friendships. Current findings in support of reduction theory indicate that the relationships formed online are generally of lower quality than are face-to-face relationships (Chan & Cheng, 2004). Thus, according to reduction theory, internet users are reducing the quality and quantity of good quality face-to-face relationships and are replacing these relationships with poor quality internet-based relationships.

In contrast, critics of early internet research put forth “stimulation theory”, which proposes that certain online activities contribute to positive outcomes in adolescence (McKenna & Bargh, 2000). According to stimulation theory, the internet connects individuals with one another, and therefore can enhance one’s social experience. Individuals who initially communicate online are often observed to like each other more

than individuals who initially communicate in a face-to-face setting (Bargh, McKenna, & Fitzsimons, 2002). This finding suggests that the internet is a likely venue for easily gathering sources of social support by increasing the probability of meeting likeable others. Later studies support stimulation theory. For example, researchers have shown that the internet provides a venue where marginalized teens are able to seek social support (McKenna & Bargh, 1998). Furthermore, research indicates that using the internet to communicate with friends increases feelings of closeness towards these friends (Valkenburg & Peter, 2007). Thus, according to stimulation theory, time spent online can lead to social connectedness and high quality friendships.

While some internet researchers support reduction theory, and others support stimulation theory, others still suggest that different activities may have different impacts on social and overall well-being. For example, a study by Ho and Lee (2001) noted that boys who use computer technology to communicate with others report more social support than those who do not, and those who use computer technology to play games report less social support than those who do not. The equivocal evidence in the literature may in part be due to the fact that previous studies largely have been correlational in nature, are based on the data of early regular internet users, or are examinations of individuals who very regularly consume internet media. No research to date has examined the longitudinal relationship between different internet-based activities and psycho-social factors in adolescence across internet-consumption patterns. The first study of this dissertation seeks to further investigate the differential role of different internet-based activities, including socialization and entertainment, in salient adolescent relationships.

Since socializing is one of the main internet-based activities of adolescents, it is not surprising that many adolescent internet users eventually will come into contact with strangers online. In some studies, 40% of adolescents reported having met strangers online (Lehnart, Rainie & Lewis, 2001; Media Awareness Network, 2001). Moreover, nearly 20% of adolescents eventually form new friendships with strangers they initially met online (Gross, 2004). When comparing the friendships that were formed on the internet to those that are formed in face-to-face settings, many researchers have focused on the quality of online and off-line friendships (e.g, Chan & Cheng, 2004, Park & Roberts, 1998). To date, research in this area has concluded that internet-based friends are generally of lower quality than face-to-face friends. Only one study has identified differences between adolescents who make online friends and adolescents who do not. In support of reduction theory, Wolak, Mitchell, and Finkelhor (2003) reported that adolescents who form online friendships were more troubled than adolescents who do not. They reported higher levels of conflict with their parents and lower levels of communication with parents than those without online friends. These researchers suggested that adolescents may be attempting to withdraw from their world by immersing themselves in the Cyber-world and forming relationships there. They contrast this type of social interaction to a healthy pattern of seeking to expand one's social support network. What is not investigated is whether those adolescents who form online friends are more likely to struggle within their face-to-face peer groups in terms of their closeness and the presence of bullying and victimization. Despite the fact that the internet is predicted by stimulation theory to increase social connectivity, the one study that investigates differences between adolescents with online friends and those without supports reduction theory. Unfortunately, no other studies to

date have examined differences between teens who form online friends and those who do not. The second study of this dissertation investigates the differences in peer group characteristics, social sensitivities and bullying and victimization involvement, between adolescents who meet friends online and adolescents who do not.

Perhaps one of the reasons that a significant number of adolescents make friends on the internet is the ease with which they can communicate with others (Bargh, McKenna, & Fitzsimons, 2002). The ease of forming positive connections on the internet also can translate to easy negative communication or negative internet-mediated behaviours. In the course of fulfilling the developmental task of experimenting with identities, some adolescents may experiment with aggressive behaviours (e.g., Ybarra & Mitchell, 2004) online and offline. Recently, aggressive acts perpetrated on the internet have caught the attention of media and of researchers (e.g., National Children's Home, 2002; Media Awareness Network, 2001), and support reduction theory. Some researchers argue that online aggression does not necessarily fit the definition of bullying (Wolak, Mitchell, & Finkelhor, 2007) due to several unique characteristics of internet-based aggression. Most other researchers, however, label a specific form of internet-based aggression as cyberbullying and have begun to examine its characteristics (e.g., Patchin & Hinduja, 2006). Early research of this phenomenon suggests that negative outcomes are associated with cyberbullying, similar to more traditional forms of bullying (e.g., Finkelhor, Mitchell, Wolak, 2000; Ybarra & Mitchell, 2004). Currently, no research examines the longitudinal association between cyberbullying and psychosocial adjustment, and no research examines the contribution of cyberbullying when other forms of bullying are also examined. The

third study of this dissertation fills these gaps in research by examining cyberbullying and victimization over time, in the context of other forms of bullying and victimization.

The following three studies fill some of the knowledge gaps in current internet research. In the first study, we examined archival data from the Teen Violence and Media Study, led by Craig, Pepler, and Connolly, to identify the longitudinal associations of internet activities and salient adolescent relationship characteristics. Changes in the quality of adolescents' best friendships and romantic relationships were evaluated in relation to their use of the internet to socialize with strangers, socialize with known-others, play games, and participate in entertainment. Based on previous studies, we hypothesized that communicating with pre-established friends (i.e., using instant messaging) would be associated with increases in the quality of best friendship and of romantic relationships. Conversely, as suggested by early internet research, we predicted that using the internet to communicate with strangers would have a negative relationship with the quality of best friendships and romantic relationships. Finally, based on studies by Chan and Cheng (2004), we predicted that using the internet for general entertainment would be associated with displacements of healthy socialization activities and to decreases in best friendship and romantic relationship quality.

The second study examined the peer group differences between those students who make close friendships through online socializing and those who do not. Such peer group differences include the size of the peer group, the closeness of adolescents to the friends listed in their peer group, bullying and victimization. We also examined the differences between students who have close internet-based friendship and those who do not on social sensitivities (i.e., social anxiety and rejection sensitivity), and quality of life. We predicted

that adolescents with online friends would have more limited peer group experiences, including lower closeness ratings and higher bullying and victimization, and also have higher levels of social sensitivities than those without online friends. We also predicted that having close online friends would contribute to a greater sense of social belonging, despite lower general well-being that would be associated with limited peer group experiences.

Finally, the third manuscript in this dissertation examines the relationship between cyberbullying and psycho-social adjustment over time. Because cyberbullying is distinguished from other forms of bullying by several unique elements (i.e., broad audience, high anonymity, low parental monitoring), we expected that cyberbullying would be associated with particularly harmful effects when compared to other forms of bullying. We predicted that cyberbullying would be associated with increases in social anxiety and rejection sensitivity, increases in substance use and decreases in quality of life. We also examined the relative contribution of Cyberbullying to our outcomes when the effects of other forms of bullying are included into a regression model. In this way, we were able to identify the unique outcomes associated with cyberbullying.

Summary

The three manuscripts of this dissertation contribute to current research by filling some of the gaps in knowledge and furthering some relatively new areas of research in the field of adolescents' internet use. Our studies enabled us to further investigate the developmental importance of internet communication in adolescents. The findings in this dissertation help us understand the role of the internet in peer group socializing and associated psychological factors in the context of these theoretical frameworks. As such,

the findings of each manuscript are discussed in terms of peer group belonging and socialization, as well as reduction and stimulation theories.

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Forward to Chapter 2

Chapter 2 consists of a manuscript that was published in the *Journal of Youth and Adolescence* in the Spring of 2008. Chapter 2 adheres to APA format. My supervisor, Dr. Wendy Craig, assisted in all aspects of the research and she appears as a co-author on the manuscript. The present study used archival data collected in the Teen Dating Violence and Media study (TDVM). The principal authors for the TDVM, Dr.'s Wendy Craig, Jennifer Connolly, and Debra Pepler, are included as co-authors on the manuscript.

Chapter 2:

Adolescents Online:

The Importance of internet Activity

Choices to Salient Relationships

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Abstract

The purpose of this study was to determine whether using the internet for different activities is associated with the quality of close adolescent relationships (i.e., best friendships and romantic relationships). In a one-year longitudinal study of 884 adolescents (Mean age = 15, 46% male), we examined whether visiting chat rooms, using ICQ, using the internet for general entertainment, or participating in online gaming predicted changes in the quality of best friendships and romantic relationships. Multiple regression analyses indicated that internet activity choice predicted later relationship quality in both best friendships and romantic relationships. Using instant messaging (ICQ) was positively associated with most aspects of romantic relationship and best friendship quality. In contrast, visiting chat rooms was negatively related to best friendship quality. Using the internet to play games and for general entertainment predicted decreases in relationship quality with best friends and with romantic partners. These findings reflect the important and complex functions of online socialization for the development and maintenance of relationships in adolescence.

Adolescents Online:

The Importance of internet Activity Choices to Salient Relationships

The internet has become part of the daily lives of most North American adolescents. In 2001, national surveys in Canada (Media Awareness Network, 2001), and in the U.S. (Lenhart, Rainie, & Lewis, 2001) revealed that seventy percent of adolescents were internet users. In their day-to-day lives, adolescents use the internet for school work, entertainment, and to communicate with others (Media Awareness Network, 2005). While some adolescents use the internet to meet and communicate with strangers (Wolak, Mitchell, & Finkelhor, 2003), most use the internet to communicate with known-others (Gross, 2004; Valkenburg & Peter, 2007). Within this reality, it remains unclear whether the internet fosters the formation and maintenance of high quality relationships (Valkenburg & Peter, 2007) or whether it isolates young people or otherwise decreases the quality of their social relationships (Kraut, Patterson, Lundmark, Kiesler, Mukopahyay, & Scherlis, 1998).

Despite the pervasiveness of internet-based activities in adolescents' lives, little is known about the longitudinal impact of these different activities on existing relationships, particularly on salient adolescent relationships such as best friendships and romantic relationships. The dearth of research in the area is striking given the importance of best friendships (e.g., Clark & Ayers, 1988, Furman & Buhrmester, 1992; Sholte, van Lieshout, & Aken 2001) and romantic relationships (e.g., Feiring, 1999; Hartup, 1993) to adolescent social adjustment. Because best friendships and romantic relationships develop increasing significance in adolescence, the importance of internet-based activities, which have also recently emerged as part of adolescent life, is of particular interest. Therefore, the goal of

this study was to examine how different internet-based activities, including entertainment and socializing with strangers (i.e., on chat rooms) and known-others (i.e., through instant messaging such as ICQ), are involved in best friendships and romantic relationships.

Overview of adolescent internet Use

Internet use is common and widespread among North American youth. In 2000, 9 out of 10 Canadian teenagers aged 15 to 19 who were surveyed reported having used the internet (Statistics Canada, 2001). Similarly, in 2001, 73% of American teens aged 12 to 17 were internet users (Lenhart, Rainie, & Lewis, 2001). Internet use studies reveal that the most popular uses for the internet are to send and read email (92%), surf or have fun (84%), visit entertainment sites (83%), send instant messages (74%), and look for information on hobbies (69%) (Lenhart, Rainie, & Lewis, 2001). The types of activities in which adolescents engage appear to differ by age and sex (Media Awareness Network, 2005). While 28% of Grade 4 students talk to friends on instant messaging, 70% to 80% of Grade 7 to 11 students communicates with friends on instant messaging. Conversely, the number of students who play games on the internet decreases from 89% in Grade 4 to 63% in Grade 11. The study also noted that the most commonly endorsed activities for girls were school work (75%), instant messaging (68%), games (68%), and music (65%). For boys, the most commonly endorsed activities were playing games (85%), school work (68%), music (66%), and instant messaging (63%). Social communication and entertainment clearly appear as popular activities among adolescents, despite some age and sex differences. The current study seeks to determine the association between these activities and existing salient relationships.

The popularity of instant messaging among adolescents – with more than 20% using instant messaging as the principal method of communication with friends (Lenhart, Rainie, & Lewis, 2001) - may be due to the fact that internet-based communication removes the physical aspect of interpersonal communication and brings the focus of communication to the personality or intellect of the communicating individuals. In fact, adolescents report that they are better able to be their “true selves” when communicating on the internet than when communicating face-to-face (Bargh, McKenna, & Fitzsimons, 2002; Lenhart, Rainie, & Lewis, 2001). The increased amount of self-disclosure reflected in these statements likely plays a role in the maintenance of adolescent relationships such as best friendships and romantic relationships.

Best friendships, romantic relationships, and the internet

Best friendships and romantic relationships are important in adolescence (Hartup, 1993; Hartup & Stevens, 1997; Feiring, 1999) and are therefore susceptible to the influence of pervasive internet-based activities. In addition to receiving emotional support (Connolly et al., 2004), adolescents are able to experiment with identities and social strategies within their close relationships (Hartup & Stevens, 1997). The internet is a likely venue in which adolescents can more easily exercise these functions of their close relationships (e.g., Lenhart, Rainie, & Lewis, 2001; Subrahmanyam, Smahel, & Greenfield, 2006).

Internet technology presents mechanisms by which adolescents can simultaneously have several private conversations at once. The mere increase in opportunities to communicate with close friends increases the likelihood that adolescents will fulfill the functions of their close relationships. In addition, adolescents report that they are more able

to communicate their true feelings on the internet compared to other modes of communication (Lenhart, Rainie, & Lewis, 2001) perhaps due to the limited availability of other social cues (Sproull & Kiesler, 1986). Through these less direct but more intimate interactions on the internet, adolescents are better able to experiment with social skills, identities, and strategies that may prove more risky in a face-to-face context (Maczewski, 2002; Turkle, 1997). Such less risky experimentation may help adolescents refine social skills in face-to-face settings without jeopardizing friendships or status within a peer group.

The greater opportunities for experimentation through the increased number of interactions and more intimate self-disclosure are likely responsible for the widespread use of instant messaging among adolescents and may affect the quality of the most salient relationships in adolescence. In fact, 48% of American adolescent internet users surveyed believed that the internet improved their social relationships (Bargh, McKenna, & Fitzsimons, 2002; Lenhart, Rainie, & Lewis, 2001). For this reason, we examined the association between internet-based activities and romantic relationships and best friendships in adolescence.

Do internet-based activities hinder or improve salient relationships?

Early researchers examined changes in socio-emotional functioning after the introduction of internet technologies into the home. They noted that, for adults and teens in American households, internet use was associated with subsequent reduction in family communication, declines in the size of social relationship networks, and increases in loneliness (Kraut, et al., 1998, Nie & Erbring, 2000). These early findings supported the *reduction* hypothesis whereby online communication impedes further development of pre-

existing friendships in adolescents (e.g., Locke, 1998). This hypothesis has been proposed based on the assumption that the time spent communicating with strangers enables adolescents to form superficial and therefore less beneficial friendships than those that could be made in a “real world” context. The time that an adolescent may take to create and maintain these less beneficial friendships would be time that is taken away from available time spent on creating and maintaining “real world”, or theoretically more beneficial friendships. The reduction hypothesis therefore proposes that, as a result of forming less beneficial friendship at the expense of the more beneficial “real world” friendships”, a reduction of existing friendship quality will be noted.

Early internet studies, which supported the reduction hypothesis, were conducted in the late 1990’s as the internet was an emerging technology for most North American households, and few people had regular access to the necessary technology. Therefore, it was less likely that internet users would communicate with known-others, and more likely that they communicated with strangers (Gross, 2004). With greater and more widespread internet access, adolescents became increasingly able to communicate with their pre-existing friends. As the internet became more familiar to adolescents, later studies began to refute the early findings supporting the reduction hypothesis (Valkenburg & Peter, 2007).

More recent research is beginning to support the *stimulation* hypothesis, which proposes that using internet-based communication may stimulate relationship formation with strangers (McKenna, Green, & Gleason, 2002) and also improve the quality or closeness of relationships with known-others. This hypothesis stipulates that the arms-length nature of communicating on the internet allows for more intimate self-disclosure, which leads to increased relationship quality with both strangers in chat rooms and existing

friendships (McKenna & Bargh, 2000). The hypothesis was proposed to explain relationship formation with strangers on chat rooms (McKenna, Green, & Gleason, 2002). More recently, Valkenburg and Peter (2007) found that adolescents who communicate with their friends online more often feel closer to their existing friends than those that communicate online less often. The effects in the study by Valkenburg and Peter (2007) were only maintained for those adolescents who mainly communicate with existing friends, or known-others, and not for those who mainly communicate with strangers. This finding, in light of early studies examining what was likely communication with strangers, suggests that communicating with known-others may have a beneficial impact while communicating with strangers may have no impact or a negative impact on relationship quality.

Other research indicates differential relationships associated with different internet-based activities, suggesting perhaps that some activities may serve reduction purposes whereas others may serve stimulation purposes. For example, a study on the overall mental health of adolescent computer users found that boys who used computer technology to communicate with others reported higher levels of social support than boys who did not (Ho & Lee, 2001). However, those boys who used computer technology to play games reported lower levels of social support than those who did not.

Hypotheses

This study seeks to examine whether different internet activity choices affect best friendship and romantic relationship quality among adolescents. Within the literature examining the functions of internet use in adolescent development, there is support for both reduction and stimulation hypotheses. In other words, some studies have demonstrated that

internet activities *reduce* the quality of existing relationships (e.g., Kraut, et. al., 1998) while others have concluded that internet activities can serve to *stimulate* relationship quality (Valkenburg & Peter, 2007). In light of findings by Ho and Lee (2001) on computer activities, we propose that different internet-based activities serve different functions in adolescents' socialization, based on the groups with whom adolescents are engaging in those activities. According to the stimulation theory and consistent with the findings of Valkenburg and Peter (2007), we hypothesize that using the internet to communicate with known-others (i.e., through ICQ¹ instant messaging technology) will positively predict relationship quality. That is, using ICQ will be associated with reductions in conflict and alienation, and increases in trust and communication, commitment, as well as intimacy and companionship in both best friendships and romantic relationships. However, communication with strangers (i.e., using chat rooms) may be associated with displacement of socialization activities that would otherwise happen with known-others. Communicating with strangers on the internet may also be associated with reports of feeling closer and more intimacy with online socialization partners, due to the reduced social cues of the technology (McKenna & Bargh, 2000), which may also be associated with reductions in the quality of the pre-existing best friendships and romantic relationships by replacing these relationships. We hypothesize that visiting chat rooms will predict increases in conflict and alienation, and decreases in trust and communication, commitment, and intimacy and companionship in pre-existing relationships, consistent with the reduction hypothesis.

¹ ICQ was introduced in 1996 as a personal communication technology that enabled peer-to-peer contact through the internet. It was the "one of the first internet wide instant messaging services" (ICQ, 2007). As the first popular messaging system (Descy, 2007), ICQ has been described as more commonly used than email for young people in the late 90's and early 2000's (Leung, 2001).

As reflected in the findings of Ho and Lee (2001) on using the computer to play games, many internet activities that do not have an explicit social purpose may nevertheless have be associated with salient relationship characteristics. Using the internet for general entertainment and playing video games often represents activities that adolescents do alone in their bedrooms (Roberts, Foehr, Rideout, & Brodie, 1999) which may be associated with less time spent developing friendship quality. “Entertainment” on the internet can reflect a wide range of potentially solitary activities, including personal research and information seeking, gambling, and consuming antisocial media. Similarly, internet games are often solitary activities and frequently contain violent themes (e.g., Bayraktar & Gun, 2007; Children Now 2001). Engaging in such activities may not only be associated with reductions in the amount of time otherwise used to socialize with friends, both in face-to-face and online environments, but they may also foster ideals and values that counter good relationship-building skills. Their consumption may therefore have a negative association with relationship quality. Consistent with the reduction hypothesis, we predict that using the internet for general entertainment and for playing games will positively predict conflict and alienation and negatively predict trust and communication, commitment, and intimacy and companionship in best friendships and romantic relationships.

Method

Procedure

This one-year study spanned from March 2001 to May 2002. The data were collected as part of a larger study aiming to study the influence of media consumption on adolescents’ relationships. Schools in both rural and urban Canadian centers participated.

Letters of information and consent forms were sent to the parents of all students in interested secondary schools. Only those students who provided both parental consent and independent assent to participate in the study were included as participants. Participants completed questionnaires in their classrooms, cafeteria, or other location reserved for data collection during the time of the study.

In the original sample, 1142 students participated at Time 1 and 910 participated at Time 2. Attrition was observed at 23% where 884 of the original 1142 students who participated at the first time of the study also participated during the second year of the study. Leaving the target school, and failing to obtain parental consent for Time 2 were the most common reasons for attrition. There were no significant differences between students who dropped out of the study and those who stayed on outcome variables. However, students who dropped out of the study were older ($M=15.70$, $SD=1.13$) than those who stayed in the study ($M=15.18$, $SD=0.92$), $F_{1,1623} = 83.61$, $p < 0.05$. This finding is consistent with older students graduating from secondary school and therefore not being able to participate in our study at Time 2.

Sample

Only the 884 students who completed the study at both times were included in our sample. Of those students, 407 were male and 477 were female. In the first year of the study, participants ranged from 14 to 18 years of age ($M=15$, $SD=1$) and were in grades 9 to 11 ($M=10$, $SD=1$). The ethnic composition of the sample was comparable to the ethnic composition described in the 2001 Canadian Census data (Statistics Canada, 2003). The sample comprised: 76% European-Canadian, 7% Asian-Canadian, 7% African/Caribbean-

Canadian, 4% South-Asian-Canadian, 1% Latin-American-Canadian, 2% Native Canadian, and 3% other.

Measures

Demographics. Developed by Connolly and Konarski (1994), *The Focus on You Questionnaire* was used to collect demographic information. Adolescents indicated their age, ethnic origin, sex, and grade level.

Internet Use. The *Teen Media Questionnaire* was initially developed by Craig, Snyder, Minaker, Pepler, and Connolly (2000) to assess adolescent media consumption, including use of the internet for various activities. One small sub-section of the questionnaire in which a list of internet activities was outlined was used for the purpose of this article. Adolescents were requested to use a checkmark to indicate whether they participated (i.e., “yes” or “no”) in each of the 6 activities. The activities listed were: “ICQ”, “entertainment”, “chat rooms”, “online games”, “personal web page”, and “specific websites”. As adolescents tend to use the internet primarily for entertainment and communication (e.g., Bayraktar, & Gun, 2007), we conceptualized “ICQ” and “chat room” as communication media (as they serve to interact with others) while “online games” and “entertainment” were conceptualized as entertainment media, as their function is to entertain, and may only indirectly involve socialization with others. The latter two activities (personal web page, and specific websites) were not included in our analyses as they are difficult to categorize as either communicating with others, or entertainment. Each of the remaining items (i.e., “ICQ”, “entertainment”, “chat rooms”, and “online games”) was used as our predictor variables in our analyses.

Relationship Quality. A combination of items from the *Network Relations Inventory* (NRI – Furman & Buhrmester, 1985) and the *Inventory of Parent and Peer Attachment* (IPPA – Armsden & Greenberg, 1987) assessed the quality of relationships with romantic partners and with same-sex best friends. The resulting questionnaire featured 15 statements that assessed the quality of the relationship with best friends and 15 statements that assessed the quality of the relationship with current romantic partners. Adolescents rated the degree to which each statement described their relationship with both best friends and romantic partners on a 5-point scale ranging from “Almost never or never true” to “Almost always or always true”. Items indicating “alienation and conflict” were reverse-coded so that higher scores indicated positive relationship quality and lower scores indicated increased levels of “alienation and conflict”. Best friendship and romantic relationship quality subscales included “trust and communication” (3 items each such as “I tell my best friend everything”), “commitment” (3 items each such as “I feel sure that this relationship with my romantic partner will last no matter what”), “alienation and conflict” (6 items each such as “My best friend and I get on each other’s nerves”), and “intimacy and companionship” (3 items each such as “I go to places and to enjoyable things with my boyfriend/girlfriend). Reliability for the friendship quality subscales in this sample at Time 1, as measured by Cronbach’s Alpha, was satisfactory: 0.88 for “trust and communication”, 0.82 for “commitment”, 0.89 for “alienation and conflict”, and 0.76 for “intimacy and companionship”. Reliability for the romantic relationship quality subscales in this sample at Time 1, as measured by Cronbach’s Alpha, was satisfactory: 0.92 for “trust and communication”, 0.80 for “commitment”, 0.83 for “intimacy and companionship”, and 0.88 for “alienation and conflict”.

Results

Using ICQ (instant messaging) was the most highly endorsed internet activity (57% of the sample), with general entertainment falling second (34%), games falling third (23%) and chat rooms being the least highly endorsed (17%). See Table 1.

Table 1

Frequency count and percentage of sample who endorse participating in each internet activity by sex.

Variable	Response	Male		Female	
		Frequency of males	Percent males	Frequency of females	Percent females
ICQ	Yes	290	49	419	63
	No	296	51	248	37
Chat Room	Yes	72	12	141	21
	No	514	88	526	79
General Entertainment	Yes	197	34	228	34
	No	389	66	439	66
Games	Yes	198	34	94	14
	No	388	66	573	86

The average reported relationship quality for both friendships and romantic relationships was relatively high, 3 to 4 on a scale of 1 to 5. Descriptive statistics for these outcome variables can be found in Table 2. See Table 3 for correlations among each key variable.

Table 2

Descriptive statistics for relationship quality variables.

	Variable	Mean	S.D.
Best Friendship	Alienation and Conflict	3.57	.89
	Commitment	4.07	.90
	Communication and Trust	3.66	1.12
	Intimacy and Companionship	3.89	.84
Romantic Relationship	Alienation and Conflict	3.56	.89
	Commitment	3.01	1.25
	Communication and Trust	3.42	1.23
	Intimacy and Companionship	3.89	.99

We conducted multiple hierarchical regressions to investigate the effects of activity choice on best friendships and on romantic relationships. In each of the regression models, sex and age were entered as control variables in the first step to ensure that we were

controlling for the sex and age differences that can be observed on social adjustment variables (e.g., Buhrmester & Furman, 1987; McNelles & Connolly, 1999) and internet use (e.g., Gross, 2004; Kraut et al., 1998). We also entered the dependent variable at Time 1 into the first step to ensure that the effects that were observed were in fact over time, and not an artefact of the correlations at one time. In addition, regressions were all computed in the reverse order, whereby social adjustment variables at Time 1 (i.e., quality of romantic relationships and friendship) were used to predict internet use (i.e., using the internet to communicate with known others, using the internet to communicate with strangers, using the internet for entertainment activities) one year later. None of the reverse of these models included social adjustment variables as significant predictors ($p < 0.05$). The following results, therefore, are unidirectional.

Best Friendships

Social activities. We conducted four hierarchical regressions to examine whether using the internet for instant messaging (ICQ) or chat rooms at Time 1 predicted the quality of best friendships one year later, including “alienation and conflict”, “commitment”, “trust and communication”, and “intimacy and companionship”. Age, sex, and the friendship quality variable at Time 1 were entered as controls into the first step of each linear regression, while using instant messaging and visiting chat rooms were included on step 2. Our dependent variables were “alienation and conflict”, “commitment”, “trust and communication”, and “intimacy and companionship” perceived in the best friendship. Results are presented in Table 4.

For “alienation and conflict”, the model at step 1 was significant $F_{3,879}=63.39$, $p<.001$. At step 2, the change in R squared indicated that the new model including internet activities had a better fit, $\Delta F_{2,877}=4.53$, $p=.011$, accounting for an additional 1% of the variance. The new model indicated that being a girl, not having “alienation and conflict”, and visiting chat rooms predicted increases in “alienation and conflict” (a decrease in friendship quality), $F_{5,877}=40.15$, $p<.001$.

For commitment, the model at step 1 was significant $F_{3,880}=67.72$, $p=.000$. At step 2, the change in R squared indicated that the new model including internet activities had a better fit, $\Delta F_{2,878}=8.97$, $p<.001$, accounting for an additional 2% of the variance. The new model indicated that being a girl, having commitment, and using instant messaging predicted increases in commitment one year later, $F_{5,878}=44.96$, $p<.001$.

Table 3

Correlations among key variables.

	Age T1	ICQ T1 (yes/no)	Chat room T1 (yes/no)	Entert. T1 (yes/no)	Online games T1 (yes/no)	Romantic Conflict & Alienation T2	Romantic Commitment. T2	Romantic Trust & Communication T2	Romantic Intimacy. & Companionship T2	Friend Conflict & Friend Commitment T2	Friend Trust & Communication T2	Friend Intimacy & Companionship T2	
Age T1	1.00	0.02	-0.04	-0.01	-0.11 **	-0.10 **	0.10 **	0.14 **	0.17 **	-0.03	0.02	0.03	0.01
ICQ T1 (yes/no)	0.02	1.00	-0.02	-0.10 **	-0.03	0.03	0.08 **	0.16 **	0.19 **	0.03	0.16 **	0.21 **	0.17 **
Chat room T1 (yes/no)	-0.04	-0.02	1.00	0.10 **	0.13 **	-0.03	0.04	0.01	0.01	-0.04	-0.01	0.05	-0.04
Enter. T1 (yes/no)	-0.01	-0.10 **	0.10 **	1.00	0.16 **	0.02	-0.02	-0.03	-0.05	0.02	-0.06	-0.03	-0.05
Online games T1 (yes/no)	-0.11 **	-0.03	0.13 **	0.16 **	1.00	-0.01	-0.06	-0.05	-0.05	-0.06	-0.05	-0.13 **	-0.03
Rom. Conflict & Alien. T2	-0.10 **	0.03	-0.03	0.02	-0.01	1.00	0.00	-0.10 **	-0.05	0.37 **	0.01	-0.07 *	0.01

(Cont'd)	Age T1	ICQ T1 (yes/no)	Chat room T1 (yes/no)	Entert. T1 (yes/no)	Online games T1 (yes/no)	Romantic Conflict & Alienation T2	Romantic Commitment. T2	Romantic Trust & Communication T2	Romantic Intimacy. & Companionship T2	Friend Conflict & Alienation T2	Friend Commitment T2	Friend Trust & Communication T2	Friend Intimacy & Companionship T2
Rom. Commit. T2	0.10 **	0.08 **	0.04	-0.02	-0.06	0.00	1.00	0.72 **	0.62 **	0.03	0.15 **	0.15 **	0.06
Rom. Trust & Commu. T2	0.14 **	0.16 **	0.01	-0.03	-0.05	-0.10 **	0.72 **	1.00	0.66 **	0.03	0.17 **	0.25 **	0.15 **
Rom. Int. & Compan. T2	0.17 **	0.19 **	0.01	-0.05	-0.05	-0.05	0.62 **	0.66 **	1.00	0.08 *	0.25 **	0.20 **	0.25 **
Friend Conflict & Alien. T2	-0.03	0.03	-0.04	0.02	-0.06	0.37 **	0.03	0.03	0.08 *	1.00	0.13 **	0.05	0.02
Friend Commit. T2	0.02	0.16 **	-0.01	-0.06	-0.05	0.01	0.15 **	0.17 **	0.25 **	0.13 **	1.00	0.59 **	0.60 **
Friend Trust & Commu. T2	0.03	0.21 **	0.05	-0.03	-0.13 **	-0.07 *	0.15 **	0.25 **	0.20 **	0.05	0.59 **	1.00	0.54 **
Friend Int. & Compan. T2	0.01	0.17 **	-0.04	-0.05	-0.03	0.01	0.06	0.15 **	0.25 **	0.02	0.60 **	0.54 **	1.00

⁺p<0.10 *p<0.05 **p<0.01

For “trust and communication”, the model at step 1 was significant $F_{3,878}=124.40$, $p<.001$. At step 2, the change in R squared indicated that the new model including internet activities had a better fit, $\Delta F_{2,876}=3.69$, $p=.025$, accounting for an additional 1% of the variance. The new model indicated that being a girl, having “trust and communication”, and using instant messaging predicted increases in “trust and communication” one year later, $F_{5,876}=101.57$, $p<.001$.

For “intimacy and companionship”, the model at step 1 was significant $F_{3,880}=87.80$, $p<.001$. At step 2, the change in R squared indicated that the new model including internet activities had a better fit, $\Delta F_{2,878}=4.11$, $p=.017$, accounting for an additional 1% of the variance. The new model indicated that being a girl, having “intimacy and companionship”, and using instant messaging and not using chat rooms (i.e., chat room negatively predicts “intimacy and companionship”) predicted increases in “intimacy and companionship” one year later, $F_{5,878}=54.69$, $p<.001$.

Table 4

Best Friendship Quality as predicted by internet social activities

	Model Adjusted R ²	Standardized Coefficient Beta	S.E.	T
Alienation and Conflict	0.19**			
Age		-.01	.03	-.31
Sex		.15 **	.06	4.67
Alienation & Conflict T1		.38 **	.03	12.19
ICQ (Instant Messaging)		.05	.06	1.60
Chat Rooms		-.08 *	.08	-2.44
Commitment	.20**			
Age		-.01	.03	-.36
Sex		.14 **	.06	4.28
Commitment T1		.36 **	.03	11.43
ICQ (Instant Messaging)		.12 **	.06	3.79
Chat Rooms		-.05	.08	-1.65
Trust and Communication	.36**			
Age		.03	.03	1.22
Sex		.18 **	.07	5.87
Trust & Communication T1		.48 **	.03	15.68
ICQ (Instant Messaging)		.08 **	.06	2.72
Chat Rooms		.01	.08	.08
Intimacy and Companionship	.23*			
Age		-.01	.03	-.18
Sex		.13 **	.05	4.10
Intimacy & Companionship T1		.42 **	.03	13.77
ICQ (Instant Messaging)		.06 *	.05	2.05
Chat Rooms		-.06 +	.07	-1.83

+p<.10 *p<.05 **p<.01

Entertainment activities. We conducted four hierarchical regressions to examine whether using the internet for general entertainment or games at Time 1 predicted the quality of best friendships one year later, including “alienation and conflict”, commitment, “trust and communication”, and “intimacy and companionship”. Age, sex, and the friendship quality variable at Time 1 were entered as controls into the first step of each linear regression, while using the internet for general entertainment or games were included on step 2. Our dependent variables were “alienation and conflict”, commitment, “trust and communication”, and “intimacy and companionship” perceived in the best friendship. Results are presented in Table 5.

For “alienation and conflict” and “trust and communication”, the change in R squared at step 2 indicated that the new model including internet activities did not have a better fit than the models at step 1 which only included age, sex, and friendship quality at time 1.

For commitment, the model at step 1 was significant $F_{3,880}=67.72, p<.001$. At step 2, the change in R squared indicated, with a trend-level significance, that the new model including internet activities had a slightly better fit, $\Delta F_{2,878}=3.42, p=.03$, accounting for an additional 1% of the variance. The new model indicated that being a boy, not having commitment, and using the internet for general entertainment predicted decreases in commitment one year later, $F_{5,878}=42.23, p<.001$.

For intimacy/companionship, the model at step 1 was significant $F_{3,880}=87.80, p<.001$. At step 2, the change in R squared indicated, with a trend-level significance, that the new model including internet activities had a slightly better fit, $\Delta F_{2,878}=2.77, p=.06$,

accounting for an additional 1% of the variance. The new model indicated that being a boy, not having prior “intimacy and companionship”, and using the internet for general entertainment predicted decreases in “intimacy and companionship” one year later, $F_{5,878}=54.00, p<.001$.

Table 5

Best Friendship Quality as predicted by internet entertainment activities

	Model Adjusted R ²	Standardized Coefficient Beta	S.E.	T
Alienation and Conflict	.18			
Age		-.00	.03	-.06
Sex		.16 *	.06	4.98
Alienation & Conflict T1		.37 **	.03	12.09
General Entertainment		.01	.06	.32
Online Games		.02	.07	.75
Commitment	.19*			
Age		-.01	.03	-.17
Sex		.15 **	.06	4.74
Commitment T1		.37 **	.03	11.99
General Entertainment		-.08 *	.06	-2.61
Online Games		.02	.07	.55
Trust and Communication	.36			
Age		.03	.03	1.13
Sex		.18	.07	5.82
Trust & Communication T1		.49 **	.03	16.42
General Entertainment		-.01	.07	-.38
Online Games		-.02	.08	-.76
Intimacy and Companionship	.23 ⁺			
Age		.00	.03	.04
Sex		.14 **	.05	4.40
Intimacy & Companionship T1		.43 **	.03	14.28
General Entertainment		-.07 *	.05	-2.26
Online Games		.03	.07	.93

⁺p<0.10 *p<0.05 **p<0.01

Romantic Relationship

Similar to the best friend analyses, we conducted multiple hierarchical regressions to investigate the effects of activity choice on romantic relationships. For these analyses, however, only adolescents who reported being involved in a romantic relationship during their time in secondary school were included. This sub-sample included 610 adolescents (43% male), ranging in age from 14 to 18 at Time 1. Multiple analyses of variance indicated some significant differences between this sub-sample and the whole sample used in previous analyses. Namely, small but significant differences were identified in the age of participants ($F_{1,608}=22.54, p<.05$), friendship commitment ($F_{1,608}=10.84, p<.05$), friendship “trust and communication” ($F_{1,608}=25.42, p<.05$), and friendship “intimacy and companionship” ($F_{1,608}=20.60, p<.05$). Secondary school adolescents who reported being involved in a romantic relationship were on average .25 years older and reported slightly higher levels of friendship commitment (Daters: $M=4.15$, Non-daters: $M=3.97$), “trust and communication” (Daters: $M=3.78$, Non-daters: $M=3.42$), and “intimacy and companionship” (Daters: $M=4.03$, Non-daters: $M=3.80$) than non-daters. No differences were noted for friendship “alienation and conflict”. These differences between the sub-sample of daters and non-daters are not unexpected. The odds of being in a romantic relationship increase with age (Darling, Dowdy, Van Horn, & Caldwell, 1999), as does relationship quality (Buhrmester & Furman, 1987; McNelles & Connolly, 1999). Because we are already controlling for age in our regression models, no further controls were entered into the equations.

Social activities. We conducted four hierarchical regressions to examine whether using the internet for instant messaging or chat rooms at Time 1 predicted the quality of romantic relationships one year later, including “alienation and conflict”, commitment, “trust and communication”, and “intimacy and companionship”. Age, sex, and the romantic relationship quality variable at Time 1 were entered as controls into the first step of each linear regression, while using instant messaging and visiting chat rooms were included on step 2. Our dependent variables were “alienation and conflict”, commitment, “trust and communication”, and “intimacy and companionship” perceived in the romantic relationship. Results are presented in Table 6.

For “alienation and conflict”, the change in R squared at step 2 indicated that the new model including internet activities did not have a better fit than the models at step 1 which only included age, sex, and romantic relationship quality at time 1.

For commitment, the model at step 1 was significant $F_{4,600}=27.42, p<.001$. At step 2, the change in R squared indicated, with a trend-level significance, that the new model including internet activities had a better fit, $\Delta F_{2,598}=2.99, p=.05$, accounting for an additional 1% of the variance. The new model indicated that being older, having commitment at Time 1, and using instant messaging predicted increases in commitment one year later, $F_{5,598}=17.76, p<.001$.

For “trust and communication”, the model at step 1 was significant $F_{3,605}=64.17, p<.001$. At step 2, the change in R squared indicated that the new model including internet activities had a better fit, $\Delta F_{2,603}=8.97, p<.001$, accounting for an additional 2% of the variance. The new model indicated that having prior “trust and communication”, and using

instant messaging predicted increases in “trust and communication” one year later, $F_{5,603}=43.11, p<.001$.

For “intimacy and companionship”, the model at step 1 was significant $F_{3,606}=43.22, p<.001$. At step 2, the change in R squared indicated that the new model including internet activities had a better fit, $\Delta F_{2,604}=8.01, p<.001$, accounting for an additional 3% of the variance. The new model indicated that having “intimacy and companionship”, and using instant messaging predicted increases in “intimacy and companionship” one year later, $F_{5,604}=29.74, p<.001$.

Table 6

Romantic Relationship Quality as predicted by internet social activities

	Model Adjusted R ²	Standardized Coefficient Beta	S.E.	T
Conflict and Alienation	.10			
Age		-.10 *	.04	-2.64
Sex		-.03	.07	-.71
Conflict and Alienation T1		.30 **	.04	7.57
ICQ (Instant Messaging)		.05	.07	1.23
Chat Rooms		-.05	.09	-1.24
Commitment	.12*			
Age		.08 *	.05	1.98
Sex		.03	.10	.71
Commitment T1		.33 **	.04	8.52
ICQ (Instant Messaging)		.09 *	.10	2.39
Chat Rooms		.03	.13	.67
Trust and Communication	.26**			
Age		.07 +	.05	1.90
Sex		.02	.09	.56
Trust & Communication T1		.47 **	.04	13.05
ICQ (Instant Messaging)		.15 **	.09	4.08
Chat Rooms		-.03	.12	-.83
Intimacy and Companionship	.19**			
Age		.14 **	.04	3.70
Sex		.07 +	.08	1.72
Intimacy & Companionship T1		.36 **	.04	9.74
ICQ (Instant Messaging)		.15 **	.08	3.88
Chat Rooms		-.03	.10	-.72

⁺p<0.10 *p<0.05 **p<0.01

Entertainment activities. We conducted four hierarchical regressions to examine whether using the internet for general entertainment or online gaming at Time 1 predicted the quality of romantic relationships one year later, including “alienation and conflict”, commitment, “trust and communication”, and “intimacy and companionship”. Age, sex, and the romantic relationship quality variable at Time 1 were entered as controls into the first step of each linear regression, while using the internet for general entertainment or games were included on step 2. Our dependent variables were “alienation and conflict”, commitment, “trust and communication”, and “intimacy and companionship” perceived in the romantic relationship. Results are presented in Table 7.

For the “alienation and conflict” model, the change in R squared at step 2 indicated that the new model including internet activities did not have a better fit than the model at step 1 which only included age, sex, and romantic relationship “alienation and conflict” at Time 1.

For commitment, the model at step 1 was significant, $F_{3,600}=27.43, p<.001$. The F change at step 2 indicated that the model at step 2 had a better fit than the model that included age, sex, and commitment, $\Delta F_{2,598}=3.95, p=.020$, accounting for an additional 1% of the variance. The new model indicates that not having prior commitment, and going online for general entertainment and to play games predicted decreases in commitment one year later, $\Delta F_{5,598}=18.20, p<.001$.

The model for “trust and communication” was also significant step 1, $F_{3,605}=64.17, p<.001$. At step 2, the change in F indicated that the new model had a better fit than the

model including only age, sex, and “trust and communication” at time 1, $\Delta F_{2,603}=3.39$, $p=.034$, accounting for an additional 1% of the variance. The new model indicates that having low levels of prior “trust and communication”, and playing online games (trend level prediction) predict decreases in communication one year later, $F_{5,603}=40.17$, $p<.001$.

Similarly, for “intimacy and companionship”, the model at step 1 was significant, $F_{3,606}=43.22$, $p<.001$. The model was also significant at step 2 $F_{5,604}=27.09$, $p<.001$, accounting for an additional 1% of the variance. The change in F indicated that the new model including entertainment activities was a slightly better fit than the model including only age, sex, and prior “intimacy and companionship”, $\Delta F_{2,604}=2.56$, $p=.079$. The new model indicates that being a boy, having low levels of prior “intimacy and companionship”, and using the internet for general entertainment predicted decreases in “intimacy and companionship” one year later.

Table 7

Romantic Relationship Quality as predicted by internet entertainment activities

	Model Adjusted R ²	Standardized Coefficient Beta	S.E.	T
Conflict Alienation	.10			
Age		-.10 *	.04	-2.57
Sex		-.04	.07	-.87
Conflict/Alienation T1		.29 **	.04	7.47
General entertainment		.04	.08	1.14
Online games		-.03	.09	-.76
Commitment	.13 ⁺			
Age		.07 +	.05	1.76
Sex		.03	.10	.83
Commitment T1		.33 **	.04	8.68
General entertainment		-.07 +	.11	-1.76
Online games		-.08 *	.13	-2.01
Trust and Communication	.24*			
Age		.07 +	.05	1.79
Sex		.03	.09	.79
Trust & Communication T1		.47 **	.04	13.12
General entertainment		-0.6	.10	-1.61
Online games		-.07 +	.12	-1.87
Intimacy and Companionship	.18 ⁺			
Age		.14 **	.04	3.70
Sex		.09 *	.08	2.40
Intimacy & Companionship T1		.37 **	.04	10.03
General entertainment		-.08 *	.08	-2.26
Online games		.01	.10	.17

⁺p<0.10 *p<0.05 **p<0.01

Discussion

The aim of this study was to determine whether different internet-based activities predicted differences in the close social relationships in adolescence, namely best friendships and romantic relationships. We hypothesized that using the internet to communicate with known-others (i.e., instant messaging) would be associated with increases in romantic relationship and best friendship quality, consistent with the stimulation hypothesis. Consistent with the reduction hypothesis, we suggested that using the internet to communicate with strangers (i.e., chat rooms) and for entertainment (i.e., general entertainment and games) would be associated with reductions in romantic relationship and best friendship quality. Our results supported these hypotheses. See summary table (Table 8). Our findings are particularly interesting given that they were noted in one direction only. In other words, internet use at Time 1 predicted relationship quality at Time 2 but relationship quality at Time 1 did not predict internet use at Time 2. Such directionality in our regression analyses suggests that internet activity choices precede changes in relationship quality.

Table 8

Summary of the direction of relationships between internet activities and relationship quality variables.

	Best Friendship				Romantic Relationship			
	ICQ	Chat	Entertainment	Game	ICQ	Chat	Entertainment	Game
Conflict & Alienation (reverse coded)		-						
Commitment	+		-		+		-	-
Trust & Communication	+				+			-
Intimacy & Companionship	+	-	-		+		-	

Consistent with the stimulation hypothesis, we found that using instant messaging (ICQ), and therefore using the internet to communicate with known-others, predicted increases in most aspects of best-friendship and romantic relationship quality. These findings replicate others that indicate better relationship quality for those adolescents who use instant messaging to communicate with friends compared to those who do not (Valkenburg & Peter, 2007). Instant messaging allows for more opportunities to communicate with known-others than does the telephone, due to the possibility of multiple

simultaneous private conversations. It also allows for more intimate self-disclosure because of the removal of physical aspects of communication (Joinson, A.N., 2001; McKenna & Bargh, 2000). Together, these two features of instant messaging are likely agents of positive changes in best friendship and romantic relationship quality. Adolescents who use instant messaging reported increased commitment, “intimacy and companionship”, and “trust and communication” one year later, over and above the amount of commitment, “intimacy and companionship”, and “trust and communication” reported in the first phase of the study. These findings are particularly striking because they are consistent across best friendships and romantic relationships.

Interestingly, reports of using instant messaging did not have an association with “alienation and conflict” within best friendships or romantic relationships. Although spending time communicating with close others is associated with improvements in the positive aspects of their relationships, it does not seem to predict negative aspects of these relationships. This finding is not very surprising given that adolescents use instant messaging to contact those that they are close to (e.g., Subrahmanyam, Smahel, & Greenfield, 2006). They are therefore more likely to use instant messaging to connect positively with their best friends or romantic partners and not to engage in conversations that would somehow strain the relationship or alienate the adolescent from his or her best friend or romantic partner. In addition, it is unlikely that adolescents who communicate with friends online feel alienated from their friends as they use multiple means (e.g., online and face-to-face) to communicate with them on a fairly regular basis. Due to the multiple means of communication, best friends and romantic partners are more likely to feel changes in positive qualities as opposed to changes in “alienation and conflict”. Therefore,

communication on the internet through instant messaging appears to play a role in the maintenance or improvement of the positive aspects of best friendships or romantic relationships (e.g., “trust and communication”) but is not associated with “alienation and conflict” status within these relationships.

Conversely, we found that visiting chat rooms was related to increased “alienation and conflict” and decreased “intimacy and companionship” within best friendships. This finding supports the reduction hypothesis. Visiting chat rooms represents a means of communicating mostly with strangers in a public forum, as opposed to communicating with known-others like best friends in a private instant messaging forum (Gross, 2004). Using chat rooms may displace the amount of time adolescents will spend using instant messaging to communicate with their best friendships and also the amount of time they spend doing enjoyable things together (as is reflected in the items of the “intimacy and companionship” scale). However, as most adolescents multi-task while on the internet and combine multiple conversations with multiple individuals at one time (Gross, 2004; Lenhart, Rainie, & Lewis, 2001), it is more probable that chat rooms are serving to create relationships with strangers that may in some way create tension in the best friendship. Because chat rooms are structured differently than instant messaging, adolescents using that technology may present themselves in different ways when communicating in chat rooms than in instant messaging (e.g., Bayraktar & Gun, 2007; Subrahmanyam, Smahel, & Greenfield, 2006). These differences in presentations may be associated with strain in the best friendship. In addition, the increased ambiguity, and accompanying anonymity associated with computer-mediated communication, can most often result in increases in positive feelings and liking towards the person with which an individual is communicating

(Tidwell & Walther, 2002). Adolescents who visit chat rooms may feel more drawn to communicate with strangers that appear more “likeable” than their best friends who have evident flaws in face-to-face interactions. Choosing to communicate through chat rooms with these strangers may therefore be related to tension in the best friendship, be associated with less enjoyable time spent together, and be associated with increases in feelings of “alienation and conflict” within those friendships over time.

Our hypothesis that entertainment activities would have a negative relationship with relationship quality was supported. Using the internet for general entertainment reflected declines in levels of commitment and “intimacy and companionship” within best friendships and romantic relationships. Similarly, using the internet to play games was associated with subsequent decreases in romantic relationship commitment and “trust and communication”. These declines support the reduction hypothesis. Using the internet for general entertainment and gaming might displace the types of activities that serve to maintain and improve healthy relationships, as noted by Kraut et. al. (1998). Research confirms that video game play can fulfill some of the needs that are otherwise met through friendships, such as companionship, and therefore reduce the need for socialization with friends to obtain companionship (e.g., Colwell & Kato, 2003). Also, because the terms “general entertainment” and “online games” were non-specific, adolescents who endorsed these items may in fact be engaging in antisocial forms of entertainment (e.g., visiting hate web-sites, playing violent video games, gambling, etc.) that may foster the development of aggression as opposed to the skills necessary for the maintenance of healthy best friendships and romantic partnerships (e.g., Colwell & Payne, 2000). The strength in these findings is reflected in the fact that they are consistent across both types of relationships.

Sex of the participant was entered as a control variable in our analyses. In many analyses, it played a significant role in predicting the outcome variable, and may therefore have a more important role in the reduction and stimulation hypotheses than we previously considered. Early studies noted that girls spent more time socializing on the internet than did boys (Kraut et al., 1998). However, later studies report that the sex gap has narrowed and that, currently, boys and girls communicate online with the same frequency (Gross, 2004). Nevertheless, the importance that is placed on internet-based communication may vary by sex. In other words, although boys and girls seem to communicate with friends at the same rate, this online communication may serve a different function for girls compared to boys as reflected in the greater amounts of intimacy reported in female friendships (Aukett, Ritchie, and Mill, 1988; Blyth & Foster-Clark, 1987). For example, if girls place more importance on their relationships than do boys, they may be more likely to see internet-based communication as a supplement to other types of communication which helps to maintain this highly valued aspect of their lives. The increased use of internet-based communication such as instant messaging may then lead to increased levels of relationship quality.

Other researchers have found support for “rich get richer” phenomena over the internet (Valkenburg & Peter, 2007). Because girls already report higher levels of relationship quality than do boys (Claes & Poirier, 1993), the internet likely adds to this quality and allows for girls to further expand on their socialization, thus increasing their relationship quality even further. Perhaps girls are not more likely to use the internet to maintain friendships but are more likely to benefit from the positive effects internet

communication has on their relationships than are boys. Further investigation into this issue is warranted.

While previous research indicates that the internet, overall, serves either stimulation or reduction purposes, our findings suggest that different activities on the internet may serve different functions. Our results support early research findings suggesting that the internet can play a role in reducing social contact and contribute to isolation (Kraut et al., 1998) but also later findings suggesting that the internet can contribute to improvements in positive relationship qualities (e.g., Valkenburg & Peter, 2007). The relationships among these variables are only noted when internet activities are used to predict relationship quality. Initial relationship quality did not predict subsequent changes in internet activity choices, which suggests that internet activity choices contribute somewhat to subsequent changes in relationship quality. These findings are particularly remarkable as they indicate changes in relationship quality over and above the level of quality reported in the first year of our study. Although small, the changes found in our analyses represent significant increases or decreases that are related to using the internet either to communicate with strangers or known others, or for entertainment.

Limitations and implications for future research

This study is not without limitations. There were some significant differences between adolescents who were dating and those who were not dating. Namely, daters endorsed significantly higher levels of “trust and communication”, commitment, and “intimacy and companionship” within their best friendships than did non-daters. Adolescents who were dating were also on average three months older than those who

were not dating. Thus, the dating adolescents may have had greater time to develop these qualities or may be more skilled within their best friendships. Daters also may have experienced a greater level of best friendship quality when involved in romantic relationship because of the differential values present within their heterosexual relationships. Also, daters in the study may have changed dating partners between Time 1 and Time 2. It therefore may have been useful to study only those adolescents who were involved in the same relationship between Time 1 and Time 2. However, the number of romantic relationships that remained stable over the course of the year is very small, because of the unstable nature of adolescent dating relationships (Brown, Feiring, & Furman, 1999). An analysis of only those relationships would severely limit our ability to identify the subtle influence of internet use.

Our data was collected through single-source self-report questionnaires. Without other sources to corroborate the responses, it is difficult to determine the validity of the responses given by the adolescents themselves. Although information from other sources may have proven helpful, our study was primarily concerned with aspects of adolescents' life (i.e., activities online and perceived relationship quality) that are largely subjective and personal.

The list of internet-based activities presented in our questionnaire was quite limited. The aim of the original study was not to study internet media specifically and therefore did not include an exhaustive list of possible internet activities. Nevertheless, the activities that were included did represent the most commonly listed activities by North American adolescents at the time (Media Awareness Network, 2001). In addition, the inclusion of ICQ at the expense of all other forms of instant messaging may represent a limitation.

However, ICQ was the first popular instant messaging system (Descy, 2007). In 2001, the time our study was conducted, ICQ itself was described as being more popular than email for many students (Leung, 2001). Our sample therefore captured the majority of students who used instant messaging technology. Finally, it was impossible to ensure that adolescents who endorsed using ICQ were using this technology to chat with known-others while adolescents who endorsed visiting chat rooms were doing so to chat with strangers. However, research suggests that conversations that occur in chat rooms primarily involve strangers (Subrahmanyam, Smahel, & Greenfield, 2006), whereas adolescents use instant messaging to communicate with known-others (Gross, 2004). It is important to note that internet technology is evolving at such a rapid pace, and that technologies available to adolescents are constantly changing. This rapid change therefore limits the generalizability of our findings to today's youth. It is important to conduct ongoing research to examine the functions of these trends. We are presently conducting ongoing studies to examine more specific and current forms of internet use to determine the relative importance of internet activities on social functioning.

Although many longitudinal relationships were identified between internet activities and relationship quality variables, the amount of variance accounted for by our internet variables was modest. Significant predictions accounted for as little as 1% of the variance. Therefore, the findings do not indicate dramatic changes in social adjustment over the course of one year. However, such subtle social changes in variance may be practically and theoretically important. As indicated by Lansford, Criss, Pettit, Dodge, and Bates (2003), small variance in regression models may still represent important findings, given the nature of regression analyses. Also, this study was conducted over the course of

one year, a time span that may be too long to capture more dramatic effects that may exist, particularly as technology evolves so quickly and as adolescent romantic relationships tend to be short-term (Brown, Feiring, & Furman, 1999). Nonetheless, subtle changes in the quality of one's salient relationships may exert changes in other areas of adolescent development. What is especially interesting about these findings is that they are unidirectional. The opposite model – does relationship quality affect internet activity choices one year later? – was not significant. Therefore, our conclusions that internet activity choices impact relationship quality, and do so in a consistent fashion across relationships, are further strengthened. Because adolescents develop in complex social worlds, their social development is certainly influenced by an infinite number of variables. Our findings have identified some of those factors that are either harmful or beneficial to adolescent social development.

Finally, some of the associations observed within the present study may be affected by individual differences. In future work on the internet and adolescent social adjustment, researchers may want to examine the association between online activity and relationship quality from a person-oriented approach to examine the heterogeneity among adolescents in the impact of internet use. As proposed by Bergman and Magnusson (1997), an approach that focuses on patterns of individual characteristics as opposed to single variables may be more appropriate to research that seeks to identify the processes involved in individual functioning, such as the internet communication and overall social adjustment. However, our study is unique in that we capture the effects of internet activities on Canadian adolescents from diverse environments that reflect the Canadian population specifically.

Conclusion

With this study, we examined the longitudinal association between internet activity choices and relationship quality over a one-year period in Canadian adolescents. Internet activity choice predicted later relationship quality in both best friendships and romantic relationships. Although instant messaging (ICQ) was positively associated with most aspects of romantic relationship and best friendship quality, visiting chat rooms and entertainment activities were either not related or negatively related to best friendship quality and to romantic relationship quality. These findings reflect the important function of online socializing for the development and maintenance of salient relationships in adolescence. The internet is now a significant aspect of the educational, social, and recreational experiences of adolescents. From a developmental perspective, there is still much to be learned about the impact of internet activities on the social adjustment and relationship qualities of adolescents.

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Forward to Chapter 3

Chapter 3 consists of a manuscript that will be submitted for publication. Chapter 3 adheres to APA format. My supervisor, Dr. Wendy Craig, assisted in all aspects of the research and in the preparation of the manuscript and she appears as a co-author on the manuscript.

Chapter 3:

Running head: INTERNET FRIENDSHIPS

Friend or foe:

The negative outcomes associated with internet based friendships.

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Abstract

While many adolescents socialize with pre-established friends on the internet, some of them meet strangers online, and others will go on to form close friendships with these strangers. This study examined the differences between adolescents who form close online friendships and those who do not. Data from 676 students in a Canadian high school on measures of peer group characteristics (i.e., size and closeness), social sensitivity (i.e., social anxiety and rejection sensitivity), bullying and victimization, and quality of life (i.e., satisfaction with wellbeing, social belonging, and self-betterment) were examined using multivariate analysis of variance (MANOVA). Results indicate that although students with online friends report having more friends than those without online friends, they also have fewer face-to-face friends than do those without online friends. For middle-adolescents, having online friends is associated with higher levels of social anxiety and rejection sensitivity than not having online friends. Having online friends is also associated with more frequent and more pervasive experiences of bullying and victimization than not having online friends. Adolescents who seek online friends may be more isolated and at risk for other psychosocial difficulties. No differences in quality of life were observed.

Friend or foe: The negative outcomes associated with internet-based friendships

In adolescence, internet use has become commonplace. Although the internet is sought out by adolescents to play games, listen to music, or gather information for school work, socializing is one of the primary reasons for going online (Lenhart, Rainie, & Lewis, 2001; Media Awareness Network, 2005). Specifically, most adolescents use the internet to socialize with pre-established friends, or known others (Gross, 2004; Valkenburg & Peter, 2007). A fairly large proportion of adolescents, however, make contact with strangers, and approximately 20% of adolescent internet users report that contacts with strangers evolve into close friendships (Wolak, Mitchell, & Finkelhor, 2003). Despite the large number of young people who report forming close friendships online, little research examines the differences between those youth who meet close friends on the internet and those who do not. Specifically, factors that may initially motivate adolescents to seek online friendships, such as problems within their face-to-face peer group (i.e., low number of friends, low closeness of friendships, and the presence of bullying and/or victimization) have not been investigated. The differences in social sensitivities associated with problematic peer groups (i.e., rejection sensitivity and social anxiety) between adolescents who make online friends and those who do not also are unknown. Finally, whether internet friendships compensate for quality of life losses that would occur without the formation of such friendships remains unclear. The purpose of this paper is to identify differences in the face-to-face peer group characteristics, individual social sensitivities, and quality of life between those who have online friends and those who do not. This examination will provide further information about the riskiness of forming close friendships online.

Previous research on internet friendships

There are many individual and peer group factors that may differentiate those adolescents who seek online friendships and those that do not. Current research on internet-based friendships identified personality factors that lead to online friendship formation, such as introversion and extroversion (Peter, Valkenburg, & Schouten, 2005), and the differences between online and face-to-face friendships in terms of quality and development (Chan & Cheng, 2004). For example, internet-based friendships have been described as lower quality friendships (Chan & Cheng 2004), and as friendships that are less close (Mesch & Talmud, 2007) than face-to-face friendships. Parks and Roberts (1998) noted that online friendships are less well-developed than are face-to-face friends. Finally, levels of similarity between online friends are lower than those between face-to-face friends (Mesch & Talmud, 2007). The general consensus in the research is that although the internet provides opportunities for intimate sharing of personal information (McKenna, Green, & Gleason, 2002), and for projecting likeable qualities onto others (Bargh, McKenna, & Fitzsimons, 2002), friendships that are formed on the internet generally are less developed and of lower quality than face-to-face relationships.

What is more concerning than the general low quality of internet relationships is that adolescents who form internet-based friendships may do so at the expense of potentially higher quality face-to-face friendships. This proposition is summarized in *reduction theory* (e.g., Locke, 1998) which suggests that internet communication largely reduces the quality and size of one's social support network by both displacing beneficial face-to-face social interaction and by creating lower quality contacts online. Consequently, individuals with internet-based friendships may be at higher risk for psycho-social

difficulties compared to those who do not form internet-based friendships. In fact, a study by Wolak, Mitchell, and Finkelhor (2003) noted that students who form online friendships are more “troubled” than those who do not. They report higher levels of conflict with parents for girls, and lower levels of communication with parents for boys, than adolescents without online friends. Based on this only study investigating differences in adolescents who form online friendships and those who do not, online friendship formation is associated with negative factors in adolescent life.

Despite these findings, some investigators have argued that forming online friendships may serve a positive function for many individuals, particularly socially isolated youth. McKenna and Bargh (1998) noted that youth who belong to otherwise marginalized groups, such as gay, lesbian, bisexual, and transsexual youth (GLBT) are able to find valuable social support on the internet, support that would not be available in face-to-face contexts. Such findings suggest that forming friendships on the internet may act as a protective factor for isolated youth. The idea that the internet may promote social support is reflected by *stimulation theory* (McKenna, Green, & Gleason, 2002). Proponents of stimulation theory propose that the internet actually serves to stimulate social support by expanding the number of available peers and by leading to feelings of closeness and intimacy between communication partners (Hu, Wood, Smith, & Westbrook, 2004, Valkenburg & Peter, 2007). Therefore, although some research suggests that having online friends is associated with negative factors, supporting reduction theory, some research proposes that having internet-based friends may be protective for at-risk youth, supporting stimulation theory. In this case, the quality of life of marginalized youth may be higher than it otherwise would be without the presence of online friends. In other words, isolated

youth may not be able to sustain good quality friendships in face-to-face contexts for various reasons, and online friendships provide an otherwise lacking source of social support even if it is of lower quality. In this way, having online friends may allow them to fulfill important social-developmental tasks that they otherwise would not be able to accomplish as isolated youth (McKenna & Bargh, 1998).

Peer Group Development

Whether it represents a negative or positive aspect of their lives, it is not surprising that adolescents turn to the internet to socialize with one another. Some of the most important developmental tasks in adolescence are the expansion of social networks into crowds and cliques (e.g., Brown, 1990; Dunphy, 1963), and the move away from the family of origin as the primary agent of socialization towards the newly expanded peer group (e.g., Berndt, 1982; Csikszentmihalyi, Larson, & Prescott, 1977). Adolescents are likely to turn to the internet to fulfill the important developmental tasks of peer group expansion and moving towards peers as important social influences. Any adolescent internet user can expand their social support network by visiting chat rooms, message boards, or other social networking applications, and by developing friendships with strangers (Gross, 2004). They also can use email and instant messaging to feel closer to their pre-existing friends (Valkenburg & Peter, 2007) in addition to increasing several aspects of friendships quality with their pre-existing contacts (Blais, Craig, Pepler, & Connolly, 2008).

The attraction towards online socialization may be particularly strong for adolescents who experience problematic peer group relationships in real-world contexts.

They may be more likely turn to the internet in order to fulfill some of the important developmental tasks of adolescence than adolescents who have relatively problem-free peer relationships. For example, students who are marginalized by their peer group may seek to expand their social support network online more so than in face-to-face contexts (McKenna & Bargh, 1998). Similarly, adolescents who do not feel close to their face-to-face friends or who have limited social support networks in terms of numbers may be more likely than those with more elaborate social support networks to seek friendships online, where there are greater likelihoods of finding similar peers (Jensen, Davis, & Farnham, 2002) and of being liked by their communication partners (Bargh, McKenna, & Fitzsimons, 2002). In these ways, internet-based interactions may serve to replace social contact that is otherwise lacking, and may suggest that adolescents who make online friends are experiencing difficulties in their face-to-face peer groups.

Bullying and Victimization

In addition to seeking out internet-based friendships due to restricted social support networks or limited closeness, adolescents who experience particularly problematic peer relationships as a result of bullying or victimization also may be drawn to the internet to form new friendships, for similar reasons. Bullying research to date identifies social isolation and marginalization as some peer group characteristics that serve as risk factors for engaging in bullying behaviour and for being victimized by bullying (Olweus, 1993; Perry, Kusel & Perry, 1988). To the extent that bullying and victimization interfere with feelings of social support within a cohesive peer group, students who experience frequent bullying and victimization may be motivated to seek social support outside of their normative face-to-face peer group. Those students with pervasive (e.g., experienced across

multiple contexts) and frequent bullying experiences may seek out internet friendships in order to compensate for the otherwise lacking social relationships.

Social sensitivity

Clearly, problematic peer relationships as characterized by bullying and victimization, limited friendships, and low levels of intimacy may motivate adolescents to socialize online. Personal characteristics, such as social anxiety and rejection sensitivity also are associated with feelings of social isolation, and problematic peer relationships (Ayduk, Mendoza-Denton, Mischel, Downey, Peak, & Rodriguez, 2000; LaGreca & Lopez, 1998; Purdie & Downey, 2000; Vernberg, Abwender, Ewell, & Beery, 1992) and may play a role in motivating students to seek internet-based friendships. On the individual level, adolescents who are particularly socially sensitive may be more likely to seek seemingly safer friendships on the internet. For the purpose of this paper, we define social sensitivities as those factors that are involved in an inaccurate perception of social situations and contribute to poor social relationships, including social anxiety and rejection sensitivity. One of the defining features of social anxiety is the fear that one will make a mistake and be criticized (Miller, Barrett, Hampe & Noble, 1972). Feelings of social anxiety limit an adolescent's willingness to interact with others or their comfort in engaging in face-to-face communication for fear of such social evaluation (Rubin, LeMare & Lollis, 1990). Those with social anxiety find some aspects of the internet particularly appealing and use the internet to chat with strangers (Madell & Muncer, 2006). Although socially anxious individuals are not necessarily more likely to use the internet to socialize with known-others than those who are not socially anxious people (Madell & Muncer, 2006), it is possible that the formation of close friendships with strangers on the internet is

particularly appealing to this group. It has been suggested that socially anxious adults may be more likely to form online relationships (McKenna & Bargh, 1999). This finding is supported by reports that individuals are better able to be their “true selves” online compared to face-to-face interactions (Bargh, McKenna, & Fitzsimons, 2002). There may therefore be a higher proportion of socially-anxious individuals amongst those adolescents who include internet-based friendships in their group of close friends. It also is important to consider that students who experience problematic peer group relationships due to victimization also are at higher risk of being socially anxious (e.g., Craig, 1998). As a result of being socially anxious, they may not confront those who bully them which will reinforce both their isolation from their peer group and their need for affiliation on the internet.

Related to social anxiety is the concept of rejection sensitivity: the tendency to “defensively expect, readily perceive, and overreact to rejection” (Downey & Feldman, 1996). A particularly unique aspect of rejection sensitivity is the fact that ambiguity increases the likelihood that the individual will feel rejected (Downey & Feldman, 1996). The arms-length nature of online communication may lead adolescents who are rejection sensitive to perceive it as less intimidating and therefore feel more comfortable on the internet and to seek out internet-based contacts. The internet however, lacks many social cues that facilitate interpersonal communication such as body language and tone of voice (e.g., Parks & Floyd, 1996). With almost purely text-based communication, internet contact is by nature more ambiguous than face-to-face contact. This feature of the internet may give adolescent who have online friends increased opportunities to interpret rejection and thus may be associated with heightened levels of rejection sensitivity in adolescents.

In summary, difficulties within one's peer group such as social isolation and bullying and victimization, and related personal social sensitivities such as social anxiety and rejection sensitivity, may lead adolescents to seek out and form internet friendships. Similarly, and according to reduction theory, these friendships may lead to increased levels of social difficulties and sensitivities. The function of online friendships is unclear. Although the reduction hypothesis supposes that internet-based friendships would displace good quality face-to-face friendships and therefore lead to negative outcomes, the stimulation theory suggests that these friendships serve a positive function in adolescent lives. Whether internet-based friendships are associated with positive or negative outcomes in relationships, the impact of that influence is also important. Generally speaking, impact on adolescent life can be assessed through measures of quality of life or general well-being (e.g., Goodman, Ford, Richards, Gatward, & Meltzer, 2000). An examination of quality of life in terms of general well-being, social belonging, and self-betterment in the context of adolescent online friendship formation will therefore serve as an indicator of the overall impact such friendships have on adolescent development.

Quality of Life and Social Belonging

The internet has been suggested to provide an alternate venue for forming friendships when an individual otherwise experiences interpersonal difficulties, social isolation, or marginalization (McKenna & Bargh, 2000). Whereas one's general sense of well being, social belonging, or satisfaction with self-betterment may suffer in the presence of social difficulties, making internet-based friends may serve as a positive factor in an otherwise difficult social environment. Having internet-based friends may serve to increase adolescents' sense of well-being and self-betterment. Similarly, having online friends,

despite the documented lower quality of these friendships (Chan & Cheng, 2004) may allow for increases in one's sense of satisfaction with social belonging as a result of the higher levels of liking which are often reported in describing online interaction partners (Bargh, McKenna, & Fitzsimons, 2002). In other words, seeking and making close friendships on the internet may be a way for adolescents to compensate for otherwise problematic socialization (as defined by either peer group difficulties, bullying and victimization, or social sensitivities) and experience positive quality of life.

Hypotheses

Based on current literature, we hypothesize that adolescents with online friends will be socially isolated (i.e., have fewer face-to-face friends) but will have more friends overall, due to the larger pool of available peers. We predict that those with online friends will also demonstrate peer group difficulties by reporting lower levels of friendship closeness than those without online friends. Similarly, we predict that adolescents who have online friends will have higher levels of peer group difficulties as demonstrated by more frequent and more pervasive bullying and victimization than those without online friends. Adolescents with online friends are predicted to have higher levels of social anxiety and rejection sensitivity than those without online friends. Finally, based on stimulation theory which suggests that internet contacts may serve to compensate for many subjective feelings of marginalization and isolation, we predict that adolescents with internet-based friendships will have higher levels of well-being, social belonging and self-betterment than those without online friends. In summary, based on previous research and on postulates made by the reduction and stimulation theories, we hypothesize that having internet-based friendships will be associated with many negative psycho-social factors but

with higher subjective ratings of quality of life (as determined by satisfaction with many aspects of their lives).

Method

Procedure

Data were collected in the Fall of 2005 as part of a larger study designed to identify the relationship between adolescent internet use and various psycho-social factors. Letters of information and consent forms were sent to the parents or guardians of each student enrolled in a large Canadian high school. Students who obtained parental consent, and who gave independent assent by completing the questionnaire were included as participants. Under the supervision of their teachers, and trained research assistants, students completed questionnaires in their classrooms during regular class time.

Sample

Overall, 676 students participated in our study, including 328 boys and 311 girls, with 37 students not indicating their sex. Because sex was entered into our analyses, we excluded those students who did not indicate their sex. Multivariate analysis of variance indicated that there were no differences between students who did not indicate their sex and those who did on all key variables, $p > 0.05$. Students ranged from 13 to 18 years old ($M = 15$, $SD = 1$) and were in grades 9 to 12. The ethnic composition of the sample is comparable to the ethnic composition described in the 2001 Canadian census data (Statistics Canada, 2003). The sample comprised: 86% European-Canadian (White); 5% Asian-Canadian; 2% African/Caribbean-Canadian; 2% Native-Canadian; 1% South-Asian Canadian; 1% Latin American-Canadian; and 4% other.

Measures

Peer Group Characteristics.

The Focus on You questionnaire (Connolly & Konarski, 1994) was used to collect demographic information about each participant. Adolescents indicated their age, ethnic origin, sex, and grade level.

The internet Activity and Peer Questionnaire (Blais & Craig, unpublished) is an adaptation of the *Peer Relations Questionnaire* (Connolly & Konarski, 1994), and was developed for this study to assess adolescent peer environments in a way that includes face-to-face, telephone, and internet-based contacts. Adolescents were asked to list their best friend, romantic partner, and up to 10 more of their closest friends either by given name or by screen name in addition to indicating each friend's age and sex. Participants also indicated whether they met each friend online, on the telephone, or in person. Those who indicated having met at least one of their listed close friends on the internet initially (and not in person or on the telephone), were included in the group of participants who have internet-based friendships. On a scale of 0 to 4 where 0 meant "not at all close", 2 meant "somewhat close", and 4 meant "very close" students indicated how close they determined each of their listed closed friendships to be. Average closeness ratings, incorporating each listed friend were computed for each participant. In our sample, overall friendship closeness ratings ranged from 0 to 4 with a mean of 3.0 and a standard deviation of 0.60.

Bullying and Victimization

The Bullying Questionnaire (Hymel, Ishiyama, & White, 2003) was first used in the Cybernet study on bullying and victimization. It was designed to measure bullying behaviours and victimization. The scale was used to assess bullying and victimization frequency and pervasiveness. In terms of frequency, students indicated how often they perpetrated and were victims of bullying in general on a 4-point scale from “never” to “several times a week” during the course of the school term. Students also indicated whether or not they perpetrated and/or were the victims of 6 bullying behaviours: physical but intended as a joke, physical not intended as a joke, bullying by property, verbal bullying, social bullying, and bullying on the internet. For the purpose of this study, we measured the pervasiveness of bullying experiences by summing the different modes of bullying or victimization reported by the respondent at least once during the school term. Higher scores indicate being involved in more types of bullying.

Social sensitivity

The Social Anxiety Scale – Adolescent Version (LaGreca & Lopez, 1998) is comprised of 18 items to assess symptoms of social anxiety in adolescents, and 4 filler items. Items were rated on a 5-point scale where 1 indicated that the item is “not at all true for you” and 5 indicated “true for you all the time”. Total social anxiety scores range from 18 to 90. In our sample, scale reliabilities as measured by Cronbach’s alpha was satisfactory (0 .92).

The Rejection Sensitivity Questionnaire – Short Form (Downey & Feldman, 1996) was developed to assess the level of rejection inferred by adults in ambiguous social

situations. The measure is composed of 8 items which present a scenario and asks participants to respond on a 6-point scale how concerned they would be in the situation and how likely they would expect the hypothetical person to react positively in the situation. In order to accommodate secondary school sample, a small alteration to one of the items was undertaken in order to make all items relevant to the secondary school student's experience. Specifically, item #3: "After graduation, you can't find a job and ask your parents if you can live at home for a while", was altered to "You ask your parents to borrow a large sum of money to buy something that is very important to you". In this way, the underlying construct (i.e., asking parents for an important favour) was maintained while the presentation of that construct was more appropriate to the age group (which included 14 year olds which may not yet be able to consider post-graduation experiences). Cronbach's alpha indicated a reliability of 0.80.

Quality of Life

A 36-item shortened version of the *Quality of Life Profile: Adolescent Version* (QOLPAV, Raphael, Rukholm, Brown, Hill-Bailey, & Donato, 1996) assessed quality of life as measured by satisfaction with three different domains: Being (well-being), Belonging, and Becoming (ambition) in adolescents. With 18 items, the well-being scale (Being) assesses quality of life related to physical (e.g., "My physical health"), psychological (e.g., "Being free of worry and stress"), and spiritual (e.g., "Feeling that life has meaning") aspects of the adolescent's life. For Belonging, the 3 areas of assessment include physical belonging (e.g., "the neighbourhood I live in"), social (e.g., "The friends I have"), and community (e.g., "having places to go with my friends"). The three areas assessed by the Becoming scale include practical (e.g., "the work I do at a job while still in

school”), leisure (e.g., “visiting and spending time with others), and growth (e.g., “learning about new things”). Adolescents indicate how important each of the 54 items is to them and then how satisfied they are in each of the 54 areas of their lives on 5 point-scales. Difference scores were computed and standardized using a procedure outlined by the authors of the scale (Raphael, Rukholm, Brown, Hill-Bailey, & Donato, 1996). Scores can range from -3.33 to 3.33, with negative scores indicating negative quality of life and positive scores indicating positive quality of life. Reliability for the overall being, belonging, and becoming subscales in this sample, as measured by Cronbach’s Alpha, was satisfactory: 0.83, 0.83, and 0.83 respectively.

Results

Group formation

Two groups were formed: Those who reported having online friendships and those who did not. Of the students who completed the internet Activity and Peer questionnaire (635 students), 20% of students (126) indicated having at least one close friend that they first met online. A z-test for proportion determined that there was a significantly higher proportion of girls (21%) that indicated having met at least one close friend on the internet than the proportion of boys (17%). We therefore included sex in the analyses to ensure that sex differences were captured.

Multivariate analyses of variance (MANOVA) were used to identify differences associated with having at least one close online friend. In each analysis, having met at least one close friend online, sex, and age group (up to 14 years old, 15 years old, and 16 years of age and up) were entered as independent variables. Four MANOVAs were run on the

following dependent variables: 1) peer group characteristics (i.e., average closeness rating of friends, number of friendships listed); 2) bullying and victimization (i.e., pervasiveness and frequency); 3) individual ratings associated with social sensitivity (i.e., social anxiety and rejection sensitivity); 4) quality of life (overall wellbeing, social belonging, and self-betterment).

Peer Group Characteristics

Significant multivariate effects were noted for having online friends $F_{3,558}=193.18$, $p<.01$, age group $F_{6,1118}=217$, $p<.05$, and sex, $F_{3,558}=36.43$, $p<.01$. In addition, a significant three-way interaction (having online friends X age group X sex) had a multivariate effect on our dependent variables, $F_{6,1118}=2.95$, $p<.01$. Tests of between-subject effects indicated that the interaction had no significant effect on outcome variables. However, significant differences based on having online friends were noted in terms of the number of face-to-face friends, $F_{1,571}=87.87$, $p<.01$, and the total number of friends, $F_{1,571}=74.79$, $p<.01$. Trend-level significant differences were noted for having online friends on average ratings of friendship closeness, $F_{1,571}=1.16$, $p=.06$.

Adolescents who listed close online friends had fewer face-to-face friends ($M=7$) than those who did not list close online friends ($M=8$). In contrast, those with online friends reported having more friends overall ($M=9$) than those without close online friends ($M=8$). Finally, participants with online friends rated their entire peer group as less close ($M=2.9$) than those without online friends ($M=3.0$).

A paired-sample t -test was conducted only with the 126 students who indicated having internet-based friends to determine whether those with online friends evaluated

their online friends as being closer than face-to-face friends. Students with online friends indicated being less close to their online friends ($M=2.6$, $SD=.88$) than to their face-to-face friends ($M=3.0$, $SD=0.51$), $t_{106}=-4.48$, $p<.001$.

Bullying and victimization. For bullying pervasiveness, a significant main effect was found for having online friends ($F_{2,584}=3.30$, $p=.04$). A 3-way interaction between sex, age group, and having online friends was found to have a trend-level significance ($F_{2,1170}=4.00$, $p=.08$). An investigation of between-subjects effects indicated that the 3-way interaction did not have an impact on the dependent variables. Having online friends exerted a significant effect on the number of ways the participant bullies others ($F_{1,1104}=4.52$, $p=.03$) and on the number of ways the participant is victimized by others ($F_{1,1104}=4.44$, $p=.02$). Participants who reported having online friends indicated bullying others using more means overall (e.g., physical, verbal, etc.) ($M=2.2$) than those who did not have online friends ($M=1.8$). Similarly, those who reported having online friends indicate being victimized by more means ($M=2.5$) than those who do not have online friends (2.1).

For bullying frequency, a significant main effect was found for sex ($F_{2,754}=6.66$, $p<.01$), age group ($F_{4,575}=2.78$, $p<0.05$), and having online friends ($F_{2,575}=5.22$, $p<.01$). No significant interactions were noted. The effect of gender only was evident on bullying others ($F_{2,575}=13.34$, $p<.01$). Similarly, the effect of age group was only evident on bullying others ($F_{2,575}=1.36$, $p<.05$). Having online friends had a significant effect on both victimization frequency ($F_{2,575}=4.30$, $p<.01$) and bullying frequency ($F_{2,575}=2.32$, $p<.05$).

Boys ($M=1.8$) indicated bullying others more frequently than did girls ($M=1.5$). Adolescents in the middle age category (15-year olds) ($M=1.7$) bullied others more frequently than those over 15-years old ($M=1.6$) and those under 15 ($M=1.4$). Participants who reported having online friends ($M=1.8$) reported being victimized more often than those who did not have online friends ($M=1.6$). Similarly, those with online friends ($M=1.7$) reported bullying others more often than those without online friends ($M=1.5$).

Individual Characteristics associated with having close online friends

Social Sensitivity Ratings. A significant 2-way interaction between age group and having online friends was found ($F_{4,1104}=1.01, p<.01$) for social anxiety ($F_{2,1104}=6.17, p<.01$). A trend level effect of the same interaction was noted for mean rejection sensitivity ($F_{2,1104}=6.05, p=.09$). Post hoc analyses on the interactions indicated that, for rejection sensitivity, no significant differences existed in either the youngest group or the oldest group. Fifteen-year-old students who had online friends had higher scores on rejection sensitivity than did fifteen-year-old students who did not have online friends. See Figure 1. For social anxiety, a similar pattern was noted. Students who are 15 years old, and who have online friends have higher scores on social anxiety while no group differences exist for students under 15 and over 15. See Figure 2.

Figure 1. Interaction between online friends and age group on rejection sensitivity.

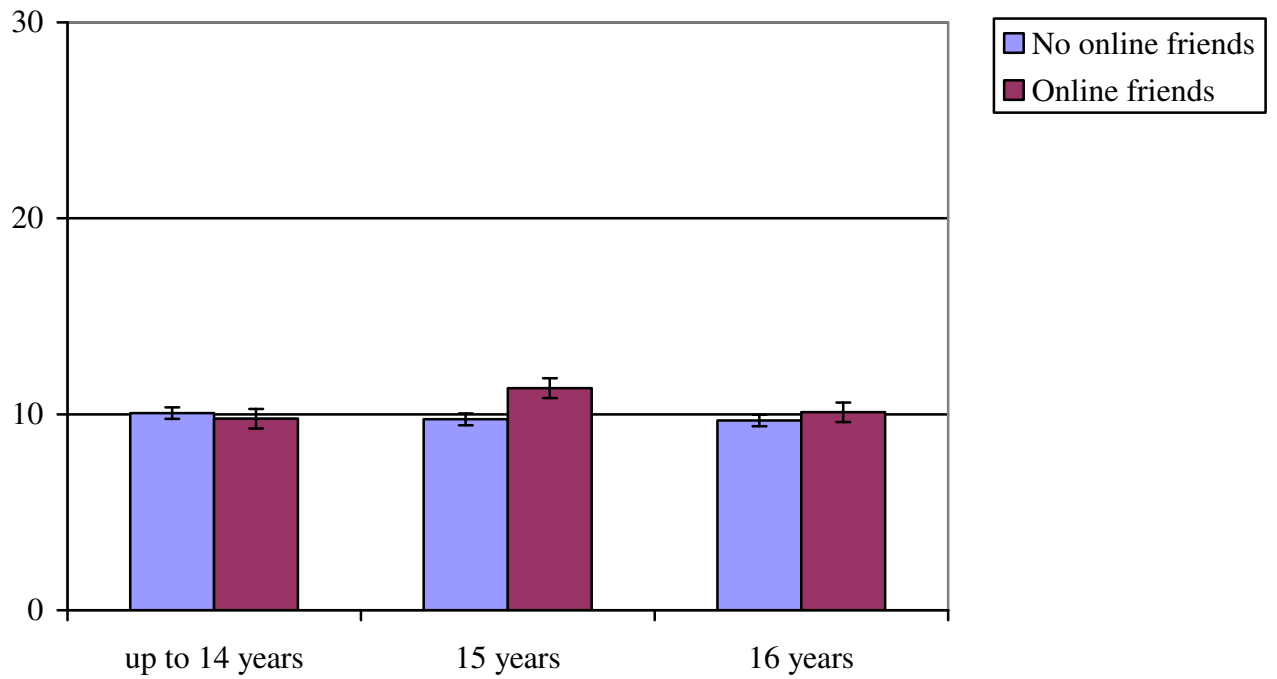
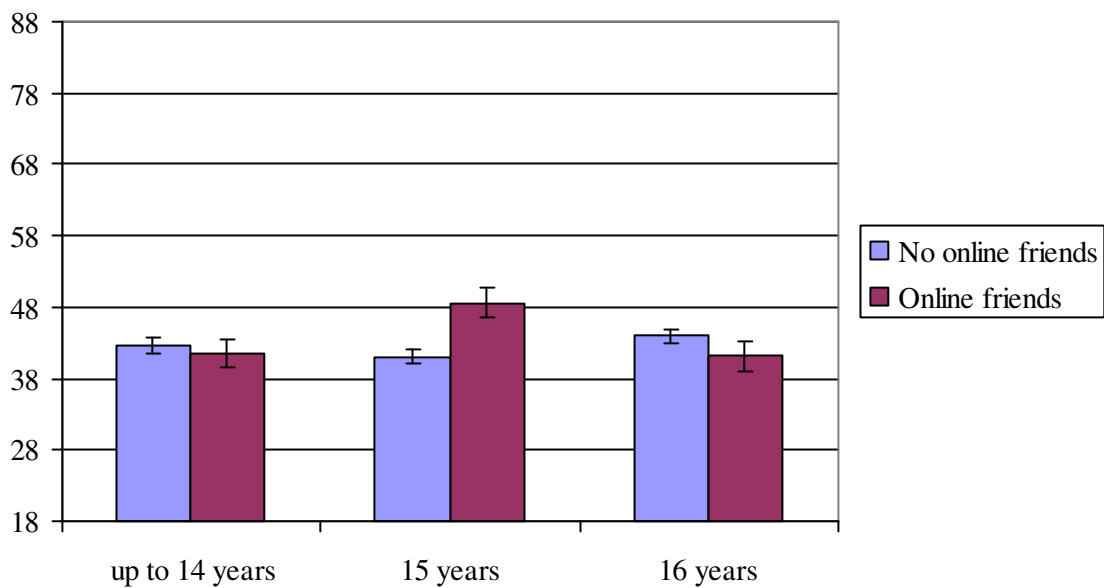


Figure 2. Interaction between online friends and age group on social anxiety.



Quality of Life. For the quality of life variables, gender and age had a significant main effect while having online friends did not have a significant multivariate effect. A three way (age by gender by having online friends) interaction existed with trend level significance ($F_{3,1042}=1.93, p=.73$), however, no significant effects were noted on individual quality of life variables, $p>.05$.

Discussion

The purpose of this paper was to examine the differences between adolescents who include internet-based friendships as part of their close network of friends and those who do not. Previous research supports reduction theory in suggesting that adolescents with online friends are more “troubled” (Wolak, Mitchell, & Finkelhor, 2003), while other research suggested that the possibility of forming close online friendships may provide positive experiences (McKenna & Bargh, 1998), in line with the stimulation theory. Accordingly, we hypothesized that having online friendships would be associated with mixed outcomes. Our findings support the propositions that having online friends is associated with negative outcomes. They did not support hypotheses that forming close online friendships would improve perceptions of social belonging or quality of life.

Peer Group Characteristics

In our data, adolescents who form close online friendships report having more friends overall, yet fewer face-to-face friends than those without online friends. Adolescents who have limited social networks (i.e., few face-to-face friends) are probably likely to seek online friendships in order to supplement or to compensate for their otherwise lacking peer groups. These adolescents still are fulfilling the developmental task

of increasing the size of one's social support network, despite the fact that it may not necessarily happen in a face-to-face context. This expanding of the social network is demonstrated by the fact that those with online friends have more overall friends than those without online friends, despite having fewer face-to-face friends. Conversely, it is possible that adolescents who are making online friends, are doing so at the expense of their face-to-face friendships, consistent with reduction theory which suggests that forming online friendships may displace higher quality face-to-face friendships (Locke, 1998). The reduction hypothesis would stipulate that, as opposed to compensating for limited social networks, online friendships may actually be acting to reduce the size of the face-to-face peer network. The directionality of this relationship is worth investigating in future studies.

Much like previous research that indicates that online friendships tend to be of lower quality than those that are formed in face-to-face contexts (Chan & Cheng, 2004), adolescents in our sample reported feeling less close to their online friends than they do to their face-to-face friends. This lower level of closeness likely contributes to the overall lower closeness of the peer groups reported by adolescents who have online friends. Consistent with the reduction hypothesis, having online friends contributed to more diffuse peer groups than would otherwise occur with only face-to-face friends. This diffusion either occurs by adding lower quality friendships to an adolescent's limited social network, or by replacing higher quality friendships with lower quality friendships.

Because of the ability to communicate intimately on the internet (Bargh, McKenna, & Fitzsimons, 2002), we hypothesized that adolescents who otherwise do not have many close friendships would turn to the internet to form close online friendships, and find intimacy there. While the internet increases the number of friends in a peer group, which is

consistent with the stimulation theory, it does not appear to increase intimacy within those peer groups, and in fact contributes to lower levels of closeness to the entire social support network. Although these findings offer some limited support for the stimulation hypothesis (i.e., online friends add to the size of the individual's peer group), they are more consistent with reduction theory (i.e., online friends are of lower closeness, and are associated with fewer face-to-face friends). The friendships formed online may displace more intimate friendships, leading to a larger peer group that is characterized by lower closeness.

In summary, our findings indicate that having online friends is associated with larger yet more diffuse friendship networks than not having online friends. Adolescents with online friends therefore may be at risk for psycho-social difficulties associated with both low levels of face-to-face friendships and also low levels of closeness. Students with social support networks that are limited in number and closeness are at higher risk of participating in bullying (Olweus, 1993; Perry, Kusel & Perry, 1988), and at higher risk for various emotional difficulties (Nansel, Overpeck, Pilla, Ruan, Simons-Morton, & Scheidt, 2001; Rigby and Slee, 1993). On the other hand, adolescents who form online friends may do so as a result of not being able to form friendships in face-to-face contexts. In this case, such adolescents may experience beneficial effects of having online friendships rather than no friendships at all.

Bullying and Victimization pervasiveness and frequency

Problematic peer relationships are associated with bullying and victimization (Olweus, 1993; Perry, Kusel & Perry, 1988). Accordingly, our data indicate that adolescents who have close online friends participate in more forms of bullying than

adolescents without close online friends and also participate in bullying more frequently than those without close online friends, both in terms of bullying and victimization. In similar ways as do adolescents with limited social support networks, those who experience peer-group difficulties due to bullying or victimization may be more likely to seek friends in an online environment. Those who are victimized may feel powerless to defend against acts of bullying and therefore seek online contacts to compensate for their difficult peer experiences. Similarly, those who bully others in face-to-face contacts may also experience an array of difficulties within their peer groups (Olweus, 1993; Perry, Kusel & Perry, 1988) that may lead them to seek more fulfilling friendships on the internet. In fact, previous research on bullying and victimization indicates that children who are victimized, or who engage in bullying and are victimized tend to be more isolated from their general peer group. Perhaps those that feel less skilled in interpersonal contexts are more likely to use the internet to socialize and to form close friendships. Similarly, it is possible that students who are bullied in face-to-face contexts are likely to turn to the internet to then bully others. The difficulties in peer groups that are noted to exist in adolescents with online friends (i.e., few face-to-face friends, low overall peer group closeness, higher levels of bullying and victimization) are also associated with individual ratings of social sensitivities.

Social Sensitivity

Peer group difficulties such as limited social networks and bullying and victimization also are associated with social sensitivities such as social anxiety and rejection sensitivity. Consequently, we expected adolescents with online friends to have peer group difficulties and also higher levels of social anxiety and of rejection sensitivity

than those without online friends. Our findings indicate that adolescents who have online friends also have higher levels of social anxiety and rejection sensitivity. Internet communication is perceived as less threatening and leaves interaction partners to more comfortably share intimate details about themselves (Bargh, McKenna, & Fitzsimons, 2002). As socially anxious adolescents are not likely to share intimate details about themselves in face-to-face contexts, they may be motivated to seek out friendships on the internet rather than face-to-face. Conversely, internet-based socializing may exacerbate problems with social anxiety. Research indicates that avoidance of a feared stimulus can lead to reinforcement of that fear (e.g., Beck & Clark, 1997). By allowing adolescents to avoid otherwise threatening social situations, online socializing may reinforce social anxiety. Most likely, these two factors work together in contributing to social anxiety. In other words, socially anxious adolescents may gravitate to online friends where interaction is more comfortable, which allows them to avoid face-to-face interactions and reinforces the anxiety, leading them to continue online socialization. The ambiguous cues offered by the internet may also allow for increased levels of anxiety. Once again, the directionality of this relationship should be investigated in future research.

The ambiguity of the communication style used on the internet also may affect rejection sensitivity. Similar to socially anxious adolescents, those that are sensitive to rejection may be more likely to seek out internet contact as a result of the perceived comfort level associated with the arms-length nature of internet communication. Not only might adolescents who are sensitive to rejection be more likely to use the internet for socialization and therefore make more online friends, the ambiguous nature of internet communication, or the relative lower number of social cues may lead them to perceive

more rejection in a situation than a non-rejection sensitive adolescent might. In similar ways as it operates with social anxiety, internet communication may work with rejection sensitivity to exacerbate this social difficulty.

Quality of Life

Contrary to our hypotheses, there were no differences between students with online friends and those without in terms of quality of life. It was particularly interesting that those with online friends did not exhibit greater levels of social belonging than those without. Those with online friends however, also did not exhibit lower levels of quality of life in any of the three domains assessed. Because adolescents with online friends report having larger peer groups, they may perceive their large social network as providing sufficient amounts of social support. Therefore, those participants with online friends may feel satisfied with most areas of their lives, despite being at higher risk for various psychosocial difficulties. Although interpretations of null results need to be made with caution, it is possible that internet-based friendships somewhat compensate for losses that would otherwise occur in the presence of peer group difficulties. Future research should further investigate this possibility.

Limitations

As with all research in the social sciences, this study is not without limitations. First, the cross-sectional nature of our study certainly limits our ability to draw causal conclusions about the data. The findings however, were important in identifying associations between the formation of close online friendships and psychosocial outcomes. Third, the data were drawn from students of one secondary school in a middle-sized city in

the province of Ontario. It is possible that the results of our study reflect a school sub-culture phenomenon as opposed to a general trend in Canadian adolescents. Nevertheless, the ethnic composition of our sample is comparable to that presented in the Canadian Census (Statistics Canada, 2003), and the number of students reporting having made online friends is similar to that noted in previous research (Wolak, Mitchell, & Finkelhor, 2003). Thus, the results may be generalizable to the internet habits of most Canadian adolescents. The fact that many of our findings are supported by previous research also suggests that the associations observed in our data are not unique to our sample.

Finally, in our analyses, it was impossible to determine whether the internet-based friendships reported by our participants were reciprocated friendships. Our analyses were based on unilateral reports of having met a close friend online. Previous research indicates that, although it is important to examine perceived social support and social networks, an analysis of reciprocated friendships can be important in friendship research (e.g., Adams, Bukowski, & Bagwell, 2005; Little & Card, 2005). Future research should examine not only reported friendships but also reciprocated internet-based friendships, to obtain a truer measure of “friendship” and not merely perceive association with one person.

Conclusion and implications for future research

This study confirms many propositions put forth by reduction theory. As suggested by reduction theorists, our results indicate an association between having internet-based friendships and various psycho-social problems including bullying, victimization, rejection sensitivity, and social anxiety. Whether adolescents with these difficulties turn to the internet to seek out close friendships or whether having such friendships effects change in

psycho-social functioning is unclear. It is likely however, that there is a reciprocal influence where certain psycho-social difficulties lead adolescents away from face-to-face peers towards internet-based friendships and that these friendships then contribute to an exacerbation of those psycho-social difficulties. Future studies should focus on identifying reciprocated internet-based friendships and their longitudinal impact on psycho-social functioning. An analyses of reciprocated friendships would provide more detail about the quality of internet-based friendships and the impact of these levels of quality on psycho-social functioning.

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Forward to Chapter 4

Chapter 4 consists of a manuscript that was submitted to *CyberPsychology and Behavior* in April 2008 and is being revised for re-submission. Chapter 4 adheres to APA format. My supervisor, Dr. Wendy Craig, assisted in all aspects of the research and in the preparation of the manuscript and she appears as a co-author on the manuscript.

Chapter 4

Something to text about:

The longitudinal and unique effects of cyberbullying

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Abstract

Cyberbullying has been identified as a significant public health issue but current research is limited to cross-sectional descriptions of students who participate in this form of bullying. The purpose of this study was to determine whether participating in cyberbullying predicted changes in quality of life, social anxiety, and substance use over the course of a school year in Canadian adolescents. This study replicated earlier findings of an overlap between internet bullying and other forms of bullying. In our sample, less than 1 percent of adolescents were involved in bullying that *only* occurred through the internet. Contrary to early research, girls were more likely to be involved in cyberbullying than were boys. Being victimized on the internet predicted decreases in quality of life related to overall well-being and social belonging, as well as increases in hard drug consumption over the course of the school year. Bullying others on the internet predicted increases in alcohol, marijuana, and hard drug consumption by the end of the school year. The findings reflect the severity of cyberbullying. Although cyberbullying is an extension of traditional forms of bullying, and is highly correlated with these forms of bullying, it is associated with unique and severe outcomes.

Something to text about:

The longitudinal and unique effects of cyberbullying

The internet represents one of the primary methods of communication for the current generation of adolescents (Lenhart, Madden, & Hitlin, 2005). The ease with which adolescents can communicate through internet technology represents a positive connection for most users (e.g., Blais, Craig, Pepler, & Connolly, 2008; Valkenburg & Peter, 2007). This same ease of communication also creates the opportunity for negative and sometimes harmful interchanges. With the increasing popularity of internet communication as a positive socializing tool among adolescents, cyberbullying also emerged (e.g., National Children's Home, 2002; Media Awareness Network, 2001).

Researchers have identified cyberbullying as a significant public health issue (e.g., Ybarra & Mitchell, 2004b). Nevertheless, because of its relatively recent emergence, most existing research is descriptive. Internet bullying shares many commonalities with traditional forms of bullying (Li, 2007). It can be experienced directly through instant messaging, chat rooms, internet communities, or text messaging (e.g., Patchin & Hinduja, 2006; Ybarra, 2004) or indirectly in the form of web pages that are dedicated to distributing slanderous information about a targeted individual (e.g., Leishman, 2005). Although similar in many regards, cyberbullying distinguishes itself from traditional forms of bullying in several ways: a perpetrator's identity can be hidden (Ybarra & Mitchell, 2004a), messages may be spread to a wide audience very quickly (Li, 2007), and it may not be as easy to monitor as more traditional forms of bullying (Patchin & Hinduja, 2006). As a relatively new phenomenon, there is little research that has addressed the associations

between cyberbullying and mental health, despite the fact that mental health practitioners have recognized the presence of cyberbullying and some associated effects in the lives of their clients (Jerome & Segal, 2003). To fill this gap in research, the current study examines how cyberbullying predicts psychosocial factors over the course of a school year. We are particularly interested in the association between internet bullying and quality of life, social anxiety, and substance abuse.

Cyberbullying as a distinct form of bullying

The traditional definition of bullying involves three important elements: specific actions with *intent* to harm, *repetition* of such actions, and the existence of a *power imbalance* between both members of the bullying relationship (e.g., Craig, 1998; Olweus, 1995). These elements are noted in the commonly cited definition of face-to-face bullying provided by Olweus (1995). The definition of cyberbullying, therefore, should contain these essentials, while incorporating the unique elements attributed to new communication technologies.

Although many brief definitions of cyberbullying have been proposed (e.g., Patchin & Hinduja, 2006; Willard, 2004), the most comprehensive definition is: “cyberbullying involves the use of information and communication technologies to support deliberate, repeated, and hostile behaviour by an individual or group, that is intended to harm others” (Belsley, 2007). The definition of cyberbullying is similar to traditional bullying. Most existing studies on internet bullying have found that between 10% and 25% of adolescents have been victimized by some form of harassment on the internet (Media Awareness Network, 2001; National Children’s Home Survey, 2002; Patchin & Hinduja, 2003).

Slightly smaller proportions have been noted in terms of adolescents who report engaging in harassing or bullying others on the internet. Between 10% and 20% of surveyed adolescents reported bullying others online (e.g., Li, 2007; Patchin and Hinduja, 2003). Patchin and Hinduja (2003) also noted that the most common types of internet bullying are: being ignored by others (60%), experiencing disrespect by others (50%), being called names (30%) and being threatened by others (21%). Little is known, however, about the impact of these actions on adolescent mental health.

Current research suggests there is a high correlation between internet bullying behaviours and traditional face-to-face bullying. Raskauskas and Stoltz (2007) noted that very few adolescents in their sample were involved in bullying *only* in Cyberspace. Rather, most of those students involved in cyberbullying also participated in similar bullying or victimization roles in the physical world (e.g., Li, 2007; Raskauskas & Stoltz, 2007). Some researchers have concluded that cyberbullying is an extension of other forms of more traditionally defined bullying, and should not be considered as a separate form of aggression (e.g., Li, 2007). Thus, we expect that cyberbullying is associated with similar types of outcomes as those that have been found to be associated with traditional forms of bullying.

Although the effects of cyberbullying may be similar to those associated with traditional forms of bullying, the elements that make bullying harmful, and that are central to its definition (i.e., harm, repetition, and power imbalance) may not be appropriate for cyberbullying. In fact, Wolak, Mitchell, and Finkelhor (2007) argue that most aggressive internet encounters do not meet the criteria for the traditional definition of bullying, and that only those online encounters that are related to a pre-existing bullying relationship

outside of the internet should be qualified as cyberbullying. There are however, three important factors that may serve the same function as the traditional elements of bullying and make cyberbullying particularly important in terms of the longitudinal associations with psycho-social functioning. These factors, low adult monitoring, anonymity of participants, and availability of a large audience, may alter the need for the elements of repetition and power imbalance as they may result in even more difficulties than what would be experienced with face-to-face bullying alone. This study investigates whether participating in this form of bullying is associated with outcomes that exceed those noted in traditional forms of bullying.

Monitoring

Adolescent internet use is often unmonitored (Media Awareness Network, 2001). Despite having shared family computers in high traffic areas of a home, it is unlikely that all communication exchanged between an adolescent and an infinite number of potential online peers is monitored closely enough for an adult to detect of the presence of cyberbullying (Media Awareness Network, 2001). Similarly, the electronic environments where bullying can occur often are not adequately supervised (Patchin & Hinduja, 2006). The difficult detection of cyberbullying may be due to a lack of awareness. Beran and Li (2005) noted that few teachers and administrators are aware that students are in fact being harassed through electronic communication. The lack of adult monitoring may allow adolescents to engage in bullying at a greater rate than they would if adults were able to more easily detect their behaviour (Berthold & Hoover, 2000), and potentially engage in other anti-social behaviours. Lack of monitoring may also lead a victimized child to

multiple incidents of victimization which would result in harm to mental health (e.g., Holt, Finkelhor, & Kantor, 2007; Raskauskas, & Stoltz, 2004).

While few teachers and administrators may be aware of most cyberbullying incidents, a study of American adolescents revealed that more than 47% of participants have witnessed online bullying as defined by “behavior that can include bothering someone online, teasing in a mean way, calling someone hurtful names, intentionally leaving persons out of things, threatening someone, and saying unwanted, sexually related things to someone” (Patchin & Hinduja, 2003). Thus, while adults are generally unaware, peers often are witnesses but may feel powerless in their ability to intervene.

In sum, the lack of monitoring available in Cyberspace creates an environment where bullying can occur easily and remain undetected by authority figures. Such potentially powerful actions, when undetected, may be associated with greater long-term effects than those defining traditional bullying which is more easily observable. Not only is cyberbullying difficult to detect, it may also spread rapidly due to the unlimited number of potential peers, whose harmful behaviours are equally difficult to detect.

Audience

When internet peers send or post messages with the intention to harm others, they are able to reach a broader audience than what is available in more traditional bullying settings such as a schoolyard or classroom. In addition, the availability of more peers to support a student engaging in cyberbullying may give a bullying adolescent more power (e.g., Salmivalli, 1999). Although instant and text messages are often intended for only one person, copies of these messages could be rapidly passed along a chain of users. Similarly,

web pages intended to bully someone (or jokingly poke fun at them), and hurtful messages on social communities such as Facebook, Myspace, or personal Blogs can be read by an unlimited number of people. Patchin and Hinduja (2003) found that the most common site for internet bullying was in a chat room, where large audiences are readily available. The potential impact of a bigger audience than would otherwise be present on a school yard may lead to a greater power imbalance. The rapid spread of harmful messages may remove the need for “repetition” that is used to commonly define traditional bullying, as one harmful message by a perpetrating adolescent may be read by several people. Each person reading this message may act to cause repetitive harm to the individual being victimized. In this sense, cyberbullying may be associated with more harm than traditional schoolyard bullying.

The potential audience to bullying on the internet is challenging to measure and it is also difficult to identify the participants. In face-to-face bullying, peer witnesses intervene more often than do adults, but adults are more likely to intervene if they are present (Craig & Pepler, 2007). When cyberbullying occurs, it may be more difficult for peers to intervene, even more so than for adults, because they are not necessarily present during the bullying incident (Beran & Li, 2005), and may not know who is responsible for perpetrating the bullying incident. The lack of potential intervention associated with large audiences and lack of monitoring may also be associated with mental health outcomes of the victim.

Anonymity and Deindividuation

The relative anonymity of the technology (McKenna & Bargh, 2000) can, as explained by deindividuation theory (e.g., Zimbardo, 1969) empower a perpetrator to carry out more abusive actions than he/she otherwise might in a traditional face-to-face encounter (e.g., Sproull & Kiesler, 1991). While on the internet, an adolescent may therefore engage in less self-monitoring of their communications. That same anonymity may leave a victimized adolescent feeling more powerless in the bullying relationship than a victimized adolescent would feel in traditional bullying contexts. The presence of such anonymity removes the need for an observable power imbalance (e.g., physical size, ability/disability, etc.) between participants in bullying. The mere presence of an unknown aggressor can create a power imbalance that may exert an important impact on participants. Ybarra and Mitchell (2004a) noted that while most aggressors know the person they are victimizing, most victimized adolescents do not know who is perpetrating the online aggression. This represents a very powerful dynamic between parties of a bullying relationship, whereby the adolescent who is bullying holds a great deal of power over the victimized adolescent (Ybarra & Mitchell, 2004a). In addition, those students who perpetrate bullying in other areas also tend to perpetrate bullying on the internet, while “bully-victims” in the physical world were also likely to be “bully-victims” in Cyberspace (Li, 2007). The anonymity afforded by the internet can create situations where bullying that occurs in a face-to-face context continues into the world of Cyberspace, without the knowledge from the victimized adolescent that the same person is perpetrating the aggression. Thirty-two percent of students who were victims of cyberbullying reported being bullied by known schoolmates (Li, 2007). Such a large proportion of non-

anonymous occurrences indicate that cyberbullying is experienced by students who already participate in bullying elsewhere, and not by a unique group of “bullying specialists”. The intrusion of bullying into Cyberspace, a place where some marginalized adolescents may seek sanctuary (McKenna & Bargh, 1998), may be associated with poor mental health outcomes.

Previous research on Impact of cyberbullying

Few studies have examined associations between cyberbullying and adolescent psychosocial outcomes and existing studies provide only cross-sectional, and not longitudinal, descriptions of potential outcomes of cyberbullying. The existing data indicate that similar psychosocial problems exist for groups involved in cyberbullying as for those involved in traditional bullying (Ybarra & Mitchell 2004a). One third of youth who have reported being harassed on the internet reported at least one symptom of stress after the incident (Finkelhor et al. 2000). Other effects were that were noted in the study by Finkelhor et al. (2000) included: “extremely upset”, “extremely afraid”, and “extremely embarrassed”. Cyberbullying may be associated with overall quality of life of students who perpetrate as well as students who are victimized by their behaviours. In addition, students who participated in online bullying report higher levels of substance use (Ybarra & Mitchell, 2004b). In Canada, findings indicated that individuals victimized by cyberbullying experience anger and sadness, among other negative consequences (Li, 2007). Patchin and Hinduja (2003) also indicate that students reported feeling frustrated, angry, sad, and bothered.

While most current research focuses on describing the cross-sectional association between cyberbullying victimization and psychosocial correlates, the impact of traditional forms of bullying is well documented (e.g., Nansel, Overpeck, Pilla, Ruan, Simons-Morton, & Scheidt, 2001; Rigby and Slee, 1993). In general, poor psychosocial adjustment has been noted in both students that bully others and in students that are victimized by bullying (Nansel, et al., 2001). Participating in bullying has been found to negatively predict health related quality of life (Wilkins-Shurmer, O'Callaghan, Najman, Bor, Williams, & Anderson, 2003). Internalizing difficulties appear to be common in victimized subgroups, including general anxiety, social anxiety, and fear of negative evaluation (Craig, 1998; Marini, Dane, Bosacki, & Ylc-Cura, 2006; Slee, 1994; Storch, Brassard, & Masia-Warner, 2003). Finally, difficulties with substance use have been noted in those that experience and are involved in bullying (Berthold & Hoover, 2000; Houbre, Tarquinio, Thuillier, & Hergott, 2006 ; Kaltiala-Heino, Rimpela, Rantanen, Rimpela, 2000).

Recent research also suggests some gender differences on the impact of cyberbullying may exist. Ybarra (2004) found that males who were regular internet users and who reported major depressive symptoms were three times more likely than non-depressed males to report having experienced some form of harassment on the internet. The same association was not found for regular female internet users. However, the cross-sectional association between experiencing cyberbullying and depressive symptoms may be due to the likelihood that depressed individuals are more likely to recall negative experiences than those who are not depressed, otherwise known as “negative recall bias”.

While interesting, these findings require further exploration as it is difficult to separate negative recall bias from genuine past experiences of bullying (Ybarra, 2004).

Hypotheses

The current study examined the longitudinal association between cyberbullying and psychosocial functioning in adolescence. We explored age and gender differences in internet bullying participation, as well as the association between cyberbullying and other forms of bullying. Because the internet is often used as a social technology, we predicted that girls would be more involved in cyberbullying than boys. We also predicted that there would be significant overlap between cyberbullying and other forms of bullying. In terms of longitudinal impact on mental health, we predicted that similar effects would be noted with adolescents that participate in cyberbullying as those who participate in traditional forms of bullying. We also predicted that effects will be noted over and above those of more traditional forms of bullying, due to the exacerbating powers of a lack of adult monitoring, a wider potential audience, and the anonymity of the internet. We hypothesized that adolescents who were victimized online would evidence increased levels of social anxiety, and substance use as well as decreased levels of social belongingness seven months later. Similarly, due to previously identified links between bullying and substance use, we predicted that adolescents who perpetrated bullying on the internet would demonstrate increased levels of substance use one year later.

Method

Procedure

Data were collected as part of a larger study investigating psycho-social factors associated with internet use and internet relationships in adolescence. Letters of information and consent forms were sent to parents of all students at a large school in an average-sized Canadian city. Only those students who had obtained parental consent, and who gave independent assent to participate in the study were included as participants. Questionnaires were administered during regular class-time in individual classes at two points: in October 2005 and May 2006.

Sample

Overall, 782 students participated in our study at either the first, second, or both points in time. For the purpose of this study, only those students who participated at both points in data collection were entered into our sample. In total, there were 534 students who participated at both times in the study, an attrition rate of 18%. Our sample was comprised of 249 boys, 254 girls, and 31 students who did not indicate their sex. Students ranged from 13 to 18 years old ($M= 15$, $SD=1$) and were in grades 9 to 12. The ethnic composition of the sample was comparable to the ethnic composition described in the 2001 Canadian census data (Statistics Canada, 2003). The sample comprised: 86% European-Canadian (white); 5% Asian-Canadian; 2% African/Caribbean-Canadian; 2% Native-Canadian; 1% South-Asian Canadian; 1% Latin American-Canadian; and 4% other.

For most outcome variables, there were no significant differences between students who remained in the study and those that dropped out ($p>.05$). However, there was a

significant difference on all substance use variables. Students that dropped out of the study consumed higher levels of alcohol (M= 3.77 for drop-outs and M=3.24 for retained participants), marijuana (M=2.64 for drop-outs and M=1.89 for retained participants), hard drugs (M=1.29 for drop outs and M=1.12 for retained participants), and cigarettes (M=2.11 for drop outs and M=1.73 for retained participants), $F_{3,656}=552.85$, $p<.01$. It is likely that those students who were involved in a high level of substance use in the fall of a school year were less likely to be attending class regularly in the spring of the same school year (Mensch & Kandel, 1988). This finding may bias our results, as those students that were retained had a lower baseline of substance use than the 18% who ceased participation in the study. Nonetheless, the findings of this study showed a consistent pattern, over and above findings associated with traditional bullying, and are unlikely to reflect an artefact of this attrition difference.

Measures

Demographics. The *Focus on You questionnaire* (Connolly & Konarski, 1994) was used to collect demographic information about each participant. Adolescents indicated their age, ethnic origin, gender, and grade level.

Bullying. A shortened version of the Safe School Student Survey (Hymel, Ishiyama, & White, 2003) was used to measure bullying behaviours and victimization. On a 4-point scale from “never” to “several times a week”, students indicated how often they perpetrated and were the victims of 6 bullying behaviours: physical but intended as a joke, physical not intended as a joke, bullying by property, verbal bullying, social bullying, and bullying on the internet. We used the “joking” variable in our analyses to ensure that we

were capturing physical bullying that was perhaps intended to be hurtful but perceived as a joke. The variable controls for those students that describe evidently harmful behaviours as “joking around”.

Social Anxiety. The Social Anxiety Scale – Adolescent Version (LaGreca & Lopez, 1998) is comprised of 18 items to assess symptoms of social anxiety in adolescents, and 4 filler items. Items were rated on a 5-point scale where 1 indicated that the item is “not at all true for you” and 5 indicated “true for you all the time”. Total social anxiety scores can range from 18 to 90. In our sample at Time 1, scale reliability as measured by Cronbach’s alpha was satisfactory at .92.

Quality of life. A 36 item shortened version of the *Quality of Life Profile: Adolescent Version (QOLPAV)*, Raphael, Rukholm, Brown, Hill-Bailey, & Donato, 1996) assessed quality of life as measured by satisfaction with three different domains of positive youth development: Being (well-being), Belonging, and Becoming (ambition) in adolescents (14-20). With 18 items, the well-being scale (Being) assesses quality of life related to physical (e.g., “My physical health”), psychological (e.g., “Being free of worry and stress”), and spiritual (e.g., “Feeling that life has meaning”) aspects of the adolescent’s life. For Belonging, the 3 areas of assessment include physical belonging (e.g., “the neighbourhood I live in”), social (e.g., “The friends I have”), and community (e.g., “having places to go with my friends”). The three areas assessed by the Becoming scale include practical (e.g., “the work I do at a job while still in school”), leisure (e.g., “visiting and spending time with others), and growth (e.g., “learning about new things”). Adolescents indicate how important each of the 54 items is to them and then how satisfied they are in each of the 54 areas of their lives on 5 point-scales. Difference scores were computed and

standardized using a procedure outlined by the authors of the scale (Raphael, Rukholm, Brown, Hill-Bailey, & Donato, 1996). Higher scores indicate higher quality of life in the domain being assessed. Reliability for the overall being, belonging, and becoming subscales in this sample at time 1, as measured by Cronbach's Alpha, was satisfactory: 0.83, 0.83, and 0.83 respectively.

Substance Use. A questionnaire derived from the *Quantity/Frequency Index* (Jessor, 1969) was administered to assess substance use. Frequency ratings from never (1) to more than 8 times a month (7) were used. Follow-up questions assessed the amount consumed in a given day, and other types of substances consumed.

Results

Characteristics of students involved in cyberbullying

Pearson Correlations were used to identify associations between the types of bullying and victimization including physical bullying (joking), physical bullying (on purpose), bullying through property, verbal bullying, social bullying, and bullying through the internet. There were significant correlations between all types of bullying and victimization (see Table 1). Students that reported bullying others online were also likely to report bullying others physically (joking and serious), through property, verbally, and socially. They were also likely to report being victimized by all 6 forms of bullying listed. Students who reported being victimized on the internet were not likely to bully others physically (either joking or serious). However, they were likely to be victimized by all forms of bullying and indicated perpetrating bullying through property, verbal bullying, and social bullying.

Table 1

Correlations between forms of bullying and victimization

	Physical Bully (Joking)	Physical Bully	Property Bully	Verbal Bully	Social Bully	Online Bully	Physical Victim (Joking)	Physical Victim	Property Victim	Verbal Victim	Social Victim	Online Victim
Physical Bully (Joking)	1	.35**	.19**	.27**	.16**	.15**	.63**	.21**	.10**	.21**	.13**	.06
Physical Bully		1	.36**	.43**	.32**	.23**	.71**	.42**	.14**	.28**	.15**	.06
Property Bully			1	.34**	.30**	.34**	.09*	.17**	.30**	.19**	.16**	.15**
Verbal Bully				1	.50**	.32**	.12**	.20**	.11**	.33**	.20**	.19**
Social Bully					1	.36**	.00	.06	.15**	.16**	.19**	.17**
Online Bully						1	.09*	.16**	.17**	.22**	.24**	.51**
Physical Victim (Joking)							1	.36**	.22**	.33**	.19**	.12**
Physical Victim								1	.36**	.55**	.35**	.18**
Property Victim									1	.28**	.27**	.28**
Verbal Victim										1	.47**	.28**
Social Victim											1	.41**
Online Victim												1

* $p < 0.05$, ** $p < 0.01$

In order to identify the overlap among different forms of bullying, the 6 forms of bullying were collapsed to form 4 groups for each of bullying and victimization: Not involved, involved in cyberbullying only, involved in other types of bullying not including cyberbullying, and involved in cyberbullying and other types of bullying. The numbers of students in each group is indicated in Table 2.

Table 2

Groups of students involved in different forms of bullying.

	Children who are Victimized		Children who Bully	
	Number	Percent	Number	Percent
Not involved	74	16%	173	34%
Involved in cyberbullying ONLY	4	1%	5	1%
Involved in other forms but not cyberbullying	239	52%	207	41%
Involved in cyberbullying AND in other forms	147	32%	118	24%

Due to the small number of students in the “involved in cyberbullying only” group, we collapsed that group with the “involved in cyberbullying and other types of bullying” group. The resulting groups were: not involved, involved in bullying which includes cyberbullying, and involved in other types of bullying which do not include cyberbullying.

ANOVA was used to determine whether age differences existed in each of the new bullying and victimization groups. No age differences were noted in victimization groups ($F_{2,359} = 0.57, p > .05$) or bullying groups ($F_{2,359} = 0.06, p > .05$). To identify gender differences in group composition, chi square analyses were used. There were significant differences in the number of boys and girls belonging to each of the 4 groups within both bullying ($\chi^2 = 22.19, p < .01$) and victimization ($\chi^2 = 17.75, p < .01$). See Tables 3 and 4 for the gender composition of bullying and victimization groups. Boys are more likely to be involved in bullying that does not include cyberbullying than girls whereas girls are more likely to be involved in types of bullying that include cyberbullying both in terms of victimization and bullying.

Table 3.

Gender composition of students who bully others.

	Boys		Girls	
	Number	Percent	Number	Percent
Not involved	61	13%	87	19%
Involved in bullying which includes cyberbullying	44	9%	69	15%
Involved in other forms but not cyberbullying	124	27%	75	17%

Table 4.

Gender composition of students who are victimized by others.

	Boys		Girls	
	Number	Percent	Number	Percent
Not involved	33	8%	37	9%
Involved in bullying which includes cyberbullying	55	13%	89	21%
Involved in other forms but not cyberbullying	139	30%	94	22%

Longitudinal effects associated with cyberbullying

Multiple hierarchical regression analyses were used to determine whether being involved in cyberbullying, either as a victim or as a bully, was associated with psycho-social outcomes over the course of the school year, over and above levels of psycho-social outcomes observed at the first point in data collection. We entered the dependent variable at Time 1 into the first step of each regression model to ensure that the effects indicated change over time, and were not an artefact of the correlations at one time. Sex and age were also entered into the first step of each regression model to ensure that we were controlling for the sex and age differences that can be observed on bullying (e.g., Espelage, Mebane, & Swearer, 2004), internet use (e.g., Gross, 2004; Kraut, Patterson, Lundmark, Kiesler, Mukophadyay, & Scherlis, 1998), social anxiety (e.g., Dell'Osso, Rucci, Ducci, Ciapparelli, Vivarelli, Carlini, Ramacciotti, & Cassano, 2003), and drug use (e.g., Shead & Hodgins, 2007). Finally, because we were interested in identifying the effects associated

with cyberbullying specifically, and not the other forms of bullying, which have already been shown to affect psycho-social functioning (e.g., Berthold & Hoover, 2000), we included the 5 other forms of bullying that we measured (physical joking, physical on purpose, property, verbal, and social) into the second step of each hierarchical regression. Cyberbullying, was entered onto the third step of each hierarchical regression to determine the additional impact that it exerts in predicting our dependent variables.

Social Anxiety. For victimization, the model at step 1 was significant, $F_{3,446}=60.19$, $p<.001$. At steps 2 and 3, the change in R squared indicated that the new models including victimization variables did not have a better fit than the model at step 1 which only included age, sex, and social anxiety at time 1. Similarly, for bullying others, the change in R squared in steps 2 and 3 indicated that the new models including bullying variables did not have a better fit than the model at step 1 which included only age, sex, and social anxiety at time 1 and was significant, $F_{3,444}=58.56$, $p<.001$. Contrary to our hypothesis, bullying others or being victimized on the internet did not predict changes in social anxiety over the course of one year.

Quality of life. In terms of victimization, the model for Being (well-being) was significant at step 1, $F_{3,417}=54.25$, $p<.001$. The change in R squared at step 2 displayed trend-level significance, $\Delta F_{5,412}=1.918$, $p<.10$ as did the change in R squared at step 3, $\Delta F_{1,411}=1.918$, $p<.10$. The model with the best fit, accounting for 28% of the variance, indicated that low levels of well-being related quality of life, being victimized through property, and being victimized on the internet predicted reductions in well-being one year later, $F_{9,411}=19.78$, $p<.001$. The addition of cyberbullying accounted for 1% of additional variance. Well-being at time 1 positively predicted well-being at time 2, while being

bullied through property and through the internet predicted decreases in Being-related quality of life one year later. See Table 5 for results.

The model for victimization and Belonging quality of life, however, displayed a different pattern. The model was significant at step 1, $F_{3,403}=50.75$, $p<.001$. The change in R squared at step 2 was significant, $\Delta F_{3,398}=2.86$, $p=.02$, as was the change in R squared at step 3, $\Delta F_{5,397}=3.82$, $p=.05$. The model with the best fit, accounting for 28% of the variance, indicated that the levels of quality of life related to social belonging, and being victimized on the internet predicted Belonging one year later, $F_{9,397}=19.45$, $p<.001$. The inclusion of cyberbullying contributed for an additional 1% of the variance. Levels of belonging at Time 1 positively predicted quality of life one year later while being bullied online predicted decreases in Belonging-related quality of life one year later. See Table 5 for results.

The model for Becoming was significant at step 1, $F_{3,404}=56.83$, $p<.001$. However, the changes in R squared indicated that the new models including victimization variables did not have a better fit than the model at step 1 which only included age, sex, and quality of life in becoming at Time 1.

For bullying others and quality of life, the models for Being, Belonging, and Becoming were significant at step 1, $F_{3,415}=53.38$, $p<0.001$, $F_{3,402}=51.93$, $p<.001$, and $F_{3,404}=57.56$, $p<.001$ respectively. When the 5 other forms of bullying were added into the models at step 2, the change in R squared indicated that the models including other forms of bullying had a better fit than those only accounting for sex, age, and quality of life at time 1, $\Delta F_{5,410}=2.31$, $p=.04$ for Being, $\Delta F_{5,397}=2.44$, $p=0.03$ for Belonging, and

$\Delta F_{5,399}=2.55, p=.03$ for Becoming. In all three cases, the model at step 3 which included cyberbullying were not a better fit than the first 2 which included age, sex, quality of life at time 1 and the 5 other forms of bullying, as indicated by the change in R squared.

Although online bullying and victimization did not appear to affect most of the quality of life variables one year later, being victimized on the internet did predict decreases in quality of life that were related to social belonging.

Table 5.

Quality of Life as predicted by internet victimization.

	Model Adjusted R ²	Standardized Coefficient Beta	S.E.	T
Belonging	.29**			
Age		-.07	.04	-1.70
Sex		.04	.08	.88
Belonging Time 1		.48 **	.05	11.32
Physical victimization joking		-.02	.04	-.34
Physical victimization on purpose		-.05	.08	-.96
Property victimization		-.08	.08	-1.61
Verbal victimization		-.04	.07	-.71
Social victimization		.05	.07	.96
Internet victimization		-.10 *	.08	-1.95
Being	.28 ⁺			
Age		-.06	.05	-1.49
Sex		-.01	.08	-.33
Being Time 1		.50 **	.05	11.60
Physical victimization joking		-.01	.04	-.19
Physical victimization on purpose		-.04	.09	-.67
Property victimization		-.10 *	.09	-2.04
Verbal victimization		.01	.07	.23
Social victimization		.05	.07	.98
Internet victimization		-.08 ⁺	.08	-1.74

⁺p<.10 *p<.05 **p<.01

Drug use. The models including victimization as predictors were significant at step 1 of the regressions for alcohol ($F_{3,487}=245.31, p<.001$), marijuana ($F_{3,480}=217.21, p<.001$), and cigarette use ($F_{3,482}=223.67, p<.001$) variables. Adding the other forms of victimization to the models for alcohol and marijuana use resulted in a model that did not have a better fit than the model only including substance use at time 1, gender, and age. For cigarette use, the model including the 5 other forms of victimization was a better fit than the first model including only age, sex, and cigarette use at time 1, $\Delta F_{5,477}=2.96, p=.01$. However, changes in R squared indicated that the model at step 3, which included cyber victimization, was not a better fit than the model at step 2.

The model for hard drug use, however, demonstrated a different pattern. The model was significant at step 1, $F_{3,480}=10.17, p<.001$. Changes in R squared indicated that the model at step 2, including the other forms of victimization, was not a better fit than the one at step 1, which only included age, gender, and hard drug use at time 1. However, changes in R squared indicated that the significant model at step 3 including cyberbullying was a better fit than the other two models ($\Delta F_{1,474}=5.52, p=.02$). The new model, accounting for 7 percent of the variance, indicated that previous hard drug use, being physically victimized (on purpose), and being bullied on the internet predicted increases in hard drug use one year later ($F_{9,474}=4.66, p<.001$). Adding cyberbullying accounted for an additional 1% of the variance. See Table 6 for results.

Table 6.

Hard drug use as predicted by internet victimization

	Model	Standardized	S.E.	T
	Adjusted R ²	Coefficient Beta		
Hard drug use	.06**			
Age		.02	.04	.45
Sex		.06	.08	1.34
Hard drug use Time 1		.22**	.06	4.88
Physical victimization joking		-.04	.04	-.88
Physical victimization on Purpose		.12*	.08	2.20
Property victimization		-.04	.09	-.74
Verbal victimization		-.05	.07	-.93
Social victimization		-.01	.07	-.17
Internet victimization		.12*	.08	2.35

⁺p<.10 *p≤.05 **p<.01

In terms of bullying others, the model for cigarette smoking was significant at steps 1 ($F_{3,478}=215.92, p<.001$) and 2 ($F_{8,473}=83.64, p<.001$). The model at step 2 that included age, sex, cigarette use at time 1, and the 5 other bullying variables, proved to be the best fit

($\Delta F_{5,473}=2.39, p=.04$) as the change in R squared indicated that the model at step 3, including cyberbullying was not a better fit than the first two.

Bullying others on the internet had a significant effect on each of the other substance use variables. The models at step 1, including sex, age, and substance use at time 1 were significant for alcohol ($F_{3,483}=234.99, p<.001$), marijuana ($F_{3,476}=206.24, p<.001$), and hard drug use ($F_{3,476}=9.78, p<.001$).

For alcohol use, adding the 5 other bullying variables did not contribute to a better fit for the model at step 2, as indicated by the change in R squared. However, adding the cyberbullying variable did make for a better fit than the model including age, sex, alcohol use at time 1, and the 5 other forms of bullying ($\Delta F_{1,477}=11.99, p=.01$). The resulting model, accounting for 60% of the variance, included previous alcohol use and cyberbullying as positive predictors and social bullying as a negative predictor of bullying, $F_{9,477}=82.47, p<.001$. Participating in cyberbullying often (contributing for an additional 2% of the variance), paired with previous alcohol use and not participating in social bullying, acted to predict increases in alcohol use one year later.

Similarly, for marijuana use, adding the 5 other bullying variables did not contribute to a better fit for the model at step 2, as indicated by the change in R squared. Nonetheless, when adding cyberbullying to the model, the change in R squared revealed that the model at step 3 was a better fit than the models including age, sex, marijuana use at time 1, and the 5 other forms of bullying ($\Delta F_{1,470}=10.11, p<.01$), accounting for 57% of the variance. The model at step 3 indicated that previous marijuana use and bullying others

online (which contributed an additional 1% of the variance) predicted increases in marijuana use one year later ($F_{9,470}=71.85, p<.001$).

Finally, for hard drug use, adding the 5 other bullying variables resulted in a better fit at step 2 than the model at step 1 including only age, sex, and hard drug use at time 1, $\Delta F_{5,471}=5.37, p<.001$; $F_{8,471}=7.19, p<.001$. Adding the cyberbullying variable contributed for additional variance and therefore had a better fit at step 3 than the models at steps 1 and 2, $\Delta F_{1,470}=11.99, p=.01$. The resulting model, explaining 10% of the variance indicated that previous hard drug use, being a girl, bullying others physically, and bullying others online predict increases in hard drug use one year later. Bullying others online contributed an additional 1% of the variance.

In summary, being victimized by cyberbullying predicts increases in hard drug use one year later but does not seem to affect the use of other substances. Bullying others on the internet, however, is associated with later increases in alcohol, marijuana, and hard drug use. See table 7 for results.

Table 7.

Substance use as predicted by internet bullying

	Model Adjusted R ²	Standardized Coefficient Beta	S.E.	T
Alcohol use	.60**			
Age		.02	.07	.52
Sex		-.02	.12	-.75
Alcohol use Time 1		.74 **	.03	22.78
Physical bullying joking		.03	.07	1.03
Physical bullying on purpose		.06	.14	1.60
Property bullying		-.01	.18	-.36
Verbal bullying		-.01	.10	-.31
Social bullying		-.09 *	.12	-2.54
Internet bullying		.11 **	.14	3.46
Marijuana use	.58			
Age		-.01	.07	-.25
Sex		-.04	.12	-1.15
Marijuana use Time 1		.74 **	.04	23.31
Physical bullying joking		.05	.07	1.51
Physical bullying on purpose		.04	.15	.99
Property bullying		-.02	.18	-.70
Verbal bullying		-.01	.11	-.18
Social bullying		-.07	.12	-1.84
Internet bullying		.11 **	.15	3.18

Hard Drug use	.10**		
Age	.02	.04	.53
Sex	.11 *	.07	2.43
Hard Drug use Time 1	.20 **	.06	4.60
Physical bullying joking	.03	.04	.70
Physical bullying on purpose	.14 *	.09	2.50
Property bullying	.08	.11	1.64
Verbal bullying	.04	.06	.77
Social bullying	-.06	.07	-1.09
Internet bullying	.12 *	.09	2.35

⁺p<.10 *p≤.05 **p<.01

Discussion

This study investigated the longitudinal psycho-social effects associated with participation in internet bullying with the hypothesis that being victimized by cyberbullying would predict increased difficulties with social anxiety and reductions quality of life over the course of the school year. Similarly, we predicted that bullying others online would be associated with decreases in quality of life and increases in substance use by the end of the school year. Our hypotheses were partially supported. While cyberbullying was not related to social anxiety or some aspects of quality of life, being involved as a perpetrator predicted significant increases in the use of substances. Being victimized by cyberbullying predicted later declines in quality of life specific to one's sense of overall well-being and social belonging, as well as increases in hard drug use.

Consistent with previous research, cyberbullying was highly correlated with other forms of bullying (Raskauskas & Stoltz, 2007). In fact, only approximately 1% of our sample was bullied or victimized *only* on the internet. In other words, only those that participate in traditional bullying are those that participate in cyberbullying, either as perpetrators or as victims. Therefore, those students that are involved in cyberbullying are highly likely to also be involved in other forms of bullying. Because it was extremely unlikely for an adolescent in our sample to report cyberbullying in isolation, its presence should be considered as an indicator of other bullying behaviour occurring in the physical world.

Our findings that girls are more likely to engage in cyberbullying than are boys contrast current literature (e.g., Li, 2006; Patchin & Hinduja, 2006; Williams & Guerra, 2007). By comparing students in the three groups (i.e., involved in cyberbullying, involved in other types of bullying and not cyberbullying, and not involved in any type of bullying) we were able to clearly differentiate between activities in which boys and girls engage, as opposed to simply contrasting the number of boys and girls involved only in cyberbullying. In addition, our sample was a large representative sample of Canadian adolescents. Many samples in previous research were rather homogenous (e.g., Patchin & Hinduja, 2006) and may not present the variability needed to identify gender differences. These samples were drawn from frequent visitors of message boards or multi-user domains (MUDs), for example. Finally, the operational definition of bullying may have differed from study to study. Based on gender differences in traditional bullying, and the fact that girls appear to make greater use of social bullying than do boys (Espelage, Mebane, & Swearer, 2003), it is not surprising that girls also make more use of electronic media to bully others.

Despite the differences between cyberbullying and traditional forms of bullying noted in the elements of monitoring, audience, and anonymity, our results suggest that cyberbullying is in fact an extension of ongoing bullying characterized by similar gender differences as traditional forms of bullying (Espelage, Mebane, & Swearer, 2003). In other words, students who participate in cyberbullying are not “specialists”, they are students who are already prone to be involved in bullying in face-to-face or “real world” settings. However, the fact that the internet is unmonitored and anonymous, and provides perpetrators with greater audiences, sets the stage for outcomes that differ from those associated with traditional bullying.

Being bullied on the internet did not predict increases in social anxiety over the course of one year. Social anxiety as measured by the Social Anxiety Scale for Children – Adolescent version is very stable due both to scale reliability and to the fact that this family of scales correlates highly with trait anxiety (La Greca, Dandes, Wick, & Shaw, 1988). The stability of adolescent anxiety is supported by the fact that social anxiety was not affected by any of the forms of bullying included in our models, despite previous research outlining associations between peer victimization and social anxiety. (e.g., La Greca & Harrison, 2005; Storch, Brassard, & Masia-Warner, 2003).

As expected, being bullied on the internet predicted decreases in quality of life as it relates to a sense of well-being and social belonging over the course of one year, while it did not predict participants’ sense of self-betterment (Becoming). This finding is not surprising. Research on other forms of bullying demonstrates decreases in general well-being and quality of life associated with victimization (Rigby & Slee, 1993; Wilkins-Shurmer, et al., 2003). Our results indicate that cyberbullying has similar associations with

psychosocial functioning as traditional forms of bullying in terms of a decreased sense of well-being. Cyberbullying in our research emerged as a better predictor of decreased quality of life than all other bullying variables, which indicates that although it is similar to traditional bullying, it has unique and perhaps more important associations with long-term adjustment.

One of the attractive qualities of the internet to most adolescents is that it represents a place to socialize, particularly when feeling marginalized (McKenna & Bargh, 1998). Adolescents who do not feel accepted in real-world contexts may resort to instant messaging to communicate with known others or to chat rooms to initiate relationships with strangers in order to compensate for the lack of socialization in other contexts. Given that cyberbullying was very rarely observed in isolation of other forms of bullying in our sample, those participants who report being victimized online are also being victimized in other areas of their lives. If the internet, perhaps the last place of refuge for a victimized or marginalized adolescent, is also infiltrated by bullying, it may lead to a decreased sense of belonging to a peer group or satisfaction with one's social surroundings, a decrease in general well-being. Cyberbullying also moves bullying incidents from the traditional physical locations of the schoolyard and school bus, for example, into the adolescent's home, which was likely the only place where the student was not experiencing bullying. These factors can easily be associated with declines in an overall sense of well-being and social belonging.

Quality of life in the areas of self-betterment would not necessarily be affected, as adolescents may engage in independent behaviours that allow them to feel satisfied about the things they do to better themselves. Becoming (self-betterment) was not predicted by

cyberbullying participation. Victimized adolescents may feel satisfied that they doing their best to better themselves, which may not be influenced by the presence of victimization in any form.

Surprisingly, the quality of life of those that report bullying others online was not affected by this behaviour, particularly as other forms of bullying (i.e., property, verbal, and physical) were associated with later declines in quality of life. The larger pool of available peers on the internet paired with the increased anonymity of internet communication likely leads adolescents who bully online to gain more power through such behaviour and therefore have quality of life that remains more stable over time. Much as a perpetrator on the playground is able to enlist the help of a group of supporters to gain power (Salmivalli, 1999), adolescents who perpetrate cyberbullying may be able to find peers that will support them, and therefore not feel any decreases in satisfaction with any areas of their lives. In addition, if an adolescent is gaining more power or popularity through bullying actions, he or she may not have a reason to feel reduced quality of life in each of the three areas measured. Finally, it may be easier for those who bully others to find others that engage in similar behaviours and mutually reinforce each other's antisocial activity (e.g., Poulin & Dishion, 1999). This unique aspect of the internet likely explains the lack of effect on quality of life.

Consistent with our hypotheses, being victimized online was associated with increases in substance use over time. The effects were evident in the use of hard drugs. The increase in hard drug use, the most risky of the assessed substances, reflects the importance of this type of bullying. An increase in the use of hard drugs is also likely a result of the fact that very few participants reported *only* being victimized by

cyberbullying. Reporting being victimized on the internet reflects being victimized in at least one of the other ways, apparently resulting in greater effects than being bullied in a more traditional form by itself. Being victimized on the internet appears to represent a warning sign that the student is being victimized by bullying in other venues and that problems with hard drug consumption may be present. In addition, adolescents who are being victimized on the internet may be resorting to the use of hard drugs as a form of self-medication to cope with effects of chronic and pervasive victimization, which is likely what those who are victimized online experience given the high correlation with other forms of victimization. An increase in hard drug use points to the significance of the cyberbullying problem.

Similarly, and more alarming, those adolescents that endorsed bullying others on the internet displayed notable increases in their consumption of alcohol, marijuana, and hard drugs over the course of one year. Participating in cyberbullying may be an indicator of more serious problems. The fact that adolescents bully others online indicates that they are also participating in other forms of bullying when not on the internet, as indicated by the low percentage of students who endorse bullying others on the internet *only*. Those adolescents that are participating in increasing numbers of anti-social activities, such as bullying, appear to also be experimenting with other forms of anti-social activities such as substance use.

The presence of cyberbullying, with its unique elements of monitoring, anonymity, and audience, seems to most strongly predict substance use (in comparison to social anxiety and quality of life). The internet represents a place where adolescents can choose friends or acquaintances from a large pool of available peers. Perhaps they are more likely

to meet others that are similar to themselves than they would be if they were limited to face-to-face contexts. The increased anonymity allows peers to more quickly disclose behaviours such as substance use to potential peers. In this situation, peer groups characterized by homophily (or similarity and attraction to those similar characteristics) may lead to deviancy training (Poulin & Dishion, 1999) whereby similar peers mutually reinforce one another's anti-social behaviour, and expose individual members to new types of anti-social behaviour.

Interestingly, both substance use and cyberbullying occur in contexts that are largely unsupervised. This indicates that a lack of supervision may facilitate the participation in such behaviours as cyberbullying and substance use, which can become worse over time. The link between cyberbullying and parental monitoring should be further investigated.

Our findings reflect research on traditional bullying. This study contributed to current knowledge in identifying changes over time in the form of increases in substance use over and above increases predicted by other forms of bullying. This finding indicates that participating in cyberbullying is associated with other serious psychosocial problems because substance use is correlated with many other psychosocial difficulties (e.g., Kokkevi, Richardson, Florescu, Kuzman, & Stergar, 2007).

In summary, being bullied online shares some similarities with being bullied in other venues, indicating that students who participate in cyberbullying are not "specialists" in this type of behaviour but rather that cyberbullying represents just another type of bullying. There are, however, some longitudinal associations that are evident only when

internet bullying is added to other forms of bullying. These findings signal the importance of increased research on cyberbullying and reflect the importance of increased adult presence and supervision in the internet context.

Limitations

As with all research, this study is not without limitations. Many significant relationships were identified between cyberbullying and future psycho-social adjustment. The models however, accounted for modest amounts of variance. In some of our models, predictions accounted for as little as 1% of the overall variance in the outcome variables. These effects were noted in models where a large number of control variables were used and were likely contributing to a great deal of the variance in outcome variables. Our findings did not reveal dramatic changes associated with cyberbullying over the course of the school year. The implications of these changes, however subtle, cannot be ignored. Small variances in regression models are common, due to the nature of regression analyses, and may still reveal important changes (Lansford, Criss, Pettit, Dodge, and Bates, 2003). Particularly when considering changes in substance use, any increase can be a dangerous one. We are therefore confident that the subtle changes identified in our data have important implications for adolescent development. What is particularly interesting is that the effects of cyberbullying were noted over and above the effects of previous levels of substance use (for example) and were also noted over and above the effects associated with all other forms of bullying. These findings therefore allow us to draw strong conclusions about the specific impact of bullying on the internet, as opposed to other types of bullying.

Cyberbullying, for the purpose of our study, was defined as indicating whether one had experienced “mean” behaviours online/email or text messages as it was part of a larger bullying questionnaire in a larger study aimed at studying bullying in general and internet consumption. This one item may not fully capture the extent of the cyberbullying experience and excludes some internet experiences. Nevertheless, we identified some effects associated with endorsing this item, including a very high overlap with other forms of bullying. In addition, by not limiting students to behaviours that had the intent to harm, were repetitious, or were in the context of a power imbalance, we did not limit our analyses to a definition of bullying that may not be appropriate for bullying that occurs in Cyberspace. Future research should identify the impact of specific forms of cyberbullying, such as verbal, social, etc.

Attrition analyses revealed that those that dropped out of our study also exhibited higher levels of alcohol, marijuana, hard drug, and cigarette use than those that were retained. Those students with a higher rate of substance use are also probably more likely to skip more school near the end of the year (Mensch & Kandel, 1988) and be generally less motivated to participate in activities that supplement the regular curriculum (such as scientific research). The resulting low baseline of substance use in the remaining sample may have inflated any notable changes. Nonetheless, the changes that were noted in regression models were noted over and above measures during the first time of the study, and any effects noted in traditional bullying. Our findings also evidenced a pattern whereby the effects were more notable for those that bully online than those that are victimized online. Such results likely represent a reliable analysis of the link between cyberbullying and substance use.

Conclusions

The purpose of this study was to examine the longitudinal association between participation in cyberbullying and psycho-social adjustment (including social anxiety, quality of life, and substance use) over a one-year period in Canadian adolescents. This study provides significant contribution to scientific knowledge of cyberbullying behaviour by providing data from a representative Canadian sample that spans the duration of a school year. In our sample, cyberbullying was associated with changes in quality of life and substance use over time. Because very little longitudinal research examines the importance of bullying itself in change over time, particularly in adolescence, this study contributes significant knowledge to existing research on bullying. Our results have indicated some significant associations with future psychosocial problems, which warrant further investigation.

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Chapter 5

General discussion

General Discussion

As internet technologies became increasingly popular, researchers have described association of this new mode of communication with mental health. Early research identified many potential harmful outcomes of online communication (Kraut, Patterson, Lundmark, Kiesler, Mukophadyay, & Scherlis, 1998, Nie & Erbring, 2000), and explained these harmful outcomes using reduction theories. As the internet became more popular, later research identified many positive influences of the internet on North-American users (e.g., McKenna & Bargh, 2000) and began to support stimulation theory. Despite the pervasiveness of internet use among North-American youth, relatively little is known of the associations between online activities and social ties online. The three studies of this dissertation further expand our knowledge of the association between internet socializing and adolescent psycho-social adjustment. In Chapter 2, it was established that different internet-based activities do predict longitudinal change in the quality of important relationships in adolescents. The second study, presented in Chapter 3, established that there are peer group and individual differences between adolescents who have online friends and those who do not. Finally, the third study described in Chapter 4, described the long-term association between participating in cyberbullying and victimization. The combined findings of these studies demonstrate that the activities and social relationships in which adolescents engage online can play a role in psycho-social adjustment.

In support of stimulation theory, and of later internet-based research, the findings of the first study indicate that spending time on the internet predicts significant increases in relationship quality. As hypothesized by stimulation theory, the time adolescents spend communicating with their (already existing) friends on the internet may help stimulate

those relationships. Our findings confirm earlier suggestions that the internet represents a place where adolescents can carry out important developmental tasks, such as further developing intimacy within friendships and developing romantic relationships. The increases in relationship quality that were noted in Chapter 2 are perhaps due to the fact that many people feel more comfortable communicating about intimate topics on the internet than they do in face-to-face contexts. In fact, previous studies have identified that people feel better able to express their true selves online, more so than what they experience in face-to-face contexts (Bargh, McKenna & Fitzsimons, 2002). By providing a venue where adolescents feel more comfortable communicating with their best friends and romantic partners, the internet stimulates the quality of these relationships. This finding is particularly important because effects are noted within best friendships and romantic relationships, particularly when considering the importance of best friendships and romantic relationships to adolescent development. Research has demonstrated that both best friendships and romantic relationships play an important role in adolescent development (e.g., Clark & Ayers, 1988, Feiring, 1999; Furman & Buhrmester, 1992; Hartup, 1993; Sholte, van Lieshout, & Aken 2001). The internet, therefore, may in fact be facilitating the developmental tasks of forming relationships, and increasing intimacy within them.

Another way the internet stimulates social networks is through the formation of friendships with strangers that were met online, otherwise known as online friends. Our findings from the second study suggest that adolescents with online friends have larger social support groups than those without, which provides further evidence for the stimulation hypothesis. Previous studies on internet-based friendships, however, have

supported the reduction hypothesis by indicating that these friendships are typically of lower quality than those that are formed in face-to-face contexts (Chan & Cheng, 2004), and that students who engage in these relationships are more troubled (Wolak, Mitchell, and Finkelhor, 2003). Consistent with previous findings comparing adolescent with online friends and those without, our second study also provides further support for the reduction hypothesis. Those adolescents with online friends have lower overall closeness with their friends than those without. Similarly, adolescents with online friends had higher levels of social sensitivities and were also more likely to be involved in bullying and victimization than those without. The study suggests that children who are marginalized may be seeking out friends on the internet. They may, however, become disappointed with the quality of the friendships that they are forming online. The “stimulation” provided by the internet as adolescents make more friends, may in fact represent a risk factor for marginalized adolescents by adding low quality friendships to their already limited social support network. However, it is possible that these low quality friendships are filling social support gaps that would otherwise go unfilled. In this case, low quality friendships formed online may be more beneficial to marginalized adolescents than no friendships at all. It will be important, in future research, to investigate whether forming poor quality friendship on the internet is more protective than not forming them at all, and remaining socially isolated from face-to-face peers.

Evidence from the second study, presented in Chapter 3, largely supports the reduction theory by noting that having online friends is associated with difficulties in the peer group and social sensitivities. In addition, despite the fact that using the internet to chat and write email is associated with higher quality relationships, our first study also

provided some evidence for the reduction theory with respect to entertainment activities. While communicating with known others may stimulate social relationships, using the internet for entertainment and gaming may reduce social relationships. Clearly, different aspects of the internet can lead to different outcomes in adolescent psycho-social adjustment, and support different theoretical frameworks. Our first and second studies noted that while the internet can provide a venue for interpersonal enhancements by predicting increases in friendship quality and providing similar levels of quality of life, it can also predict decreases in relationship quality when used for entertainment purposes and be associated with psycho-social difficulties such as social isolation, anxiety, and rejection sensitivity.

Our third study, which examines cyberbullying as well as other forms of bullying, provides further support for the reduction theory. The findings indicate that internet-based bullying is a serious and significant occurrence, perhaps more so than face-to-face bullying in isolation, which suggests that factors associated with the internet may be contributing to worse outcomes. Cyberbullying rarely occurs in absence of other forms of bullying, suggesting that cyberbullying may be an indicator for more pervasive difficulties with bullying and victimization. When accounting for the effects of all other forms of bullying, we noted that cyberbullying predicts decreases in psycho-social adjustment. The unique elements of internet interactions (i.e., low parental monitoring, high anonymity, and broadly available audiences) likely contribute to the increased harmfulness of this particular form of bullying, thus providing further evidence for the reduction hypothesis. In this case, reduction theory is supported as cyberbullying appears to be more severe in terms of psycho-social adjustment than face-to-face bullying. While the internet provides some

opportunities for enhancement and growth, cyberbullying along with online entertainment and forming friendships with strangers represents increased negative associations with the internet compared to face-to-face interaction.

Although many negative outcomes on adolescent psycho-social adjustment were noted in this group of studies, the positive findings are nonetheless worth noting. Internet communication was related to increased quality in salient adolescent friendships. Consequently, internet communication may allow adolescents to fulfill many socialization tasks in perhaps a more efficient and less committing way than communicating in face-to-face contexts. This finding suggests that the internet is not something that should be entirely avoided. Combined with other research that indicates the beneficial uses of the internet in terms of conducting school research (e.g., Media Awareness Network, 2001), finding health-related information (Borzekowski, Fobil, & Asante, 2006), and marginalized teens finding needed social support (McKenna & Bargh, 1998), the findings from our first study indicate that the internet plays an important positive role in adolescent development. The findings from previous research which support the reduction hypothesis and the findings from our second and third study, however, suggest that caution should be used when facing the subject of internet use with adolescents.

First, our findings suggest that internet use may lead to small increases in severe forms of psycho-social difficulties. For example, participating in cyberbullying is associated with increases in substance use. Similarly, engaging in internet-based entertainment activities can predict decreases in the quality of social support received by an adolescent. As cyberbullying and drug use are both most likely to occur in settings that are not monitored by adults, these findings suggest that adult monitoring of internet use may be

important. Perhaps one solution is ensuring that adolescents use a computer in a central area that is easily monitored by parents. Increasing the physical presence of parents may not only help to monitor the activities in which adolescents engage online (such as bullying others online), but may also provide the opportunity to decrease other associated behaviours (such as consuming substances). As internet technologies become increasingly personalized (e.g., PDA's and cellular phones provide constant opportunity for "text messaging" and access to email), however, such physical forms of monitoring internet activity may be less effective. Future research should examine the moderating role of parental monitoring and parental communication about internet safety in the link between internet use and negative psycho-social outcomes.

The group of studies also reflects the importance of peer group characteristics, and education on positive relationships. Adolescents who feel marginalized may be more likely to seek social contact on the internet. Although this contact can be a positive one for those who already have a strong social support network, reflecting a "rich get richer" phenomenon, those that are seeking social support online may be more likely to interact with strangers, and to therefore form less beneficial relationships. As was noted in the second study, adolescents with online friends are also at risk for many types of psycho-social difficulties. Perhaps forming online contacts represents a lesser risk to overall adjustment than not seeking internet contact at all, despite some of the risks associated with some internet-based activities. It would be of interest to investigate the differences between marginalized teens who seek social contact and those who do not seek social contact over time. Nevertheless, the findings reflect the importance of education on positive relationships and on early intervention when social difficulties are noted.

Limitations

This group of studies made exclusive use of self-report questionnaires. This methodology may lead to under-representations of sensitive behaviours such as bullying and substance use. Corroboration from other sources may have lead to more reliable data. Nevertheless, a substantial number of adolescents did endorse participating in sensitive activities, leading to interesting findings in the data. Future studies may benefit from including data from teachers, parents, and computer logs to provide a richer picture of the data.

Summary

The three studies of this dissertation advance our knowledge of the role of internet activities in adolescent social development. Although they establish that the internet can represent a positive connection for many youth, the studies also indicated that many risks are involved in internet communication. They confirm that online communication predicts enhancements of interpersonal relationships whereas engaging in online entertainment predicts difficulties in inter-personal relationships. They confirm that having online friends is associated with negative outcomes. Finally, they confirm that cyberbullying is a dangerous experience, both in terms of bullying others and in terms of being victimized by the behaviours. While these studies further our understanding of adolescents and the internet, they also provide many avenues for future exploration. The study of parental monitoring and of the influence of peer group factors are of particular interest.

Put together, the findings of our studies indicate that while internet use is beneficial to adolescent relationships, certain activities may contribute to harm in psycho-social

development, and warrant increased attention. The findings point towards the need for the development and implementation of prevention and intervention strategies. The monitoring of online activities by significant adults in an adolescent's environment can play a protective role in the use of the internet by youth. Of primary importance, however, is the need for universal education about internet-based activities and healthy relationships. This factor is particularly important as internet communication becomes increasingly personal (e.g., cell phones, personal computers, etc) and difficult to monitor.

In conclusion, the findings in this group of studies guide future research in terms of investigating the role of parental monitoring, and the reciprocal longitudinal effect of internet-based variables on psycho-social outcomes. The findings suggest there is a need for broad education, prevention, and intervention programs targeted specifically on healthy relationships and internet use. While many studies point towards the risks associated with the use and misuse of the internet, the importance of this technology in adolescent socialization and development should not be ignored. As with many other aspects of adolescent life, a balance of acceptance and caution should be exercised.

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