COMPULSIVE TEXT MESSAGING:
DO YOUTH NEED TO KICK THE HABIT?

Kelly M. Lister

A Dissertation

Submitted to the Graduate College of Bowling Green
State University in partial fulfillment of
the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2010

Committee:

Eric F. Dubow, Ph.D., Advisor

Jean M. Gerard, Ph.D.

Montana C. Miller, Ph.D.

Dara R. Musher-Eizenman, Ph.D.

ABSTRACT

Eric F. Dubow, Ph.D., Advisor

In the last decade, electronically-mediated communication (EMC) has increased dramatically as a format for social interaction, particularly among adolescents. Despite this increase, little research has focused on the behaviors occurring in EMC, most notably through text messaging. The purpose of this study was to address questions regarding the frequency and compulsivity of adolescents' texting, its relation to adjustment, and moderators of the relation between compulsivity of texting and adjustment. Participants were 211 8th graders who completed a survey about their texting behaviors. Most adolescents (80%) reported sending text messages between a few days a week and every day, with 23% reporting that they send and receive over 100 text messages each day. Females reported greater compulsivity of texting than males. Frequency of texting was related to compulsivity of texting, although only 9% of students reported compulsively texting at the rate of sometimes or more. Compulsive texting was positively related to aggression and negatively related to academic adjustment. Self-control, including effortful control and conscientiousness, moderated the relation between compulsive texting and internalizing problems, academic adjustment, and prosocial behavior. There was a protective effect for high self-control, such that compulsive texters with high self-control showed more positive adjustment than those with less self-control. Limitations of this survey study included limited generalizability of results due to the age and ethnic distributions of the sample and the lack of longitudinal data, which precludes conclusions about temporal directions of effects. Finally, ideas for future studies and important implications of this study, such as parental supervision of texting and school-related responses to texting, were discussed.

This dissertation is dedicated to Ian, for your many sacrifices and beastly love and support.

Like their big sisters, Bobby, Molly, and Jack also deserve a special shout-out –

your little smiles light up my life.

ACKNOWLEDGMENTS

First, I would like to extend special thanks to my advisor, Dr. Eric Dubow, for his support and guidance over my six years of graduate school. I would also like to acknowledge my dedicated committee members, Dr. Dara Musher-Eizenman, Dr. Jean Gerard, and Dr. Montana Miller. Their thoughtful attention to my project from start to finish is greatly appreciated. Further, the energy and creativity of my research group was invaluable. Thank you especially to Sarah Domoff, Lisa Reinemann, and Liz Kryszak, my amazing graduate colleagues, and our dedicated undergraduate team of Kristina Sharp, Erica Bennett, and Katie Neilson. Special thanks to Paula Watson, Sue Thornton, Kelly Avery, Hillary Harms, and the BGSU HSRB for their help in this project running smoothly. I am especially grateful to the administration, teachers, parents, and students of Bowling Green High School and Bowling Green Junior High School for their participation in this project. Data collection (as well as making it through these past six years) would not have been possible without the assistance and friendship of many graduate school colleagues. Finally, I would like to thank Ian, my parents, my family, and my friends for their love, patience, and senses of humor over the course of graduate school. I would not be heading back to the east coast with my degree without your support, and for that and many other reasons, I love and appreciate you.

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INTRODUCTION

"haha omg lmao! g2g cu 2moro…have a gr8 nite!" "thx u2! cu l8r!" Do such "text speak" phrases have meaning to the adult population in America? How does the use of text messaging promote or hinder teens' interactions with one another? Are there potential addictive qualities of using electronic forms of communication to connect with peers? Do other factors, such as involvement in extracurricular activities, moderate potential negative effects of teens' text messaging behaviors? As "text speak" is quickly disseminating through the culture of American youth, it is important to focus attention on this form of technology as questions are being posed about the relation between youth's text messaging and behavior. The potential compulsive nature of text messaging is also of interest.

This manuscript addresses several issues. First, it describes electronically-mediated communication (EMC), specifically by defining text messaging and how it relates to other new media formats, such as instant messaging (IM) and blogging. While use of EMC has risen in frequency across age groups, it is particularly prevalent in youth's communication with one another. Therefore, youth's EMC via text messaging is highlighted, including descriptions of use and frequency of use information.

Then, this manuscript reviews conceptualizations of youth's behavioral, social, and academic adjustment. Positive and negative adjustment related to EMC use is highlighted, with special attention being paid to compulsive text messaging behaviors. There are numerous studies that highlight the positive aspects of communication via the internet and mobile phones, whereas many other studies focus on possible negative adjustment. Given the scarcity of research in the field of compulsive text messaging, addiction to the internet is a focus in the review of negative aspects of communication via new forms of communication to lay a foundation for compulsive

text messaging. This manuscript identifies questions that have yet to be answered regarding compulsive text messaging, particularly among youth. It appears necessary for researchers to examine the potential addictive qualities of text messaging and how potential negative effects are moderated by other factors.

Finally, the present study is described. This study is a survey of adolescents that examines descriptive data regarding text messaging, correlates of text messaging, and moderators of the relation of frequency of text messaging with adjustment. This study is particularly concerned with compulsive text messaging behaviors and related adjustment factors. In particular, this study focuses on the predictor variable of compulsivity of text messaging and the adjustment variables of depression, loneliness and quality of social relationships, aggression, prosocial behavior, and academic adjustment. The potential protective factors that will be highlighted include individual factors (effortful control and conscientiousness), family support (parental monitoring and knowledge), and external support (youth's involvement in extracurricular activities).

Electronically-Mediated Communication

EMC, like computer-mediated communication, is a cluster of interpersonal communication systems used for conveying written text, generally over the internet (Baron, 2004). Various forms of EMC have emerged, including IM, shared hypermedia, weblogs, and graphical chats, all which may have social and communicative effects (Riva, 2002). Goman (2006) claimed that even e-mail is considered to be somewhat of an outdated communication mode, having been replaced by IM and blogging. There are numerous types of EMC, and IM and blogging can be considered two of the most popular formats for communication over the internet. Researchers believe that EMC also comprises text messaging between two or more

mobile phones as another form of mobile communication (Ishii, 2006), due to the use of a device that requires typing and similar concerns about temporal characteristics and lack of face-to-face cues that are present during internet communication. Bryant, Sanders-Jackson, and Smallwood (2006) referred to this collective group of technology as "socially interactive technologies," or SITs.

EMC has the potential to present some problems in communication, as it requires new characteristics to take the place of social cues used in face-to-face interaction (Riva, 2002). Some social cues absent in EMC include shifts of the head away from the speaker, audible inhalations, the initiation of gestures, and overloudness in the first segments of speech that are present when listeners attempt to take their turn as speakers (Patterson, 1990). EMC communication allows participants to be typing at the same exact time without knowing the other is responding or to not even be at their computer or near their cell phone at all and receive the message at a later time. Temporal information in face-to-face communication is missing in EMC, such as turn-taking, and EMC does not always guarantee that the user's declared identity is accurate, for identities through computer-based EMC are typically recognized in the form of usernames (Riva, 2002). Communication via a computer monitor and keyboard, or cell phone and key pad, takes longer than face-to-face communication, and there is an absence of metacommunicative features like facial expressions, posture, and tone of voice (Riva, 2002). However, these aspects can be artificially constructed through the use of graphical "smileys" and the use of capitalization and punctuation to provide emphasis in the intended message, but the effectiveness of these methods can be considered wary. The lack of face-to-face cues in communication may allow adolescents to construct identities more independent of the age, race, and gender cues evident in their regular face-to-face interactions (Cassell, Huffaker, Tversky, & Ferriman, 2006). Therefore, it can be

said that EMC lacks the rules on which effective interaction depends and can provide the opportunity for miscommunication (Riva & Galimberti, 1998). This is consistent with the theory that people may be drawn to mediated interactions because of their ease, lack of risk, and immediate gratification, but the interactions that occur may be less rewarding over the long term (Green & Brock, 1998).

A review of text messaging is warranted in order to understand this format of communication and attend to factors that may be associated this type of EMC.

Text Messaging

Text messaging, or texting (originally called "Short Message Service," or "SMS"), is a form of communication in which people send short messages between two or more mobile phones that gained rapid growth in popularity in the late 1990s (Ishii, 2006). Texting allows users to access instantly other users by sending and receiving messages from handheld mobile phones (Horstmanshof, 2005). It is similar to e-mail in its ability to be convenient for both the recipient and the sender (Faulkner & Culwin, 2005). Messages arrive on the recipients' phones in text format and are typically stored on the phone until the owner deletes them. Texting can incorporate text, photographs, pictures, and music. People may have similar social uses for texting as they have for IM (Bryant, Sanders-Jackson, & Smallwood, 2005). White and White (2005) indicated that texting offers distinctive opportunities for spontaneous connections with others, particularly while traveling, although it lacks the same emotionality that is present during voice phone conversations. In their study, texting and oral phone communication led to travelers feeling similarly as integrated into the relationships in which they were attempting to maintain connection (White & White, 2005). Texting also allows for a sense of privacy in that it is affordable for teens to own cell phones independent of their other family members. It is typically

more difficult for youth to have their own computers, and therefore, they usually have to share a computer with their family members.

Youth's Use

Youth's access to newer forms of EMC has increased dramatically in the past decade. Goman (2006) attempted to explain this increase by stating that youth need to be actively involved in receiving information quickly or they tend to lose interest in the task at hand.

Youth have created subcultures in which they communicate primarily through texting over mobile phones (Ishii, 2004). Regarding contact with their peers, many teens now prefer texting to talking on their cell phones (Haste, 2005). In one study, 42% of parents contact their children daily using a cell phone (Kennedy et al., 2008). Teens have been described as the most consummate mobile phone users who have made texting into a common form of interaction (Ling, 2007). Kennedy et al. (2008) stated that 57% of children ages 7-17 have their own cell phone. More specifically, 27% of preteens aged 9-12 years-old have their own cell phone, while 75% of teens aged 13-17 years-old have their own phone, according to their parents (C.S. Mott Children's Hospital, 2009). This same study reported that 87% of teens with cell phones use text messaging (C.S. Mott Children's Hospital, 2009), while just four years earlier, 64% of teens with cell phones were reported to regularly send text messages (Lenhart, Madden, & Hitlin, 2005). Faulkner and Culwin (2005) reported that text messaging activity declines with age after adolescence and highlighted a study in which 94% of 10 and 11 year-old children had sent or received text messages (Davie et al., 2004, as cited in Faulkner & Culwin, 2005). The "tween" years seem to be the peak years for media use, as teens aged 11-14 years-old reported being exposed to media (e.g., TV, music, the computer, video games) for close to 12 hours per day, while 8-10 year-olds had close to eight hours of media exposure per day (Lamontagne, Singh, &

Palosky, 2010). In the same study, 7th through 12th graders reported spending an average of one hour and 35 minutes sending or receiving text messages per day. As teens get older, their engagement in these types of media decreases. Vorhaus (2007) supported the decrease of text messaging with age by reporting a significant decrease in the use of text messaging after the age of 24, similar to the decreases with both IM and blogging. Forty-six percent of users in the 18 to 24 year-old age group reported texting regularly, as opposed to only 19% of users in the 25 to 34 year-old age group (Vorhaus, 2007).

Youth in the United States use text messaging for a variety of reasons and often cite the maintenance of privacy in communication as one of the most enticing features (Aoki & Downes, 2003). In Japan, over 53% of 15-29 year-old texters reported that they use text messaging to talk to someone in privacy from their family members, while less than 15% of 30-49 year-old texters agreed (Hashimoto et al., 2000, as cited in Ishii, 2006). Texting may provide an element of social cohesion in youth's peer groups while at the same time becoming a tool of emancipation from youth's homes (Ling, 2007). Ishii's (2006) nationwide Japanese study indicated that young, unrelated friends who had frequent face-to-face contact were the most likely to use text messaging, and of those users, texting was preferable for those who tended to avoid direct communication. Texting, more so than communication over the internet, was primarily used to maintain existing connections rather than create new bonds (Ishii, 2006).

Regarding sex differences, in a study of adolescents, girls (63%) were more likely to carry cell phones with them than boys (48%; Davie et al., 2004, as cited in Faulker & Culwin, 2005). They also indicated that females averaged 6.3 texts and males averaged 4.8 texts per day, and it is very likely that these numbers have increased with the introduction of cell phones with more capability for texting since that time.

Because adolescents spend more time engaging in text messaging than ever before, a review of their compulsive use and its relation to their social-emotional behavior is warranted.

Compulsive EMC Use

A specific potential negative factor that may be associated with text messaging is the compulsive use of this format of interaction. Compulsive use has been referred to by several different terms in previous literature, including "problematic use" and "addiction." For the purposes of this study, the term "compulsive use" will be used to describe this construct. Compulsive use can be defined as a behavioral dependence on maladaptive patterns of EMC. One limitation in previous research is that compulsive text messaging has been studied very little. Therefore, although text messaging is the focus of this study, theory in this arena will borrow from the ample research on compulsive internet use and be applied to text messaging. A brief review of the scarce research related to compulsive text messaging will be examined first. Then, compulsive internet use theories will be reviewed, including a description of internet addiction, psychological factors associated with it, and youth's problematic use. The application of internet theory to text messaging theory is warranted given the similarities in interaction made possible by the two EMC formats.

Compulsive Text Messaging

There is very little research focusing on people's compulsive text messaging. Compulsive text messaging, in particular, can be defined as a behavioral dependence on maladaptive patterns of text messaging. Compulsive texting is more complex than frequency of texting. Not only is the amount, or frequency, of time people spend texting related to their compulsive use, but their thoughts, feelings, and behaviors related to texting are involved as well. As will be further outlined in the Methods section of this manuscript, careful consideration was paid to

differentiating between survey questions that pertain to compulsive text messaging and those that focus on adjustment variables such as depression and loneliness.

Communication via the internet and communication via text messaging share many similar qualities but also have important differences. The internet and text messaging allow for rapid, relatively cheap communication within one's peer network, and they both share a text-based approach to interaction (Bryant, Sanders-Jackson, & Smallwood, 2006). Although instant messaging and blogging are typically free once one has internet access, texting sometimes requires payment per message (Ling & Baron, 2007), but cell phone plans are increasingly addressing this by offering free, unlimited in-network texting plans. Youth appear to have similar social uses for texting as they have for instant messaging, and texting allows for a similar type of multi-tasking that is afforded by communicating online (Lenhart, Madden, & Hitlin, 2005). However, text messaging and internet communication differ in some important ways.

In contrast to the internet, texting allows for the user to have the device needed for communication with them at all times. This feature potentially enables youth to use text messaging even more compulsively than the internet. Further, text messaging does not allow the same type of anonymity afforded by the internet, as the user must have been given the recipient's phone number somehow and vice versa (Bryant, Sanders-Jackson, & Smallwood, 2006). The user also is required to input the messages in different ways, as texting uses thumbs on a small phone keypad, while interacting via the internet requires all ten fingers on a full-sized computer keyboard (Ling & Baron, 2007). These researchers also reported that while individual text messages were longer in length than individual instant messages (IMs), the average length of a complete conversation was longer in IM, as IMs are typically sent in quick succession. Additionally, Ling and Baron (2007) found that more unambiguous abbreviations, or "text

speak," were used in text messages than in IMs, and vowels were more frequently left out of words, as well as punctuation not being used properly (Ling & Baron, 2007).

Despite these differences, it is likely that compulsive use trends may be similar between text messaging and internet communication given their numerous similarities. Perhaps individuals are drawn to, and thus become addicted to, the same communicative properties present in all forms of EMC. It is clear that text messaging and the internet have many similarities and some potentially important differences that warrant a review of compulsive internet use in order to borrow theory for the construction of this study.

Description of Compulsive Internet Use

Caplan (2007) referred to the phenomenon of compulsive internet use as "problematic internet use" and described it as a multidimensional syndrome consisting of cognitive and behavioral symptoms that result in negative social, academic, and professional consequences. It is a point of debate whether internet addiction should be considered its own psychiatric disorder with specific diagnostic criteria. Although it is not currently included in the Diagnostic and Statistical Manual – Fourth Edition, Text Revision (DSM-IV-TR), many professionals are pushing to have it included in the upcoming DSM-V. Some professionals believe that internet use is only problematic when it is used for certain activities, such as gambling or aggression, and most particularly in users who have demonstrated impulsive, addictive behaviors in other areas as well (Cao, Su, Liu, & Gao, 2007; Yellowlees & Marks, 2007). Beard and Wolf (2001) indicated that excessive internet use does not meet all of the criteria necessary to diagnose other addictions, such as physical withdrawal. Beard (2005) noted that regardless of whether it is considered its own disorder, many people are developing a harmful dependence on the internet which relates to their social, educational, and occupational functioning.

Griffiths (2000) described his adaptation of the DSM-IV diagnostic criteria for internet addiction. If a person fits three or more of seven areas, he or she is considered dependent on the internet. These areas include: assessing for tolerance; determining whether the person spends more time on the internet than intended; determining whether the person is engaging in online activities that promote staying online for a longer period of time; determining whether social, occupational, or recreational activities have been abandoned to spend time on the internet; determining whether use has continued despite more problems at home, work, or school; determining whether the person has made unsuccessful attempts to cut down on the amount of time spent online; and determining whether withdrawal symptoms exist. Griffiths (2000) also noted the importance of salience, mood modification, conflict, and relapse in determining if one meets criteria for internet addiction. Young (1996, as cited in Beard & Wolf, 2001) changed pathological gambling criteria to apply to internet addiction and made the threshold more stringent. Beard (2005) proposed a model for conceptualizing problematic internet use, incorporating biochemical, genetic, psychological, familial, environmental, and cultural components. This model suggests that the more time a person spends on the internet and the greater the availability of the internet, the more prone he or she will be to develop an internet addiction. This is particularly salient when applied to text messaging, as cell phones are more easily accessible than computers. Beard (2005) also suggests that expectations and peer pressure from friends to participate in online activities may contribute to people's problematic internet use, which may be particularly true for youth and their text messaging behaviors.

Problematic internet use is possible across ages and social, educational, and economic contexts. Children may potentially become addicted to interactive websites, such as Webkinz, given that they are responsible for caring for their pets and their pets give them positive

reinforcement as they are cared for (Conforti & Dellinger-Pate, 2008). Full-time college students, in particular, were described as being more likely to be addicted to the internet given their unlimited access to the internet and flexible time schedules (Chak & Leung, 2004). Over 18% of British college students of a 371 person sample were considered to be pathological internet users (Niemz, Griffiths, & Banyard, 2005), and early estimates stated that approximately 6% of internet users suffer from internet addiction (Greenfield, 1999, as cited in Young, 2007), yet that number appears to be growing. Males and females did not differ in time spent online or number of problems experienced (Brenner, 1997; Kim et al., 2006).

Psychological Factors

Those engaged in problematic internet use described themselves as bold and assertive, yet depressed and lonely (Young, 1998, as cited in Beard, 2005). Individuals with compulsive internet use reported the highest degree of loneliness, depressed mood, and compulsivity in a cross-sectional study of 13,588 internet users (Whang, Lee, & Chang, 2003). Reid and Reid (2007) cited several studies that indicate that lonely, anxious, and depressed individuals feel positive emotions as a result of online interaction, which leads to excessive and problematic internet use, and they presented the case that the same may be true for texters. In one cross-sectional study by the same researchers, texters who declared a preference for texting over talking on their cell phones were both lonelier and more anxious than those who preferred talking (Reid & Reid, 2005).

Further, Chak and Leung (2004) found that the higher the tendency of a person being addicted to the internet, the shyer the person is, the less faith the person has, and the higher trust the person places on chance in determining the course of his or her life. As with other addictions, problematic internet users reported feeling exhilarated and competent in using internet

communication and spent an average of 38 hours per week on the internet. Most users tried and failed to decrease their amount of time online despite other areas of their lives being significantly affected (Young, 1998, as cited in Beard, 2005). In one cross-sectional study, Brenner (1997) showed that 80% of nearly 600 average internet use participants indicated at least five internet use-related problems, such as missed sleep and poor time management, which suggests that interruption of daily life by use of the internet is the norm. Some participants reported serious problems consistent with other addictions, such as trouble with employers or social isolation (Brenner, 1997). It has been proposed that, because approximately 50% of people use the internet to procrastinate and these 50% spent about 47% of their time online procrastinating, procrastination may account for lapses in productivity, leading to occupational and academic difficulties (Lavoie & Pychyl, 2001). Time disruption, which interferes with work and routines, appears to be the most distressing aspect of compulsive internet use, while other aspects of higher levels of time spent on the internet could possibly be positive (Chou, Condron, & Belland, 2005). Similar trends may appear with compulsive text messaging.

Youth's Problematic Use

Several areas of youth's lives might be affected by problematic internet use. Nalwa and Anand (2003) studied 16 to 18 year-old students in India to determine their addiction to the internet. "Dependents" were shown to delay their schoolwork to spend time online, lose sleep, and feel as though life would be boring without the internet. In this cross-sectional study, they also scored higher than those students who were not dependent on the internet on a measure of loneliness (Nalwa & Anand, 2003). In contrast, Caplan (2007) described the relation between loneliness and preference for problematic online social interaction over face-to-face interaction as spurious, and he suggested that social anxiety is the confounding factor. Liu and Kuo (2007)

demonstrated that the more social anxiety and discontent with their peer interactions youth experienced, the more addicted they were to the internet. Ha et al. (2007) found that Korean adolescents addicted to the internet scored significantly higher in measures of depression and obsessive compulsive disorder. Kim et al. (2006) supported this claim regarding depression and also indicated that internet-addicted Korean adolescents were more likely to report higher levels of suicidal ideation than their non-addicted counterparts. Longitudinal studies are needed to further examine the results of many of these studies.

In a study of 2,114 Taiwanese high school students, researchers not only found evidence of depression being related to internet addiction, but they also found that symptoms of ADHD in males and females and hostility in males were associated with internet addiction (Yen, Ko, Yen, Wu, & Yang, 2007). Further, the qualities of interpersonal relationships and the parent-child relationship in a sample of 611 Taiwanese students were related to internet addiction, with higher quality relationships relating to less addiction (Liu & Kuo, 2007). College students with pathological internet use tended to display academic problems in addition to their social and interpersonal problems and lower self-esteem (Niemz, Griffiths, & Banyard, 2005).

Compulsive internet use, including IM and blogging formats of communication, clearly presents an opportunity for negative adjustment. There is the potential for positive adjustment as well. Similarly, text messaging may relate to both positive and negative adjustment in youth, beyond compulsive frequency of use. Adjustment related to internet communication will continue to be applied to text messaging in order to assess potential types of adjustment related to text messaging.

EMC and Social-Emotional Behavior

EMC has a unique set of potentially positive and negative correlates beyond the focus of compulsive use. In Lister's (2007) study of junior high and high school students, higher ratings of IM use were related to higher levels of positive online interactions and more use also was related to higher levels of online aggression. Further, higher ratings of blog use were related to higher levels of positive online interactions (Lister, 2007). Regarding other adjustment factors, empirical findings to date have presented mixed results.

EMC and Positive Adjustment

There is a wide variety of potentially beneficial uses of EMC for social interaction, including staying in touch with friends, saying positive things about others, helping others with homework and other activities, and being able to contact more than one person at a time in order to save time. Lister (2007) found that approximately 89% of adolescents reported engaging in online prosocial behavior, while 80% reported being recipients of online prosocial behavior. Adolescents reported engaging in more online prosocial behavior than online aggression, and females were significantly higher than males in their online prosocial behavior. Further, adolescents' engagement in online prosocial behavior was related to their engagement in face-to-face prosocial behavior, so adolescents who were prosocial during face-to-face interactions were also prosocial online and those who were the recipients of prosocial behavior face-to-face were the recipients of prosocial behavior online (Lister, 2007).

Larson (2003) suggested that children have developed effective online relational behaviors and are able to establish trust and intimacy online, and dispute resolution and problem-solving skills are likely to develop online as well. Interactive websites, such as Webkinz, have encouraged children to correspond with their peers on a "friends list" and send predetermined, positive messages to one another (Conforti & Dellinger-Pate, 2008). In a cross-sectional study,

Morgan and Cotten (2003) found that higher levels of e-mail and IM use among college students were associated with lower levels of depressive symptomatology. In a longitudinal study, Shaw and Gant (2002) found that engaging in online chat sessions among extroverted college students was significantly related to lower levels of loneliness and depression and higher levels of perceived social support and self-esteem. Although extroverted users tend to use the internet to reinforce preexisting bonds, it is conceivable that the internet provides introverted users with an anonymous forum to find new friends and social outlets to compensate for what they lack offline (Gross, Juvonen, & Gable, 2002). IM users, especially women, became significantly happier after an IM rather than a face-to-face conversation with a stranger (Green et al., 2005).

Hu, Wood, Smith, and Westbrook (2004) found that IM use relates to higher levels of intimacy, as the amount of IM use was positively associated with verbal, affective, and social intimacy. Campbell, Cumming, and Hughes (2006) suggested that socially fearful individuals in a cross-sectional study who use the internet as a type of low-risk social approach and an opportunity to practice social behavior and communication skills may be helped by their rehearsals online in order to improve their offline interactions. Ishii (2006) highlighted cross-sectional studies suggesting that texting is related to a greater level of social activities, although very little information is available regarding the relation of texting and interpersonal relationships in daily life. Texting also is a unique mode of communication that has been shown to relate to social cohesion in peer groups, while other technologies (such as television and certain use of the internet) do not relate as strongly to social cohesion (Ling, 2007).

In terms of internet use and academic adjustment, the more children reported using the internet, the higher their scores were on standardized tests of reading achievement and higher grade point averages in the HomeNetToo project, in which computer and internet access was

granted to low socioeconomic status families for a period of 16 months (Jackson et al., 2006). In this study, a causal direction was not established, so it is uncertain whether higher levels of internet use impacted the children's higher performance scores or whether children's higher academic abilities influenced the amount of time they spent online. Again, more longitudinal studies are needed in this area of study.

Texting may be used effectively for unique tasks, such as disseminating information and promoting administrative communication in higher education settings while supporting students' transitions to college (Harley, Winn, Pemberton, & Wilcox, 2007; Naismith, 2007) and reminding patients of primary care appointments, thus improving attendance (Leong et al., 2006). Further, texting has shown some success as an aftercare method for treatment of bulimia nervosa and smoking cessation (Bauer, Percevic, Okon, Meermann, & Kordy, 2003; Obermayer, Riley, Asif, & Jean-Mary, 2004). The use of media technology has also been examined as a support for mental health and social services (Brown & Marin, 2009), and its use in various clinical settings is growing (Nunes et al., 2010).

Given the potential for positive adjustment related to the use of EMC, it appears that there may be a fine line between positive adjustment and negative adjustment given the level of compulsivity related to one's use.

EMC and Potential Negative Adjustment

However, other studies have shown that negative factors also are related to EMC. Some online formats provide settings for higher levels of competition, even between very young children (Conforti & Dellinger-Pate, 2008), which could relate to positive or negative adjustment. Analyses of longitudinal data found that as teenagers and adults in families spent more time online, they experienced greater declines in social and psychological well-being

(Kraut et al., 1998). Negative correlates are particularly noteworthy when harassment or aggression is involved.

Internet harassment, while sparsely documented, is an overt, intentional act of aggression toward another person online (Ybarra & Mitchell, 2004a). The Centers for Disease Control and Prevention (CDC) described electronic aggression as any type of harassment or bullying that occurs through e-mail, a chat room, IM, a website (including blogs), or text messaging (CDC.gov). The CDC provided examples of electronic aggression, including disclosing someone else's personal information in a public area in order to cause embarrassment, posting rumors or lies about someone in a public area, distributing embarrassing photographs of someone by posting them in a public area or sending them via e-mail, assuming another person's identity to post or send messages about others with the intent of causing the person harm, and sending mean, embarrassing, or threatening text messages, IMs, or e-mails (CDC.gov). In a cross-sectional study, Rock et al. (2006) concluded that the internet is being used as an outlet for indirect aggression among adolescents, particularly for older participants and females. Fifteen percent of young people aged 10 to 17 years-old have been self-reported online aggressors (Ybarra & Mitchell, 2004b), while 6% of youth claimed to have been targets (Finkelhor, Mitchell, & Wolak, 2000). Lister (2007) found that approximately 35% of adolescent EMC users reported being agents of online aggression at times, while 25% reported being recipients of online aggression. For these adolescents, online aggression was related to face-to-face aggression, indicating that the youth who were aggressive toward others online were the same youth who were aggressive toward others when face-to-face, and those who were victimized face-to-face were also victimized online. Further, males and females were similar in their rates of online aggression (Lister, 2007). In the college population, between 10-15% of students reported

receiving repeated e-mail or IM messages that "threatened, insulted, or harassed" (Finn, 2004). Although most targets of online aggression reported being relatively unaffected, approximately one-third felt at least one symptom of stress following an incident (Finkelhor et al., 2000). In one study, almost half of the victims of internet aggression did not know the identity of their bullies (Kowalski & Limber, 2007).

Ybarra and Mitchell (2004a) showed that both youth aggressors and victims of internet aggression tended to report significant negative psychosocial symptoms, including depressive symptomatology, problem behaviors, and involvement in traditional face-to-face aggression. Reports of depressive symptomatology are particularly related to being targets of internet harassment (Ybarra, 2004). Further, aggressors face specific challenges such as poor parent-child relationships, substance use, and delinquency (Ybarra & Mitchell, 2004b). Females who had high levels of conflict with parents or were highly troubled were more likely than other females to form close relationships with strangers on the internet, as were males who were highly troubled or had low levels of communication with parents (Wolak, Mitchell, & Finkelhor, 2003). The causal direction of these relations is unknown, so it is unclear if youth's conflict with others influenced them to reach out to others online or if forming close relationships online negatively impacted their family relationships.

Regarding text messaging, there is evidence that the extended use of mobile communication may relate to adolescents' sleep or lack thereof (Van den Bulck, 2003). Further, mobile phone communication offers other specific concerns that are not necessarily possible over the internet given the potential for youth to carry phones with them at all times. For instance, texting has been shown to be affecting youth in the classroom in that it provides ample

opportunity for them to cheat during exams in a way that was never before possible (May & Hearn, 2005).

Limitations of Previous Studies

There are several limitations to the empirical studies described above that focused on the relation between EMC use and indices of children's and adolescents' adjustment. First, selection bias appears to have been a concern in many of the studies, meaning that the researchers typically only used accessible samples of participants to support their hypotheses and often focused only on internet users rather than on both internet users and non-users. Also, the research could have been affected by the willingness of potential participants to partake in the studies. There also is a lack of naturalistic observation, and researchers could have added to their studies by observing youth online or having them keep diaries of their use. Researchers tend to rely only on self-reports. Further, there is a lack of experimental studies and a significant scarcity of longitudinal data. Most of the studies reviewed were cross-sectional and correlational in nature and offered no insight into causality. So it is equally possible that significant relations between EMC and adjustment are due to EMC affecting adjustment or to pre-existing adjustment affecting EMC use. It would be beneficial to follow up on some of these studies to observe long-term relations and adjustment. Next, there is a lack of ethnographic depth in the research design of the studies described above, meaning that the researchers did not gain multiple perspectives on the youth's use and did not follow their participants long enough to see patterns in the youth's EMC use and its correlates. Altogether, these limitations preclude the determination of the directionality of the relations between EMC use and adjustment. In other words, it is important to emphasize again the point that it is unclear whether EMC use in the referenced studies influenced the participants' behaviors or whether their behaviors influenced their EMC use.

Given the numerous adjustment patterns, particularly negative, that are possible in conjunction with compulsive text messaging, it is necessary to review resilience and potential protective factors that may apply to compulsive text messaging. Moderators of use in other compulsive behavior studies (i.e., substance use) will be examined to identify potential moderators of potential negative effects of compulsive text messaging. The resilience model that has been widely used to understand risk and protective factors in youth's adjustment will be reviewed and applied.

Resilience

Rutter (1990) defined resilience as individual variations in positive response to risk factors in the face of stress and adversity. Resilience involves three separate types of reactions, including good adjustment in high-risk children, sustained competence in children under stress, and recovery from trauma (Masten, Best, & Garmezy, 1990). In order to understand resilience, it is essential to understand risk factors because resilience requires the presence of risk factors that one must overcome. If risk factors do not exist, a person's individual, family, and external factors are not likely to be considered protective because there is little or no threat by a risk factor to the person's adjustment. In the present research, compulsivity of text messaging is considered a risk factor.

An important feature of resilience is its ability to vary from situation to situation and across developmental levels (Rutter, 1990). That is, it is possible for people to display negative adjustment in the face of risk factors in some cases while simultaneously showing resilience and utilizing protective factors in the face of other risk factors. Alternatively, it is possible to show resilience in one domain (e.g., in social adjustment) but not in other domains (e.g., academic). Developmental stages must be considered as well, as some youth display resilience as young

children but have problems adapting to risk factors in later childhood or adolescence, or vice versa.

Children's resilience was first studied in the children of parents with schizophrenia in order to determine how the children were adapting and developing in the face of this significant stressor (Luthar, Cicchetti, & Becker, 2000). Because many children seemed to thrive, even in the presence of this serious risk factor, studies began to focus on children's resilience in the face of other stressors (e.g., parental separation/divorce; poverty). Researchers also attempted to explain the underlying mechanisms by which children respond to risk factors, i.e., protective and vulnerability factors.

Rutter (1990) described protective and vulnerability factors as follows. A protective factor (e.g., a supportive family environment) changes the trajectory of a child facing a risk factor from a negative adjustment to a positive adjustment trajectory, whereas a vulnerability factor (e.g., lack of parental supervision) changes the trajectory of a child facing a risk factor from a negative trajectory to an even more maladaptive trajectory. Luthar et al. (2000) expressed concern over these constructs by identifying the problematic ways in which people use the terms "protective" and "vulnerability" factors in varied, inconsistent ways. Within the framework of resilience, when stressors are present, protective and vulnerability factors contribute to some type of change in behavior given the accompanying risk factors. Protective and vulnerability factors are considered opposite ends of the same spectrum (Rutter, 1990). For instance, if positive family relationships can be considered a protective factor that contributes to positive adjustment when faced with risk, then negative family relationships can be considered a vulnerability factor that contributes to even more negative adjustment when faced with risk. In sum, Rutter (1990) described a protective factor as helping to improve a situation and protect against risk factors,

while a vulnerability factor typically makes the situation worse and exacerbates risk factors. As with any factors that serve as moderators of effects between two variables, protective and vulnerability factors have indirect effects that are dependent on an interaction between the risk and protective/vulnerability factor variables (Rutter, 1990). Processes, rather than factors, are currently the focus of resilience studies due to researchers' quest to learn *how* factors contribute to positive adjustment, rather than simply knowing which factors contribute to positive adjustment (Luthar et al., 2000).

The examination of protective factors that relate to resilience is warranted. For example, children who experience adversity recover more successfully when they have a positive relationship with a competent adult, are good problem solvers, are engaging in relation to other people, and have areas of competence and perceived efficacy valued by the self or society (Masten et al., 1990). A triad of protective factors has been proposed by Garmezy (1991), which organizes protective factors in terms of individual attributes or temperament (e.g., activity level and cognitive skills), family support (e.g., positive parent-child interactions, warmth, and cohesion), and external support (e.g., a strong parental substitute, committed teacher, and the presence of an institutional structure, such as involvement in social or religious organizations). Using this triad of protective factors, it is expected that potential positive moderators in relation to compulsive text messaging, or factors that might mitigate the expected negative association between compulsive text messaging and adjustment, will include individual factors, family support, and external support. Further, it is suspected that potential vulnerability factors, or factors that might exacerbate the relation between compulsive text messaging and negative adjustment, will include a lack of positive individual attributes, family support, and external support. Because studies have not examined the role of protective factors in the face of the risk

factor of compulsive text messaging, a review of protective factors in other compulsive behavior studies is warranted.

Individual Factors

Individual factors, such as psychological attributes, serve to protect youth against potential risk factors related to substance abuse and subsequent addiction. For example, Hüsler et al. (2005) reported that personal variables, such as a secure sense of self, gain protective power against negative peer pressure. Desousa et al. (2008) reported that greater life satisfaction served as a protective factor against developing alcohol dependence in the face of frequent binge drinking. In Griffin et al.'s (2001) study, adolescents with high personal competence skills, defined as effective cognitive and behavioral self-management strategies, reported greater psychological well-being. Greater well-being predicted less substance use, indicating that competence skills protect youth by enhancing well-being. The researchers claimed that prevention programs should aim to enhance competence in order to promote resilience (Griffin et al., 2001). Clinton-Sherrod et al. (2005) found that interventions focusing on coping skills during the transition to middle school may be effective in delaying the onset of substance use for sixth graders. Therefore, it appears that positive coping skills serve as a protective factor for young adolescents at risk for substance abuse.

When considering vulnerability factors, the opposite is true. Youth with negative psychological attributes tend to be at an increased risk for compulsive behaviors. In a study that focused on youth at risk for cannabis use, adolescents with social skill deficits demonstrated negative mood, a delinquent peer network, and delinquency, and a lower level of other protective factors, such as family relations and a secure sense of self (Hüsler, Plancherel, & Werlen, 2005).

It is possible that the protective and vulnerability factors from this domain of individual attributes also are applicable to compulsive text messaging.

Two individual protective factors that have not been applied to compulsive behaviors in previous studies are of interest, including effortful control and conscientiousness. Effortful control can be defined as the ability to inhibit a dominant response to perform a subdominant response or the efficiency of executive attention, including the ability to inhibit a dominant response and/or to activate a subdominant response, to plan, and to detect errors (Rothbart & Bates, 1998). Effortful control includes attentional regulation (the ability to voluntarily manage attention), inhibitory control (to inhibit behavior as needed to adapt), and activational control (to activate behavior as needed to adapt). Self-regulation is greatly impacted by a person's effortful control of his or her temperament (Eisenberg, 2005). Studies have shown that effortful control can serve as a protective factor in the face of particular risk factors. For example, effortful control is predictive of resilience and school readiness in children who have been exposed to significant stressors (e.g., homelessness, mothers experiencing job loss, mothers entering welfare system; Li-Grining, Votruba-Drzal, Bachman, & Chase-Lansdale, 2006; Obradovic, 2010). Given that effortful control predicts children's preparedness for school, it is likely that having higher levels of effortful control may moderate potentially negative effects of compulsive texting on academic adjustment. Effortful control is also an important protective factor against the development of behavioral and emotional problems. In one study, it served as a protective factor for children who had one parent deployed in the military (Morris & Age, 2009). It is also a protective factor for children with anxiety disorders (Muris, 2006). In another study, low levels of effortful control were associated with an elevated risk for conduct problems (Loukas & Murphy, 2007). Therefore, effortful control can be protective for emotional adjustment as well as

school adjustment, so it is predicted that higher levels of effortful control may protect children who engage in compulsive text messaging from experiencing negative psychosocial adjustment.

Conscientiousness can be defined as task and goal-directed behavior and socially prescribed impulse control, such as being dependable, organized, productive, reliable, and thorough (John, Caspi, Robins, Moffitt, & Stouthamer-Loeber, 1994). Conscientiousness has been identified as a specific protective factor in a variety of studies for individuals with various risk factors. For example, conscientiousness was identified as having a protective effect on the progression of symptoms for people with HIV (Ironson & Hayward, 2008), given that the disease progressed more slowly over the course of four years for individuals with higher levels of conscientiousness (Ironson, O'Cleirigh, Weiss, Schneiderman, & Costa, 2008). Further, in a longitudinal study, it was discovered that people who are more conscientious have greater longevity and are less likely to commit suicide (Friedman et al., 1995), and the author concluded that conscientiousness may have wide-ranging effects on health. Lester (2001) believed that this is due to people with higher levels of conscientiousness potentially being better able to cope with stress because they have prepared themselves for it (e.g., may be more likely to adhere to a treatment regimen). They may also be less impulsive, more productive, and have a stronger and healthier social support network (Lester, 2001). Given the protective nature of conscientiousness in relation to maladjustment in other studies, it is likely that it will serve as a protective factor for youth who compulsively text.

Family Support

In other compulsive behavior research, Kostelecky (2005) reported that close relationships with parents served a protective purpose for youth at risk for substance abuse problems after experiencing significant life events such as receiving failing grades in school or

losing a loved one. Adolescents who perceived themselves as having a close relationship with their parents had lower levels of substance use than their peers without close parental relationships (Kostelecky, 2005). Desousa et al. (2008) reported that strong parental bonds were protective factors against frequent binge drinking. Myers et al. (1997) concluded that positive parental and family characteristics protected against future risk of substance use by enhancing anti-drug attitudes. In a study of adolescent pregnant females who used substances prior to pregnancy, Rhodes, Gingiss, and Smith (1994) concluded that girls at risk for substance use during their pregnancies who identified having parents or mentors who provided high levels of support were less likely to consume alcohol during their pregnancies. In a longitudinal study, Gjeruldsen, Myrvang, and Opjordsmoen (2003) reported that 74% of former drug addicts at risk for relapse were able to refrain from using drugs within a 25 year period, and many believed that help and support from family and friends assisted them in reaching this achievement.

Hüsler et al. (2005) reported that family relations lose all protective value against the risk factor of negative peer pressure. Best et al. (2005) showed that adolescent cannabis users were less likely to spend time regularly with both their mothers and fathers and instead spent their time with friends who also used cannabis. Similarly, in a study of adolescents at risk for using inhalants, less attachment to parents and school was a vulnerability factor in that it strongly predicted adolescents' use of marijuana, alcohol, and inhalants (Mosher et al., 2004). Therefore, it appears possible that family support has less of a chance of serving a protective role in youth whose risk factors include spending time with peers who use substances and who pressure them to use. In adolescents whose risk factors included taking prescription stimulants in a non-medical fashion, those who reported the vulnerability factor of high family conflict were more likely than their peers to abuse the prescriptions non-medically (Herman-Stahl et al., 2006). It is presumed

that protective and vulnerability family factors for substance addiction also apply to compulsive text messaging.

Parental monitoring in particular has been demonstrated as a protective factor in several studies, particularly against risky behaviors. For example, parental monitoring was identified as a protective factor in a meta-analytic review of teens who use marijuana (Lac & Crano, 2009). Rodgers and Fleming (2003) demonstrated that high levels of parental monitoring and parental support were protective factors in Native American youth at risk for alcohol abuse due to having high levels of stress while living on a reservation. It appears that parental monitoring served as a protective factor against frequent alcohol abuse for youth with a risk factor of occasional alcohol use. Similarly, parental monitoring was deemed "a universal protective factor for adolescents" by researchers who studied smoking, binge drinking, and marijuana use of teens (Piko & Kovcs, 2010). In another study, researchers concluded that parental monitoring may be protective for teens whose parental monitoring was negatively associated with their ecstasy use (Wu, Liu, & Fan, 2010). Given its role as a protective factor for teens engaged in other risky behaviors, it is likely that parental monitoring will serve as a protective factor for teens who compulsively text.

External Support

In Rodgers and Fleming's (2003) study, simply having an adult, regardless of whether the adult was the parent, who monitored teens' behaviors was a significant factor against alcohol use. Among youth who used alcohol, those who believed an adult was monitoring their behavior were three times less likely to report drinking in a subsequent 1 month period than those who did not believe they were being monitored (Rodgers & Fleming, 2003). It appears that adult monitoring within the community served as a protective factor against frequent alcohol abuse for youth with a risk factor of occasional alcohol use. Further, Galaif et al. (2007) reported that

youth's law abidance was significantly negatively correlated with adolescent drug use. Therefore, because societal factors offer a protective role for youth at risk for drug abuse, they also may offer a protective role for compulsive text messaging.

Positive peer relationships can serve protective roles, while peer pressure and negative interactions can serve as vulnerability factors in youth at risk for substance use. For example, adolescent cannabis users are more likely to spend time with friends who smoke, drink alcohol, use illicit drugs, and are involved in criminal activity (Best et al., 2005). Therefore, adolescent cannabis users are likely to be susceptible to higher substance abuse given the presence of these vulnerability factors. Similarly, peers may contribute to adolescents' vulnerability toward developing compulsive text messaging behaviors because youth may feel the need to respond to peers who texted them in a timely fashion, which may impact those with the risk factor of higher levels of text messaging.

In a study of multiethnic adolescent boys, Galaif et al. (2007) reported that school involvement was significantly negatively correlated with adolescent drug use. Desousa et al. (2008) reported that strong bonds to school and lower levels of being a target of bullying were protective factors against frequent binge drinking in youth with a risk factor of alcohol use. Sullivan and Farrell (1999) reported that a combination of protective factors, including school and family features, significantly predicted lower levels of beer, wine, liquor, or composite drug use and moderated the risk for cigarette use in youth at risk due to a history of alcohol and nicotine use.

Youth's involvement in extracurricular activities, both in and out of school, also has been identified as a protective factor in several studies. For example, being involved in extracurricular activities was a protective factor for both males and females at risk for becoming violent juvenile

offenders (Hart, O'Toole, Price-Sharps, & Shaffer, 2007). For teens in an urban high school, involvement in extracurricular activities, both after school and during the summer, served as a protective factor and assisted them in achieving at high levels academically (Reis, Colbert, & Hebert, 2005). In another study, adolescents' participation in organized group activities was protective against their substance use, including cigarettes, alcohol, and marijuana (Elder, Leaver-Dunn, Wang, Nagy, & Green, 2000). It is likely that involvement in extracurricular activities will also serve as a protective factor for teens who compulsively text.

Within addiction research, it is important to note that the factors that serve as protective or vulnerability factors for one sex may not be the same for the opposite sex. For instance, females who reported binge drinking and selling drugs were more likely to use methamphetamine than were males who reported the same behaviors (Herman-Stahl et al., 2006). It is possible that differences will be evident between boys' and girls' protective factors related to their compulsive text messaging.

Present Study

The purpose of the present study was to address many questions still unanswered regarding children's and adolescents' compulsive text messaging. First, it was expected that a majority of youth have engaged in text messaging and that, consistent with Davie et al.'s research (2004, as cited in Faulker & Culwin, 2005), girls engage in text messaging more than boys (hypothesis 1). Exploratory analyses were computed to examine ethnic and family structure differences in youth's frequency of text messaging.

Then, youth's compulsive text messaging behaviors were examined and compared to their frequency of use. It was expected that there would be a positive correlation between the frequency and compulsivity of youth's text messaging behaviors (hypothesis 2). While there was

no evidence that a sex difference should exist and therefore a hypothesis was not warranted, sex differences in youth's compulsivity of text messaging were explored as well.

Next, youth's depression, loneliness and quality of social relationships, aggression, prosocial behavior, and academic adjustment (i.e., grades, school bonding, and perceived academic competence) were examined as they related to their compulsivity of text messaging. Given the literature review above that highlighted the positive correlations between compulsivity of internet use and depression, loneliness, and aggression and the negative correlations between compulsivity of internet use and prosocial behavior and academic adjustment, it was hypothesized that the levels of depression, loneliness, and aggression would increase as the compulsivity of text messaging increased; and academic variables and prosocial behavior would decrease as the compulsivity of text messaging increased (hypothesis 3).

Given that not all youth who show compulsive behaviors were expected to exhibit negative adjustment, it was important to identify factors that protect youth from negative behaviors associated with compulsive text messaging. For the purposes of the present study, the individual protective factors of interest were youth's effortful control and conscientiousness. For those with higher levels of effortful control and conscientiousness, it was hypothesized that there would be non-significant relations between compulsive texting and internalizing problems, aggression, academic adjustment, and prosocial behavior. Students with lower levels of self-control would have significant positive relations between compulsive texting and internalizing problems (hypothesis 4a) and aggression (hypothesis 4b) and significant negative relations between compulsive texting and academic adjustment (hypothesis 4c) and prosocial behavior (hypothesis 4d).

The family support protective factors of interest were parents' knowledge of and monitoring of their children's behaviors. In previous studies, 41% of parents reported being either "very" or "somewhat" concerned about the amount of time their children spend text messaging (C.S. Mott Children's Hospital, 2009). Further, only about 30% of youth reported having rules about the amount of time they spend using media, but those whose parents did set limits spent significantly less time, about three fewer hours, using media than their peers who do not have rules (Lamontagne, Singh, & Palosky, 2010). It was speculated that parent knowledge and monitoring would moderate the relations between compulsive text messaging and depression, loneliness, aggression, prosocial behavior and academic adjustment. For students whose parents have more knowledge of their activities, there would be non-significant relations between compulsive texting and internalizing problems, aggression, academic adjustment, and prosocial behavior. Students with lower levels of parent knowledge would have significant positive relations between compulsive texting and internalizing problems (hypothesis 5a) and aggression (hypothesis 5b) and significant negative relations between compulsive texting and academic adjustment (hypothesis 5c) and prosocial behavior (hypothesis 5d).

The external support protective factor of interest was youth's involvement in extracurricular activities. It was expected that students with higher levels of extracurricular involvement would have non-significant relations between compulsive texting and internalizing problems, aggression, academic adjustment, and prosocial behavior. Students with lower levels of extracurricular involvement would have significant positive relations between compulsive texting and internalizing problems (hypthesis 6a) and aggression (hypothesis 6b) and significant negative relations between compulsive texting and academic adjustment (hypothesis 6c) and prosocial behavior (hypothesis 6d).

METHODS

Participants and Procedures

Given the great increase of text messaging in the junior high school population in recent years and Kennedy et al.'s (2008) indication that students in the younger elementary school years are less likely to own cell phones than their older counterparts, this study focused on youth in junior high school. Junior high school students are as likely to own a cell phone as high school students, and it seemed likely that they text their peers at a similar rate. Two hundred and thirty-one eighth-grade students were recruited from Wood County, OH schools. One student's survey was not used due to patterned responses. Twelve students' parents returned forms indicating that they did not want their child to complete the survey. Further, seven students were removed from the sample by the school principal for being in a special education class, leading her to believe that they would not be able to appropriately complete the survey. Thus, the final sample consisted of 211 students (see Table 1), representing an approximately 91% response rate. Fifty-three percent of the sample was female, 81% was Caucasian, and 66% had two parents living in the home.

The university's institutional review board granted a waiver of parental consent to recruit participants. Letters describing the study (see Appendix A) were sent to the parents of children in the selected grade levels of the participating schools. The letter described the survey that their children would complete anonymously, how the survey would be administered in their children's school, topics the survey would examine, and why this information was important to parents, teachers, and researchers. The parents were instructed to return a form to the school by a given date if they *did not* want their children to participate in the survey. Next, the researchers visited the schools and provided all participating students with a description of the study and individual

assent forms (see Appendix B), which were returned to the researchers. Students were informed that they did not have to participate if they did not want to, their responses would be anonymous, and they were free to stop participation at any time. Each classroom visit took approximately 45 minutes.

Measures

Overview of Survey

There were several sections of the survey. The first three pages sought demographic information and information on frequency of texting. The demographic questions (see Appendix C) were generally adapted from the Henry J. Kaiser Family Foundation's study (Roberts, Foehr, & Rideout, 2005). Requests for demographic information included student's sex, grade level, and race or ethnic background. Then, questions asking who lives in the students' homes and students' access to cell phones and text messaging were included, followed by frequency of use items. After the demographic and frequency of use sections, the survey included items that assessed youths' compulsivity of text messaging. Then, questions regarding the adjustment variables (i.e., depression, loneliness, aggression, prosocial behavior, academic adjustment) were included. Lastly, questions regarding the moderator variables (i.e., effortful control and conscientiousness, parental monitoring and knowledge of behaviors, and involvement in extracurricular activities) were included.

Frequency of Text Messaging Items

Three frequency of text messaging questions (see Appendix C) elicited information regarding how many days a week and times a day youth use text messaging. The first item began with the stem, "About how many days a week do you text?" and had response options on a 5-point Likert-type scale from "never" to "everyday." The following two questions began with the

stem, “About how many text messages…” and the individual items included “do you send in a day,” and “do you receive in a day?” Nine Likert-type response options ranged from “never” to “over 50.” Higher scores indicated greater use of text messaging.

Compulsivity of Text Messaging Items

Charlton (2002) argued that applying typical addiction to substances criteria to compulsive media use may likely overestimate the number of people addicted to EMC. Most research has focused on problematic internet use rather than compulsive text messaging. An internet addiction measure was adapted to assess youth’s compulsive text messaging, with higher scores relating to more compulsive use.

The items regarding compulsive text messaging (see Appendix D) were adapted from an EMC addiction measure, the Internet Addiction Test (Young, 1998). Young (1998) developed a 20-item questionnaire called the Internet Addiction Test to assess the degree to which people’s internet use affects their daily routine, social life, productivity, sleeping pattern, and feelings and cognitions. For the purposes of this study, the internet addiction questions were altered to assess compulsive text messaging in particular. However, it is important to note that the questions from the original measure that were confounded with the adjustment measures of interest were deleted (e.g., “How often do you feel depressed, moody, or nervous when you are off-line, which goes away once you are back on-line?”). Young’s measure employed a 5-point Likert response scale, ranging from never to always. The IAT was originally based on a compulsive gambling measure, and items were created by changing the words “gambling” or “substance” to “internet,” (Ng & Wiemer-Hastings, 2005). Young adapted the DSM-IV criteria for pathological gambling to relate to internet use for her measure (Widyanto & McMurran, 2004). In their review of the psychometric properties of the IAT, Widyanto and McMurran (2004) highlighted the high face

validity of the measure but subjected it to systematic psychometric testing. Factor analysis of the IAT demonstrated six factors: salience, excessive use, neglecting work, anticipation, lack of control, and neglecting social life. Salience was the most reliable of the factors, but all factors showed good internal consistency and concurrent validity. Items from the salience, excessive use, and lack of control domains were used in this survey, while items from the neglecting work, anticipation, and neglecting social life domains were deleted due to confounding with the adjustment variables in this study. Widyanto and McMurran (2004) concluded that the IAT demonstrated the potential to be a good basis for developing a valid instrument to assess internet addiction. Ngai (2007) utilized the IAT in his study of Hong Kong junior high and high school students and supported Widyanto and McMurran's claim that the IAT demonstrated good reliability and validity in its correlations with predictor variables.

Recall that for the purposes of this study, compulsive text messaging was defined as a behavioral dependence on maladaptive patterns of text messaging, beyond just the frequency or amount of text messaging in any given time period. Youth's thoughts, feelings, and behaviors related to texting contributed to their compulsivity. Potential compulsivity of use items from the IAT were carefully considered in order to be differentiated from frequency of use items and from adjustment items. In order to avoid confounding variables that potentially could arise from using all of the original EMC addiction items in conjunction with the adjustment items, those that appeared to be problematic were eliminated from the compulsivity section. For example, the original item from the IAT stating, "How often do you feel depressed, moody, or nervous when you are off-line, which goes away once you are back on-line?" was confounded with the depression items and was thus removed from the compulsivity scale. The compulsivity items that remained did not overlap with the adjustment items.

After this elimination process, the compulsivity section of this survey contained 14 items adapted from the IAT (see Appendix D). The IAT items began with the stem, "Please tell us how you feel about the following statements," and a sample item was, "How often do you find that you text longer than you intended?" The response options were on a 5-point Likert scale from "always" to "never." The coefficient alpha for the compulsivity items was .87. There were moderate to strong significant correlations among the subscales: excessive use and lack of control, $r(176) = .66$, $p < .01$; excessive use and salience, $r(176) = .49$, $p < .01$; lack of control and salience, $r(176) = .64$, $p < .01$. Therefore, the 14 items were considered together as one factor, compulsivity of text messaging, in future analyses. A mean compulsivity score was calculated, with higher scores indicating greater endorsement of compulsivity of text messaging.

Depression Items

To assess students' adjustment with regard to depression, 20 self-report questions (see Appendix E) were taken from the Center for Epidemiological Studies Depression Scale for Children (CES-DC; Weissman et al., 1980). Each question asked the adolescent how much he or she had felt a certain way in the last week. Response options were on a 4-point scale from "not at all" to "a lot." Two examples of items included, "I felt down and unhappy," and "I did not feel like eating, I wasn't very hungry." Higher scores indicated higher levels of depression. Faulstich et al. (1986) studied the psychometric characteristics of the CES-DC and found that test-retest reliability, internal consistency, and concurrent validity were good when administered to an adolescent population. The coefficient alpha for the depression items in the present study was .87. A mean depression score was calculated, with higher scores indicating greater endorsement of depression.

Loneliness and Quality of Social Relationships Items

Students were assessed with regard to their loneliness and satisfaction with peer relations by completing the Loneliness & Social Dissatisfaction Questionnaire (Cassidy & Asher, 1992b; see Appendix F). This measure included 24 items with three response options each: yes, no, or sometimes. Sixteen of these items assessed loneliness and social dissatisfaction (e.g., "Is it hard for you to make friends at school?"). Eight items that focus on youth's hobbies were considered "filler" items to help children relax and feel at ease while completing the measure (e.g., "Do you like to read?"). The Loneliness & Social Dissatisfaction Questionnaire was based on original works by Asher, Hymel, and Renshaw (1984) and Asher and Wheeler (1985) and has been reformatted so that children are answering questions rather than responding to broad statements. The authors of the Loneliness & Social Dissatisfaction Questionnaire reported adequate internal consistency reliability (α = .79). Further, Cassidy and Asher (1992a) found that children's self-report on their measure demonstrated good construct validity by correlating significantly with peer status, which was assessed via sociometric measures, and teachers' reports of the children's social behavior.

The coefficient alpha for the loneliness and social dissatisfaction items in the present study was .89. After applying necessary reverse-coding, a mean loneliness score was calculated, with higher scores indicating greater endorsement of loneliness and social dissatisfaction.

Data reduction was explored for the two internalizing variables of depression and loneliness by examining their correlation. There was a strong significant correlation between these two variables, $r(208) = .55$, $p < .01$, so these variables were standardized and averaged in order to combine them into a single internalizing variable for future analyses.

Academic Adjustment Items

Items that assessed youth's academic adjustment (see Appendix G) were collected in three formats: grades, school bonding, and perceived competence. First, self-reports regarding youth's grades in school were collected. Students were asked what grades they usually earned, and the response options ranged from "mostly A's," "mostly A's and B's," "mostly B's," to "mostly F's." This format was loosely based on a previous Henry J. Kaiser Family Foundation's study (Roberts et al., 2005).

Then, three school bonding items assessed youth's negative attitudes toward school. The three items (e.g., I care how I do in school) were derived from Jenkins (1997) and displayed satisfactory internal consistency (α = .68). Response options ranged on a 5-point scale from 1 (always) to 5 (never). The coefficient alpha for the school bonding items in the present study was .63. Two of the items were reverse-coded as necessary, and a mean score was obtained, with higher scores indicating greater school bonding.

Next, students completed a specific subscale (i.e., scholastic competence) adapted from the *Harter Self-Perception Profile for Adolescents* (Harter, 1988), which assessed adolescents' perceived competence in several areas of functioning. The scholastic competence subscale consisted of five items that involved pairs of opposing statements describing a particular belief. For instance, one item said, "Some teenagers feel that they are just as smart as others their age BUT other teenagers aren't so sure and wonder if they are as smart." On the original measure, students chose which teenager was more like them and to what extent, ranging from "really true for me" or "sort of true for me," for a total of four response options. For the purposes of this study, the questions were adapted to be asked with a 5-point response option scale ranging from "always" to "never." For example, the stem for all of the items now read, "Please tell us how you feel about the following statements." The item now read, "Some teenagers feel that they are just

as smart as others their age but other teenagers aren't so sure and wonder if they are as smart. Do you feel that you are just as smart as others your age?" The five items generally assessed whether a student felt competent in meeting the demands of school. The internal consistency reliabilities of this subscale ranged from α = .62 to .79 (Harter, 1988). In this study, necessary items were reverse-coded, and higher scores reflected a higher level of perceived competence. The coefficient alpha for the perceived competence items in the present study was .80.

Data reduction was explored for the three academic adjustment variables by examining correlations among the three separate academic measures. There were moderate to strong significant correlations among the following scales: GPA and academic competence, $r(207) = .56$, $p < .01$; GPA and school bonding, $r(206) = .47$, $p < .01$; academic competence and school bonding, $r(207) = .42$, $p < .01$. Because they were significantly correlated, these scales were standardized and averaged in order to combine them into a single academic variable for future analyses.

Aggression and Prosocial Behavior Items

The aggression and prosocial behavior items (see Appendix H) were adapted from the Direct & Indirect Aggression Scales (DIAS; Björkqvist, Lagerspetz, & Österman, 1992). DIAS items assessed face-to-face aggression. Aggression was assessed by a modified version of the DIAS. The DIAS, originally developed as a peer-nominated aggression measure, had demonstrated strong internal consistencies ranging from .78 to .96 across samples (Kaukiainen et al., 1999; Österman et al., 1999). The peer-nomination items of the DIAS had been adapted in other studies to be administered as self-report items. In one particular study in which a reduced number of self-report items were used, the items maintained the following levels of internal

consistency: direct aggression, 5 items: .76, and indirect aggression, 3 items: .61 (Musher-Eizenman et al., 2004).

In other studies, the DIAS had been used with and similarly revised from a peer-nomination measure to a self-report measure in the same way other measures, such as Eron's Peer Nomination of Aggression, had been revised (Musher-Eizenman et al., 2004). It had also been compared to self-report measures (Österman et al., 1994). Self-report scores on physical, verbal, and indirect aggression had been shown to relate to corresponding DIAS peer-nominated scores, with correlations ranging from .17 to .55 across age groups (Kaukiainen et al., 1999).

For the purposes of the present study, the self-report version of the DIAS was modified to instruct students to report on their behaviors in the role of the aggressor. As noted, the original DIAS (Björkqvist et al., 1992) was modified for this purpose as follows. Consider the stem of the original DIAS items, "Tell us how each of your classmates acts when he/she has problems with or gets angry with another classmate," with a subsequent item, "calls the other one names." This item had 5 response choices (0=never, 4=very often; Björkqvist et al., 1992). For the present study, the item was modified as follows: "Please tell us how often you do the following things when you are with others… You call another person names." The response options remained never, seldom, sometimes, quite often, and very often. This modified scale contained 10 items. The coefficient alpha for the aggression items in the present study was .85. A mean aggression score was calculated, with a higher score indicating greater endorsement of aggression.

This survey included 10 prosocial items that followed the same format as the DIAS scale (i.e., including a stem, the items, and five response options from "never" to "very often" for each item). A sample item was, "You compliment someone." The coefficient alpha for the prosocial

items in the present study was .90. A mean prosocial score was calculated, with a higher score indicating greater endorsement of prosocial behavior.

Effortful Control Items

Items that assessed youth's effortful control were included in the survey (see Appendix I). These items were adapted from Ellis and Rothbart's (1999) Early Adolescent Temperament Questionnaire – Revised Short Form, which assesses three dimensions of effortful control: activation control, or the capacity to perform an action when there is a strong desire to avoid it; attention control, or the capacity to focus attention and shift attention when desired; and inhibitory control, the capacity to plan and suppress inappropriate responses. In Ellis and Rothbart's (1999) measure, adolescents were asked to read an item (e.g., "I have a hard time finishing things on time") and choose from five responses options, from 1 = "almost always untrue" to 5 = "almost always true." These items were adapted for a total of 16 items with four response options, ranging from "not true for me" to "very true for me."

The coefficient alpha for the effortful control items in the present study was .80. There were moderate to strong significant correlations among the subscales: activation control and attention control, $r(208) = .49$, $p < .01$; activation control and inhibitory control, $r(208) = .36$, $p < .01$; attention control and inhibitory control, $r(208) = .58$, $p < .01$. Therefore, the items were considered together as one factor, effortful control, in future analyses. Necessary items were reverse-coded, and a mean score was calculated, with higher scores indicating a higher level of effortful control.

Conscientiousness Items

Items that assessed youth's conscientiousness were adapted from the nine items of the Conscientiousness versus Lack of Direction subscale of the Big Five Scales for the California

Child Q-Set (John et al., 1994). The items were adapted from a third-person perspective (e.g., "he pays attention well and can concentrate on things") to a first-person perspective (e.g., "I am good at paying attention and concentrating;" see Appendix I). The coefficient alpha for the conscientiousness items in the present study was .86. A mean score was obtained, with higher scores indicating higher levels of conscientiousness.

Data reduction was explored by examining correlations between the individual factors of control and conscientiousness, $r(173) = .68$, $p < .01$. Because they were strongly significantly correlated, these scales were standardized and averaged in order to combine them into an individual moderator variable, self-control, for future analyses.

Parent Knowledge Items

In order to assess parents' monitoring of their children's texting and knowledge of their behaviors overall, eight items were adapted from a measure of monitoring (Brown, Mounts, Lamborn, & Steinberg, 2010), and four text-specific items were based on the Kaiser study (Roberts et al., 2005), for a total of 12 items (see Appendix J). Despite calling it parental monitoring, many of Brown et al.'s (1993) items truly captured parental knowledge. In the original measure, youth rated their parents' knowledge on a three-point scale from "don't know" to "knows a lot," for questions such as "where you go at night," and "who your friends are." These items were adapted and given 5-point Likert response options, ranging from "not true for me," to "very true for me." A sample item was, "My parents/guardian know(s) who my friends are." The same response options were used for the four text-specific questions, and a sample item was "My parents/guardian usually know(s) how much time I spend texting." Mean scores were calculated for the text-specific items, general items, and all of the items. Higher scores

related to more parental monitoring and knowledge. The coefficient alpha for the parent knowledge items in the present study was .87.

Data reduction was explored by examining correlations between the family factors of parents' knowledge about texting and parents' general knowledge, $r(173) = .50$, $p < .01$. Because they were significantly correlated, these scales were standardized and averaged in order to combine them into a parent moderator variable, parent knowledge, for future analyses.

Involvement in Extracurricular Activities Items

To assess youth's involvement in extracurricular activities, two separate measures were used (see Appendix K). The first measure captured youth's involvement in nine school-related activities in the past year and was based on Dubow et al.'s (1989) adaptation of the School Involvement scale of the Health and Daily Living – Youth Form (HDL; Moos, Cronkite, Billings, & Finney, 1986). The School Involvement scale presented adolescents with a list of activities and asked them to indicate whether they have recently engaged in each activity in the past year. Dubow et al. (1989) added additional items to the original scale to enhance its reliability, resulting in the internal consistency reliability ranging from .70 to .77 across subsamples. For the purposes of this study, students were expected to answer "never," "a little," "sometimes," or "a lot" regarding their involvement in each activity in the past year. Some examples of items included, "Went to a meeting of a school club or group," and "Took part in a school play or show." The coefficient alpha for in-school extracurricular activity items in the present study was .76. A mean score was calculated, and higher scores indicated more involvement in school-related extracurricular activities.

The second measure captured youth's involvement in 16 out-of-school activities in the past year and was adapted from Wigfield et al.'s (1997) competence beliefs measure. The first

six items (e.g., “Play board games, puzzles, card games”) came directly from Wigfield et al.’s (1997) “General Activities” subscale of eight items, not including two items that were too childish for the intended age group (e.g., “pretend games like house, dress up”). The next seven items were adapted from Wigfield et al.’s (1997) other subscales that pertained to out-of-school activities that were frequently engaged in by youth (e.g., “Did athletic things like running or biking just for fun”). The remaining three items were added in order to highlight a typical part-time job of adolescents (i.e., “babysat”) and two currently growing pastimes (e.g., “played video games” and “played on the computer”). For the purposes of this study, the stem of each item was, “How often have you done the following activities in the past year?” Students were expected to answer “never,” “a little,” “sometimes,” or “a lot” regarding their involvement in each activity. Internal consistency reliabilities ranged from .59 to .82. The coefficient alpha for the out-of-school extracurricular activity items in the present study was .68. A mean score was calculated, with higher scores indicating more involvement in out-of-school extracurricular activities.

Finally, scores from the in-school and out-of-school activities subscales were combined to indicate the students’ levels of extracurricular involvement across settings. Data reduction was explored by examining the correlations between the external factors of in-school extracurricular activities and out-of-school extracurricular activities, $r(171) = .40$, $p < .01$. Because they were significantly correlated, these scales were standardized and averaged in order to combine them into an external moderator variable, involvement in extracurricular activities, for future analyses. Higher scores indicated more overall involvement in extracurricular activities. The coefficient alpha for total extracurricular activity items in the present study was .79.

RESULTS

Preliminary Analyses

Prior to testing each hypothesis, preliminary analyses were computed. In all future analyses involving the measures related to text messaging (i.e., frequency of use, compulsivity of text messaging, and moderator variables), data from only 8th graders who use text messaging was included. In analyses that did not rely on text messaging (i.e., descriptive data for variables such internalizing behavior, aggression, prosocial behavior, and academic behavior), data from all 8th graders was used.

The relation between the demographic variables (e.g., sex, ethnicity, family structure) and the major study variables (frequency of text messaging, compulsivity of text messaging, aggression, prosocial behavior, academic adjustment, internalizing problems, and self-control, parent knowledge, and involvement in extracurricular activities) was investigated through a series of multivariate analyses of variance (MANOVAs). MANOVAs were computed to determine how the demographic variables related to domains of variables (i.e., text messaging variables; hypothesized moderator variables; and adjustment variables) to determine which demographic variables needed to be statistically controlled in later analyses. The first MANOVA examined the relation between the independent variables of sex, ethnicity, and family structure and the dependent variables of frequency of text messaging and compulsivity of text messaging (see Table 2). There were no significant effects for ethnicity or family structure. There was a significant multivariate effect for sex, $F(2, 158) = 9.36$, $p < .01$. A follow-up univariate ANOVA found a significant effect for sex on compulsivity of texting, $F(1, 159) = 17.54$, $p < .01$; female students reported significantly higher levels of compulsivity of text messaging compared to male

students. Therefore, sex was used as a covariate in analyses related to compulsivity of text messaging.

The second MANOVA examined the relation between the independent variables of sex, ethnicity, and family structure and the dependent variables of internalizing problems, aggression, prosocial behavior, and academic adjustment (see Table 3). (The adjustment measures were included together in one MANOVA given their significant intercorrelations; see Table 4). There were no significant effects for ethnicity or family structure. There was a significant multivariate effect for sex, $F(4, 186) = 5.23$, $p < .01$. Follow-up univariate ANOVAs found a significant effect for sex on academic adjustment, $F(1, 189) = 3.90$, $p = .05$, and internalizing problems, $F(1, 189) = 6.65$, $p < .05$. Specifically, female students reported significantly higher levels of academic adjustment and internalizing problems than male students. Therefore, sex was used as a covariate in all analyses related to academic and internalizing adjustment.

The third MANOVA examined the relation between the independent variables of sex, ethnicity, and family structure and the dependent variables of self-control, parent knowledge, and involvement in extracurricular activities in order to determine if any needed to be controlled for in future analyses (see Table 5). (The hypothesized moderators were included together in one MANOVA given their significant intercorrelations; see Table 4). There were no significant effects for sex, ethnicity, or family structure, so no covariates were needed as control variables in later analyses related to the moderator variables.

Hypothesis 1: The Majority of Youth Will Engage in Text Messaging

Frequencies of text messaging were examined. The majority of participants (80%) reported sending text messages between a few days a week and every day, with 59% reporting that they engage in text messaging every day (see Table 6). Eighty-nine percent of participants

reported having their own cell phone. Approximately twenty-three percent both send and receive over 100 texts each day. Only 16% of the students reported that they do not engage in text messaging (see Table 6).

Hypothesis 2: Positive Correlation Expected between Frequency and Compulsivity of Text Messaging

First, I examined the degree to which students indicated that they used text messaging compulsively. Only 9% of students reported that they compulsively text at the rate of sometimes or more. Females endorsed higher rates of compulsivity than males (see Table 7).

Next, I examined the correlation between frequency of text messaging and compulsivity of text messaging. As expected, there was a significant moderate correlation between frequency of text messaging and compulsivity of text messaging, $r(176) = .48$, $p < .01$.

Hypothesis 3: Positive Correlation Expected between Compulsivity of Texting and Internalizing Problems and Aggression; Negative Correlation Expected between Compulsivity of Texting and Prosocial Behavior and Academic Adjustment

Correlations between compulsivity of text messaging and each adjustment measure were examined to test whether compulsivity of text messaging related to internalizing problems, aggression, prosocial behavior, and academic adjustment (see Table 4). It was expected that there would be a positive correlation between compulsivity of text messaging and internalizing problems and aggression, and a negative correlation between compulsivity of text messaging and academic adjustment and prosocial behavior. There was a significant positive correlation between compulsivity of text messaging and aggression, $r(175) = .30$, $p < .01$. There also was a significant negative correlation between compulsivity of text messaging and academic

adjustment, $r(176) = -.16$, $p < .05$. There were not significant correlations between compulsivity of text messaging and internalizing problems or prosocial behavior.

Overview of Statistical Analyses for Testing Hypotheses 4-6: Self-control, Parent Knowledge, and Involvement in Extracurricular Activities Will Moderate the Relation between Compulsive Texting and Adjustment

The moderation hypotheses predicted that specific individual, family, and external factors would moderate the relation between compulsive text messaging and four adjustment variables (i.e., internalizing problems, aggression, prosocial behavior, and academic adjustment). Each moderation hypothesis was tested separately with a series of hierarchical regressions following the guidelines of Cohen and Cohen (1975), resulting in twelve separate regression analyses. Sex was significantly related to two of the four adjustment variables, internalizing problems and academic adjustment, and to the compulsive texting predictor included in all analyses, so all regression analyses controlled for sex in Step 1 of the regression. Compulsive texting and one moderator were entered into Step 2. Finally, in Step 3, the interaction of compulsive texting and the moderator was entered. Analyses for each moderation hypothesis were computed for the overall sample.

More specifically, in order to test the moderating effect of the protective factors, the third step in the regression analyses consisted of the interaction between compulsive text messaging and the protective factors. All predictor variables comprising the interaction terms were centered by subtracting the mean from each participant's score. According to Holmbeck (2002), centering is necessary to reduce multicollinearity between predictors and interaction terms, but it does not change the significance of the interaction or the value of simple slopes. Significant interactions were investigated according to the techniques of Cohen and Cohen (1975), Aiken and West

(1991), and Holmbeck (2002) in order to determine the nature of the moderation. Specifically, for each significant moderation effect, regression analyses were computed for high and low levels (i.e., 1 SD above and below the mean) of the moderating variable. These regression analyses yielded regression coefficients that represent the simple slope for the regression lines for compulsive texting predicting the adjustment variable at the high and low levels of the moderator variable. Graphic representations were created to depict the nature of the moderating effect across different levels of compulsivity of text messaging, and standardized regression coefficients were used on all graphic representations to indicate the extent of the relation between the predictor and adjustment variable at each level of the moderator.

Hypothesis 4: Self-control Will Moderate the Relation between Compulsive Texting and Internalizing Problems, Academic Adjustment, Aggression, and Prosocial Behavior

It was hypothesized that higher levels of self-control would protect students from the possible negative effects of compulsive texting. Specifically, students with higher levels of self-control were expected to have non-significant relations between compulsive texting and all four adjustment variables. Students with lower levels of self-control were expected to have significant positive relations between compulsive texting and internalizing problems (hypothesis 4a) and aggression (hypothesis 4b). It was also hypothesized that youth with lower levels of self-control would have significant negative relations between compulsive texting and academic adjustment (hypothesis 4c) and prosocial behavior (hypothesis 4d).

In Step 1 for each regression (see Table 8), sex accounted for between 4-6% of the variance in academic adjustment and prosocial behavior. Females had better academic adjustment and higher levels of prosocial behavior than males.

Hypothesis 4a: Students with Higher Levels of Self-Control Will Have Non-Significant Relations between Compulsive Texting and Internalizing Problems; Students with Lower Levels of Self-Control Will Have Significant Positive Relations between Compulsive Texting and Internalizing Problems

In Step 2 (see Table 8), there was not a significant main effect for compulsive texting in predicting internalizing problems. There was a significant main effect for self-control in predicting internalizing problems, $\beta = -0.41$, $t(174) = -5.49$, $p < .01$, such that higher levels of self-control predicted lower levels of internalizing problems. Compulsive texting and self-control explained a significant proportion of variance in internalizing problems, $R^2 = 0.15$, $F(2, 174) = 15.94$, $p < .01$.

In Step 3 (see Table 8), the interaction of compulsive texting and self-control significantly predicted internalizing problems, $\beta = 0.14$, $t(173) = 1.98$, $p = .05$. A significant proportion of variance was explained by this interaction, $R^2 = 0.02$, $F(1, 173) = 3.91$, $p = .05$. The nature of this moderation effect was explored and is displayed graphically in Figure 1. Follow-up analyses indicated that the nature of the interaction was less clear because neither of the slopes for the regressions at high levels ($\beta = .17$) and low levels ($\beta = -.05$) of the moderator was significant. The relation between compulsive texting and internalizing problems for students with high levels of self-control approached, but did not meet, marginal statistical significance ($p = .11$). The hypothesis was not supported.

Hypothesis 4b: Students with Higher Levels of Self-Control Will Have Non-Significant Relations between Compulsive Texting and Aggression; Students with Lower Levels of Self-Control Will Have Significant Positive Relations between Compulsive Texting and Aggression

In Step 2 (see Table 8), there was a significant main effect for compulsive texting in significantly predicting aggression, $\beta = 0.18$, $t(173) = 2.47$, $p < .05$, such that higher levels of compulsive texting predicted higher levels of aggression. There was also a significant main effect for self-control in predicting aggression, $\beta = -0.39$, $t(173) = -5.50$, $p < .01$, such that higher levels of self-control predicted lower levels of aggression. Compulsive texting and self-control explained a significant proportion of variance in aggression, $R^2 = 0.23$, $F(2, 173) = 25.45$, $p < .01$. In Step 3 (see Table 8), the interaction of compulsive texting and self-control did not significantly predict aggression, so the hypothesis was not supported.

Hypothesis 4c: Students with Higher Levels of Self-Control Will Have Non-Significant Relations between Compulsive Texting and Academic Adjustment; Students with Lower Levels of Self-Control Will Have Significant Negative Relations between Compulsive Texting and Academic Adjustment

In Step 2 (see Table 8), there was not a significant main effect for compulsive texting in predicting academic adjustment. There was a significant main effect for self-control in predicting academic adjustment, $\beta = 0.67$, $t(174) = 11.50$, $p < .01$, such that higher levels of self-control predicted higher levels of academic adjustment. Compulsive texting and self-control explained a significant proportion of variance in academic adjustment, $R^2 = 0.45$, $F(2, 174) = 76.18$, $p < .01$.

In Step 3 (see Table 8), the interaction of compulsive texting and self-control significantly predicted academic adjustment, $\beta = 0.13$, $t(173) = 2.35$, $p < .05$. A significant proportion of variance was explained by this interaction, $R^2 = 0.02$, $F(1, 173) = 5.54$, $p < .05$. The nature of this moderation effect was explored and is displayed graphically in Figure 2. For individuals with high levels of self-control, higher levels of compulsive texting were associated more strongly and positively with academic adjustment, but there was not a similar association

for individuals who reported low levels of self-control. This is inconsistent with the hypothesis that students with higher levels of self-control would have non-significant relations between compulsive texting and academic adjustment and students with lower levels of self-control would have significant negative relations between compulsive texting and academic adjustment.

Hypothesis 4d: Students with Higher Levels of Self-Control Will Have Non-Significant Relations between Compulsive Texting and Prosocial Behavior; Students with Lower Levels of Self-Control Will Have Significant Negative Relations between Compulsive Texting and Prosocial Behavior

In Step 2 (see Table 8), there was not a significant main effect for compulsive texting in predicting prosocial behavior. There was a significant main effect for self-control in predicting prosocial behavior, $\beta = .49$, $t(173) = 7.02$, $p < .01$, such that higher levels of self-control predicted higher levels of prosocial behavior. Compulsive texting and self-control explained a significant proportion of variance in prosocial behavior, $R^2 = 0.22$, $F(2, 173) = 26.06$, $p < .01$.

In Step 3 (see Table 8), the interaction of compulsive texting and self-control significantly predicted prosocial behavior, $\beta = 0.21$, $t(172) = 3.11$, $p = .01$. A significant proportion of variance was explained by this interaction, $R^2 = 0.04$, $F(1, 172) = 9.65$, $p = .01$. The nature of this moderation effect was explored and is displayed graphically in Figure 3. For individuals with high levels of self-control, higher levels of compulsive texting were associated more strongly and positively with prosocial behavior, but there was not a similar association for individuals who reported low levels of self-control. This is inconsistent with the hypothesis that students with higher levels of self-control would have non-significant relations between compulsive texting and prosocial behavior and students with lower levels of self-control would have significant negative relations between compulsive texting and prosocial behavior.

Hypothesis 5: Parent Knowledge Will Moderate the Relation between Compulsive Texting and Internalizing Problems, Academic Adjustment, Aggression, and Prosocial Behavior

It was hypothesized that higher levels of parent knowledge would protect students from the possible negative effects of compulsive texting. Specifically, students with higher levels of parent knowledge were expected to have non-significant relations between compulsive texting and all four adjustment variables. Students with lower levels of parent knowledge were expected to have significant positive relations between compulsive texting and internalizing problems (hypothesis 5a) and aggression (hypothesis 5b). It was also hypothesized that youth with lower levels of parent knowledge would have significant negative relations between compulsive texting and academic adjustment (hypothesis 5c) and prosocial behavior (hypothesis 5d).

In Step 1 for each regression (see Table 9), sex accounted for between 5-6% of the variance in academic adjustment and prosocial behavior.

Hypothesis 5a: Students with Higher Levels of Parent Knowledge Will Have Non-Significant Relations between Compulsive Texting and Internalizing Problems; Students with Lower Levels of Parent Knowledge Will Have Significant Positive Relations between Compulsive Texting and Internalizing Problems

In Step 2 (see Table 9), compulsive texting did not significantly predict internalizing problems, but there was a significant main effect for parent knowledge, $\beta = -0.19$, $t(171) = -2.48$, $p < .05$. Higher levels of parent knowledge predicted lower levels of internalizing problems, and compulsive texting and parent knowledge explained a significant proportion of variance in internalizing problems, $R^2 = 0.04$, $F(2, 171) = 3.97$, $p < .05$. In Step 3 (see Table 9), the interaction of compulsive texting and parent knowledge did not significantly predict internalizing problems, so the hypothesis was not supported.

Hypothesis 5b: Students with Higher Levels of Parent Knowledge Will Have Non-Significant Relations between Compulsive Texting and Aggression; Students with Lower Levels of Parent Knowledge Will Have Significant Positive Relations between Compulsive Texting and Aggression

In Step 2, there was a main effect for compulsive texting in that it significantly predicted aggression, $\beta = 0.24$, $t(170) = 3.22$, $p < .01$, such that higher levels of compulsive texting predicted higher levels of aggression. There was also a significant main effect for parent knowledge in predicting aggression, $\beta = -0.36$, $t(170) = -5.05$, $p < .01$. Higher levels of parent knowledge predicted lower levels of aggression. Together, compulsive texting and parent knowledge explained a significant proportion of variance in aggression, $R^2 = 0.22$, $F(2, 170) = 23.29$, $p < .01$. In Step 3 (see Table 9), the interaction of compulsive texting and parent knowledge did not significantly predict aggression, so the hypothesis was not supported.

Hypothesis 5c: Students with Higher Levels of Parent Knowledge Will Have Non-Significant Relations between Compulsive Texting and Academic Adjustment; Students with Lower Levels of Parent Knowledge Will Have Significant Negative Relations between Compulsive Texting and Academic Adjustment

In Step 2, there was a main effect for compulsive texting in that it significantly predicted academic adjustment, $\beta = -0.19$, $t(171) = -2.47$, $p < .05$, such that higher levels of compulsive texting predicted lower levels of academic adjustment. There was also a significant main effect for parent knowledge in predicting academic adjustment, $\beta = .31$, $t(171) = 4.29$, $p < .01$. Higher levels of parent knowledge predicted better academic adjustment. Together, compulsive texting and parent knowledge explained a significant proportion of variance in academic adjustment, $R^2 = 0.15$, $F(2, 171) = 15.75$, $p < .01$. In Step 3 (see Table 9), the interaction of compulsive texting

and parent knowledge did not significantly predict academic adjustment, so the hypothesis was not supported.

Hypothesis 5d: Students with Higher Levels of Parent Knowledge Will Have Non-Significant Relations between Compulsive Texting and Prosocial Behavior; Students with Lower Levels of Parent Knowledge Will Have Significant Negative Relations between Compulsive Texting and Prosocial Behavior

In Step 2, compulsive texting did not significantly predict prosocial behavior. There was a significant main effect for parent knowledge in predicting prosocial behavior, $\beta = 0.38$, $t(170) = 5.37$, $p < .01$. That is, higher levels of parent knowledge predicted higher levels of prosocial behavior. Compulsive texting and parent knowledge also explained a significant proportion of variance in prosocial behavior, $R^2 = 0.15$, $F(2, 170) = 15.78$, $p < .01$. In Step 3 (see Table 9), the interaction of compulsive texting and parent knowledge did not significantly predict prosocial behavior, so the hypothesis was not supported.

Hypothesis 6: Extracurricular Involvement Will Moderate the Relation between Compulsive Texting and Internalizing Problems, Academic Adjustment, Aggression, and Prosocial Behavior

It was hypothesized that higher levels of extracurricular involvement would protect students from the possible negative effects of compulsive texting. Specifically, students with higher levels of extracurricular involvement were expected to have non-significant relations between compulsive texting and all four adjustment variables. Students with lower levels of extracurricular involvement were expected to have significant positive relations between compulsive texting and internalizing problems (hypothesis 6a) and aggression (hypothesis 6b). It was also hypothesized that youth with lower levels of extracurricular involvement would have

significant negative relations between compulsive texting and academic adjustment (hypothesis 6c) and prosocial behavior (hypothesis 6d).

In Step 1 for each regression (see Table 10), sex accounted for between 5-6% of the variance in academic adjustment and prosocial behavior. Females had better academic adjustment and higher levels of prosocial behavior than males.

Hypothesis 6a: Students with Higher Levels of Extracurricular Involvement Will Have Non-Significant Relations between Compulsive Texting and Internalizing Problems; Students with Lower Levels of Extracurricular Involvement Will Have Significant Positive Relations between Compulsive Texting and Internalizing Problems

In Step 2 (see Table 10), there was not a main effect for compulsive texting in predicting internalizing problems. There was a significant main effect for extracurricular involvement in predicting internalizing problems, $\beta = -0.20$, $t(170) = -2.58$, $p < .05$. Higher levels of involvement in extracurricular activities predicted lower levels of internalizing problems. Together, compulsive texting and involvement in extracurricular activities explained a significant proportion of variance in internalizing problems, $R^2 = 0.05$, $F(2, 170) = 4.11$, $p < .05$. In Step 3 (see Table 10), the interaction of compulsive texting and involvement in extracurricular activities did not significantly predict internalizing problems, so the hypothesis was not supported.

Hypothesis 6b: Students with Higher Levels of Extracurricular Involvement Will Have Non-Significant Relations between Compulsive Texting and Aggression; Students with Lower Levels of Extracurricular Involvement Will Have Significant Positive Relations between Compulsive Texting and Aggression

In Step 2, there was a significant main effect for compulsive texting in predicting aggression, $\beta = 0.33$, $t(169) = 4.27$, $p < .01$. Higher levels of compulsive texting predicted higher levels of aggression. There was not a significant main effect for extracurricular involvement in predicting aggression. Compulsive texting and extracurricular involvement explained a significant proportion of variance in aggression, $R^2 = 0.10$, $F(2, 169) = 9.12$, $p < .01$. In Step 3 (see Table 10), the interaction of compulsive texting and involvement in extracurricular activities did not significantly predict aggression, so the hypothesis was not supported.

Hypothesis 6c: Students with Higher Levels of Extracurricular Involvement Will Have Non-Significant Relations between Compulsive Texting and Academic Adjustment; Students with Lower Levels of Extracurricular Involvement Will Have Significant Negative Relations between Compulsive Texting and Academic Adjustment

In Step 2, there was a significant main effect for compulsive texting in predicting academic adjustment, $\beta = -0.30$, $t(170) = -4.06$, $p < .01$. Higher levels of compulsive texting predicted lower levels of academic adjustment. There was a significant main effect for extracurricular involvement in predicting academic adjustment, $\beta = 0.30$, $t(170) = 4.16$, $p < .01$. Higher levels of involvement in extracurricular activities predicted better academic adjustment. Together, compulsive texting and involvement in extracurricular activities explained a significant proportion of variance in academic adjustment, $R^2 = 0.14$, $F(2, 170) = 15.01$, $p < .01$. In Step 3 (see Table 10), the interaction of compulsive texting and involvement in extracurricular activities did not significantly predict academic adjustment, so the hypothesis was not supported.

Hypothesis 6d: Students with Higher Levels of Extracurricular Involvement Will Have Non-Significant Relations between Compulsive Texting and Prosocial Behavior; Students with Lower

Levels of Extracurricular Involvement Will Have Significant Negative Relations between Compulsive Texting and Prosocial Behavior

In Step 2, there was a significant main effect for compulsive texting in predicting prosocial behavior, $\beta = -0.17$, $t(169) = -2.40$, $p < .05$. Higher levels of compulsive texting predicted lower levels of prosocial behavior. There was also a significant main effect for extracurricular involvement in predicting prosocial behavior, $R^2 = 0.43$, $F(2, 169) = 6.24$, $p < .01$. Higher levels of involvement in extracurricular activities predicted higher levels of prosocial behavior. Together, compulsive texting and involvement in extracurricular activities explained a significant proportion of variance in prosocial behavior, $R^2 = 0.19$, $F(2, 169) = 20.85$, $p < .01$. In Step 3 (see Table 10), the interaction of compulsive texting and involvement in extracurricular activities did not significantly predict prosocial behavior, so the hypothesis was not supported.

DISCUSSION

The purpose of the present study was to address several questions regarding adolescents' use of text messaging. Frequencies of texting, ratings of compulsive texting, adjustment variables, and potential moderators of the relation between compulsive texting and adjustment were examined in order to provide insight regarding this unique nature of adolescents' interactions with peers.

Hypothesis 1: The Majority of Youth Will Engage in Text Messaging

As expected, the majority of teens reported engaging in text messaging on a daily basis, often multiple times a day. Fifty-nine percent of participants reported using text messaging every day. Even more noteworthy is the frequency with which the frequent texters text. Not only do 59% engage in text messaging daily, but 23% reported both sending and receiving over 100 text messages a day. The average length or content of each message was not examined in this study. It would be interesting to investigate whether teens were texting quick one-word responses or comments to each other, or if they were meeting or exceeding their 160 character limit, which is often imposed by the cell phone company when communicating with people whose cell phone numbers are out of the network. The extent to which this frequency enhances or interferes with their daily functioning or completion of activities is in question. Eighty percent of teens reported that they text between a few days a week and every day. This form of media is clearly widespread and often a first line of communication for many teens. Given the rates of engaging in text messaging, it appeared justified to investigate this type of communication's relation to social behaviors. It is also noteworthy that there was not a significant difference in frequency of texting based on sex, race, or family structure.

Hypothesis 2: Positive Correlation Expected between Frequency and Compulsivity of Text Messaging

There was a significant moderate correlation between frequency of texting and compulsivity of texting, leading one to believe that the two constructs in this study may have been capturing similar constructs or that those children who texted more frequently also experienced more compulsivity in their texting. However, only 9% of students reported compulsive texting at the rate of sometimes or more. Less than 2% indicated that they compulsively text most of the time to always. These low rates of compulsive texting were unexpected and surprising given that parents, teachers, and teens themselves verbally acknowledged (in the media and in the researcher's personal experience in discussing trends with these groups) that teens are dependent on texting.

The low rate of compulsivity of texting calls into question whether the compulsivity measure in this study was the appropriate measure to capture compulsivity of texting. The compulsivity measure was based on valid measures of addiction, particularly internet addiction. In hindsight, compulsive texting shares features with other forms of addiction but also has differences. Compulsive drinking, drug use, and gambling are similar to compulsive texting in the psychological pull they impose on the user. However, compulsive texting carries with it the potential for the enhancement of relationships. Typically, compulsive drinkers', drug users', and gamblers' relationships are diminished and negatively affected while addicted to their respective compulsive behavior. Internet users, while often interacting with friends, have the potential to engage in communication with strangers via the internet and become involved in relationships not based on face-to-face reality. Internet addiction also adds the component of multitasking and becoming addicted to many facets of the experience on the internet, including social networking

sites, e-mail, listening to music, blogging, instant messaging, web browsing, and potentially pornography. Texting, on the other hand, typically occurs between individuals who already have a relationship with one another, which is reflected by the fact that they exchanged and saved cell phone numbers. While text messaging has the potential to become addictive, it also enhances relationships and keeps users more interconnected, potentially strengthening already positive relationships. So, while compulsive texting is similar in some ways to compulsive internet use, drinking, drug use, and gambling, the ultimate outcome may be different enough that it warrants a unique type of measurement. Compulsivity in this study, while present, may not be accurately highlighted given the adaptation of measures related to these other behaviors.

Despite the low rates of compulsive texting, this construct was still related to frequency of texting. And, while race and family structure were not significantly related to compulsivity of text messaging, sex was related in that females endorsed more compulsive texting than did males. This is noteworthy given that sex was not related to frequency of text messaging. Therefore, although the compulsive measure used in this study may be an additional way of highlighting frequency, it also appears to be different than frequency given the differences in the relation of sex to each variable. It is uncertain why girls endorsed more compulsivity of texting than males, and sex differences were not hypothesized. In a previous study, girls averaged 6.3 texts a day as compared to boys' 4.8 daily texts (Davie et al., 2004, as cited in Faulker & Culwin, 2005). However, that study is now outdated and far preceded the introduction and propagation of unlimited text messaging plans and quick, QWERTY keyboard cell phones. The sex difference in frequency has also disappeared. Perhaps the compulsivity question relates to these authors' other finding that girls were more likely to carry their cell phones with them than boys. Females may experience a stronger need or desire to stay in touch, thus contributing to their compulsive

checking of and intrusive thoughts about their phones. Texting may involve more anxiety and social distress for females than for males, which is highlighted by the compulsivity measure. It appears that males text as frequently as females, but they may be texting in response to females rather than having the compulsion to initiate the interaction. This pattern is consistent with internet research, in which females were described as using EMC as a tool for social interaction and to establish and nurture relationships, while males used EMC for conveying information (Baron, 2004). This pattern of sex differences should continue to be explored in future studies.

Hypothesis 3: Positive Correlation Expected between Compulsivity of Texting and Internalizing Problems and Aggression; Negative Correlation Expected between Compulsivity of Texting and Prosocial Behavior and Academic Adjustment

Compulsivity of text messaging was significantly positively correlated with aggression and significantly negatively correlated with academic adjustment, as expected. Contrary to the hypotheses, compulsive text messaging was not significantly related to internalizing problems or prosocial behavior.

Perhaps teens who are drawn toward compulsive behaviors are more likely to feel the need to control their environment, thus acting aggressively toward others. This is consistent with Yen et al.'s (2007) finding that males who are addicted to the internet have higher rates of hostility than others. Further, internet dependents delayed their schoolwork to spend time online (Nalwa & Anand, 2003) and had more academic problems (Niemz, Griffiths, & Banyard, 2005), which may be true for texting as well.

In hindsight, it is understandable that compulsive texting was not negatively related to prosocial behavior. Although it was assumed that compulsive behavior would lead one to be anxious and hypervigilant, that does not necessarily mean that he or she would be less prosocial

toward others. In fact, individuals may feel the anxiety to check texts and respond in a timely manner in an effort to be prosocial toward others via the cell phone, including saying nice things to others or answering them before they feel ignored.

Compulsive texting was not significantly related to internalizing problems. Given that few compulsive text messaging studies have been done, this study was based on theories within internet studies, given the similarities in communication type. However, this result is inconsistent with internet addiction studies that demonstrate that participants who are addicted to the internet experience more loneliness (Nalwa & Anand, 2003) and depression (Yen et al., 2007) than participants not addicted to the internet. This difference may be attributed to the fact that teens who text are often texting friends rather than strangers that may be involved in online interactions. It is noteworthy that the internalizing problems of choice in this study were depression and loneliness. Texting may make users feel more connected and less alone, so it is understandable that compulsive texting would not be positively correlated with internalizing problems. However, if future studies highlighted anxiety or stress as internalizing problems, their correlation with compulsive texting might be significant, and possibly more so for girls.

Hypotheses 4-6: Self-control, Parent Knowledge, and Involvement in Extracurricular Activities Will Moderate the Relation between Compulsive Texting and Internalizing Problems, Academic Adjustment, Aggression, and Prosocial Behavior

Hypotheses 4a-4d: Self-Control Moderating the Relation between Compulsive Texting and Adjustment

As expected, there were significant main effects for self-control in predicting internalizing problems, aggression, academic adjustment, and prosocial behavior, such that higher levels of self-control predicted lower levels of internalizing problems and aggression and

higher levels of academic adjustment and prosocial behavior. In this study, self-control was the combination of effortful control and conscientiousness. These results are consistent with previous research (e.g., Li-Grining et al., 2006; Lester, 2001; Loukas & Murphy, 2007; Muris, 2006; Obradovic, 2010) that demonstrated that higher levels of effortful control and conscientiousness predicted positive adjustment, such as increased resiliency, school readiness, and social skills and decreased internalizing problems and conduct problems.

The interaction of compulsive texting and self-control did not significantly predict aggression. The interaction of compulsive texting and self-control did significantly predict internalizing problems, academic adjustment, and prosocial behavior, although not in the directions expected. Follow-up analyses showed that the relation between compulsive texting and internalizing problems for students with high levels of self-control approached, but did not meet, marginal statistical significance, so the results were uninterpretable. Regarding academic adjustment and prosocial behavior, for individuals with high levels of self-control, higher levels of compulsive texting were associated with more strongly and positively with academic adjustment and prosocial behavior, but there was not a similar association for individuals who reported low levels of self-control. This is inconsistent with the hypotheses that students with higher levels of self-control would have non-significant relations between compulsive texting and academic adjustment and prosocial behavior and students with lower levels of self-control would have significant negative relations between compulsive texting and academic adjustment and prosocial behavior. Nevertheless, it is important to note that there seems to be a protective effect for high self-control. Compulsive texters with high self-control show more positive adjustment than compulsive texters with less self-control. When examined more closely (see Figures 2 and 3), the results represented a “protective-enhancing” effect (Luthar et al., 2000) of

self-control, meaning that youth with the protective resource (self-control) actually exhibited enhanced adjustment at higher levels of compulsive texting.

Given the significant interactions described above, it appears that the children with higher levels of self-control have a stronger positive correlation between compulsive texting and positive adjustment. With a low number of teens endorsing high levels of compulsive texting in this study, the "high" group may not represent a truly compulsive group. It is likely that the "high" group captures many of the teens whose texting rate is more frequent, but not pathological. If they have high feelings of self-control to start, their chances for positive adjustment increase considerably. Many of the frequent users who were included in the "high" group may use texting for positive reasons, such as social support and quickness and efficiency of communicating with others. It can be concluded that children who text often and have good internal resources, such as effortful control and conscientiousness, are displaying more positive adjustment than their peers.

Hypotheses 5a-5d: Parent Knowledge Moderating the Relation between Compulsive Texting and Adjustment

As expected, there were significant main effects for parent knowledge in predicting internalizing problems, aggression, academic adjustment, and prosocial behavior, such that higher levels of parent knowledge predicted lower levels of internalizing problems and aggression and higher levels of academic adjustment and prosocial behavior. These results are consistent with results from previous research regarding teens' risky behaviors, which indicated that higher levels of parental monitoring predicted better adjustment (e.g., Piko & Kovcs, 2010; Rodgers & Fleming, 2003; Wu, Liu, & Fan, 2010).

Contrary to the hypotheses, the interaction of compulsive texting with parent knowledge did not significantly predict internalizing problems, aggression, academic adjustment, or prosocial behavior. There was a moderate negative correlation between compulsive texting and parent knowledge, indicating that as compulsive texting increased, parent knowledge decreased.

Hypotheses 6a-6d: Extracurricular Involvement Moderating the Relation between Compulsive Texting and Adjustment

As expected, there were main effects for extracurricular involvement in predicting internalizing problems, academic adjustment, and prosocial behavior, such that higher levels of involvement in extracurricular activities predicted lower levels of internalizing problems and higher levels of academic adjustment and prosocial behavior. These results are consistent with results from previous research that indicated that higher levels of extracurricular involvement predicted better adjustment (Elder et al., 2000; Reis, Colbert, & Hebert, 2005). Involvement in extracurricular activities did not significantly predict aggression, which is inconsistent with a study in which extracurricular involvement predicted less aggression and violence for both males and females (Hart et al., 2007).

Contrary to the hypotheses, the interaction of compulsive texting with extracurricular involvement did not significantly predict internalizing problems, aggression, academic adjustment, or prosocial behavior. There was a moderate positive correlation between compulsive texting and extracurricular involvement, indicating that as compulsive texting increases, involvement in extracurricular activities also increases. It is possible that these teens compulsively text in preparation for events related to their extracurricular activities, such as making sure their teammates are where they are supposed to be or that their parents are picking them at an appropriate time, but do not experience poor adjustment. They may also be more

social children than peers with less extracurricular involvement. The motivation for their texting would have to be explored to draw decisive conclusions in this regard. On the other hand, it is possible that extracurricular involvement simply has no impact on the relation between the child's texting and adjustment whatsoever.

Limitations and Future Directions

Important limitations of this study should be noted. Results for this sample are limited in their generalizability to other populations. There are several overarching themes or ideas for future studies based on the design of this study. First, it could be helpful to implement this survey with different samples, including children in grades above and below 8th grade, particularly college students. Age differences may exist in texting, and it appears important to track usage of various age groups as texting becomes more widespread. Given that this study was conducted in a small northwest Ohio city, the participants were likely less representative of racial diversity than other populations. It also could be helpful to assess socioeconomic status and recruit a more racially diverse sample in other regions beyond northwest Ohio in order to obtain a more representative sample of the larger population. Although socioeconomic status was not assessed, the socioeconomic statuses of these participants' families presumably differs from the larger population in that there are likely economically disadvantaged populations that were not captured in this sample.

Additionally, this study was not longitudinal in nature. Therefore, the directionality of the findings cannot be determined, meaning that it is unknown whether texting influences adjustment and behaviors or whether adjustment and behaviors influence texting. It would be interesting to examine whether changes that may occur in adolescents' texting affect changes in their adjustment over time using a longitudinal design.

In future studies of compulsive texting, it will be beneficial to address the fact that there were so few 8th graders who endorsed compulsive texting in this study. It is possible that teens do not feel distress at their need or desire to text. Given that there were so few highly compulsive texters, future studies should use larger samples to allow for a wider variability in compulsive texting. Additionally, compulsivity of text messaging and frequency of text messaging were highly correlated, and it is possible that frequency of texting, rather than compulsivity, is the driving force behind many of the results. Future studies may focus on the relation between the frequency of texting and adjustment. It may also be helpful to reassess the compulsive texting scale used in this study to determine if it is truly capturing what it is intended to capture. Given the low number of students who endorsed compulsive texting, particularly while it is such a hot topic in the current media, the scale's applicability to compulsive texting is in question and re-examination of a more appropriate assessment of compulsive texting is warranted.

It also is possible that the method of collecting data from the students and the measures used did not capture the true nature of their texting. For example, the items used to assess people's compulsivity of substance use or gambling that were transformed into compulsivity of texting items may not apply here. These types of questions may be inherently different because texting does not carry with it the same negative stigma involved in alcohol abuse and gambling. Further, I collected exclusively self-reported data. Instead of solely using a self-report subscale based on other compulsive behaviors, such as alcohol and drug use or gambling, data may need to be gathered in alternative or multiple ways. Currently, only one person's perspective is being considered, but others (i.e., parents, teachers, peers) may have a different perspective of how compulsively teens are engaged in texting. Other data gathering methods may be helpful in future studies, such as daily logs or parent ratings. More information about adolescents' texting

behaviors could be gleaned by incorporating an observational component to future studies, in addition to self-reports, by having them engage in texting in a controlled environment while observers rate their behaviors or having them keep logs of their own use and their behaviors during use. Further, parents could provide frequency of use information based on their phone bills to get accurate numbers of texts that were sent and received.

Implications

Despite the limitations listed above, the results of this study have implications for theory and practice. As always with EMC, cues such as tone and facial expressions may be lost via text messaging. In Lister's (2007) internet study, teens showed that their use of computer-mediated communication predicted their online aggressive and prosocial behaviors above and beyond the extent to which their face-to-face aggressive and prosocial behaviors predicted their online behaviors. Thus, it was evident that engaging in frequent online interactions influenced teens to engage in specific online aggressive and prosocial behaviors beyond what could be predicted by their corresponding face-to-face behaviors. So, it was not just the teens who were aggressive or prosocial when face-to-face with their peers who were being aggressive and prosocial, respectively, when online. Similarly, teens may be more willing to say things to peers through text messaging than they would feel comfortable saying face-to-face. Therefore, more antisocial declarations may be easily made, but prosocial admissions may be more frequent as well (such as a teen telling a peer that he or she is romantically interested in the other via texting rather than while on the phone or face-to-face). The uses of text messaging are important. If teens are using texting to enhance their already existing friendships, texting may have positive outcomes. However, if teens are uncomfortable with face-to-face interactions and are using texting as a shield, it is possible that their already difficult interactions may become further impaired.

Perhaps most importantly, it is imperative that parents talk to their children about their texting and monitor their cell phone use when possible. Currently, there are many benefits of teens having their own cell phones and texting capabilities, even for parents. Parents are much more easily in touch with their teens in order to know when to pick them up from school or with whom they are spending their time outside of the house. Further, texting offers a popular, ever-changing format for adolescents' interactions, and youth are using it frequently. Parents may not understand the multiple uses of texting to which teens adhere, such as sending multimedia messages or having ongoing text conversations while their parents send shorter, goal-oriented messages. It would be in parents' and teens' best interests to communicate with one another to keep abreast of the formats, particularly should the adolescents need help dealing with poor adjustment related to their texting or highlighted by their lack of texting. Parents should inquire about what is attracting their teens to text messaging over other forms of communication and continue to ask that question, as media changes so rapidly that the teens' motives may change significantly.

Taking away a teen's cell phone (and thus, text messaging capabilities) is a common form of discipline for many parents. It is often necessary to remove privileges for a period of time in order to change behavior. Clearly, teens engage in high rates of text messaging, so it may be a particularly effective means of changing behavior. Given that the teens value the use of their cell phones, they may do anything in their power to get their phone back as quickly as possible, including complying with their parents' requests or directions.

Most elementary and high schools have cell phone policies while classes are in session. Many require cell phone owners to not use their phones at all while at school. Others allow the phone to be on a silent or vibrate setting in case of emergencies. Even college students are given

warnings about cell phone use in class. There is ample opportunity to have cell phones interfere with a student's ability to pay attention in class. Cell phones in the classroom setting also allow students to cheat on tests or assignments more easily than ever before. Currently, it is the schools' responsibility to determine an appropriate cell phone policy for each school. Additionally, teachers are in a unique position to witness academic adjustment difficulties and problems with social interactions and may be able to intervene when necessary.

"Sexting," or texting sexual images or messages with sexual themes, was not a component of this study, despite public interest. Although there are no data on sexting in this study, it is a clear that sexting is an ongoing problem that needs to be appropriately addressed when discussing teens' text messaging behaviors. In the meantime, parents, teachers, and school districts should reach out to children and parents to educate them about the dangers of sexting. Sexting carries social and legal ramifications, and teens have been tried in cases around the United States for sexting, thus disseminating child pornography. These potential consequences must be highlighted repeatedly to teens' parents, since teens may feel peer pressure to send a sext message or respond to a request for a sext message from a peer.

Several concerns about teens' texting were highlighted in this study. It also is imperative that adults recognize the potential benefits of texting for youth and communicate with their children about the attractive qualities of texting. Many positive social interactions are occurring through text messaging, and teens' relationships may be enhanced by this interactive avenue of communication.

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APPENDIX A: PARENTAL CONSENT FORM

Dear Parents or Guardians:

Teenagers today are using text messaging more than ever before. Parents, guardians, educators, and researchers are becoming more interested in the role of text messaging in the social lives of children. In the past few years, children have been using text messaging to interact with each other in increasing ways. Does this new way of communicating with peers help or harm their adjustment?

Graduate students from Bowling Green State University are working with Professor Eric Dubow to conduct a survey to find out more about how junior high students use text messaging to interact with each other. First, we want to see how frequently students engage in text messaging and the types of thoughts and behaviors associated with their texting. Then, we want to see how their text messaging relates to their involvement in school and how they feel about themselves. We are particularly interested in seeing how students' feelings of competency and control over their own behavior, perceptions of their parents' or guardians' attitudes about teens' text messaging behaviors, and school and community involvement relate to their text messaging.

Graduate students from BGSU will come to your child's classroom to administer a survey about these issues for one class period during the school day. The survey should take about 45 minutes to complete. **STUDENTS DO NOT HAVE TO COMPLETE THE SURVEY IF THEY DO NOT WANT TO**. If you decide not to have your child participate, that will have no impact on your child's grades or relationship to his or her school. There are no anticipated risks of participation. Students' responses to the survey are completely anonymous. Students will be told **NOT** to write their names anywhere on the survey and will **NOT** be asked **ANY PERSONAL INFORMATION THAT COULD IDENTIFY THEM OR THEIR FAMILIES**. We are interested in the responses of students as a group. If you do not want your child to participate or he/she chooses not to, his or her teacher will provide an alternate activity to do while waiting for the other students to complete the survey.

We are excited about administering this survey in your child's school. When we compile the results, we will prepare a report that will be shared with parents or guardians by the school. The results will be helpful in allowing us to learn more about how children use text messaging. If for any reason you do not want your child to complete the survey, please let us know by returning the attached form to your child's teacher or by returning it to us in the envelope provided. If you have any questions, please call the principal, Mrs. Lee Vincent, at Bowling Green Junior High School at (419) 354-0200 or Eric Dubow at BGSU at (419) 372-2556. In addition, if you have any concerns about the conduct of the study or your child's rights as a research participant, you may contact the Chair of the Human Subjects Review Board at BGSU at (419) 372-7716.

If you do not want your child to participate in this survey, you must return the attached form by Tuesday, May 5, 2009. Thank you very much for your time and consideration.

In addition to the lack of knowledge about children's texting behaviors, there is also a shortage of information about parents'/guardians' texting behaviors, parents'/guardians' attitudes regarding certain texting behaviors in which their children engage, and what parents/guardians know about their children's use of text messaging.

Included in this packet is a short survey for you to complete. The survey should take about 20 minutes to complete. This survey is voluntary. **YOU DO NOT HAVE TO COMPLETE THE SURVEY IF YOU DO NOT WANT TO.** Completing and returning the parent survey serves as your consent to participate. There are also no anticipated risks of participation. If you choose not to participate, it will have no impact on you or your child in any way. Also, if you choose not to complete the survey, your child will still be eligible to complete his or her part of the survey at school. Your responses to the survey are completely anonymous, and there will be no way to connect your answers with your child's answers. Please do **NOT** write your name anywhere on the survey or **ANY PERSONAL INFORMATION THAT COULD IDENTIFY YOU OR YOUR FAMILY**. We are interested in parents'/guardians' responses as a group, not in individual parents'/guardians' responses.

When we compile the results, we will prepare a report that will be shared with your child's school and with you. The results will be helpful in allowing us to learn more about parents'/guardians' texting behaviors and their views about their children's use of texting. If for any reason you do not want to complete the survey, simply discard this survey and we will not contact you any further. If you have any questions, please call Professor Eric Dubow at BGSU at (419) 372-2556. In addition, if you have any concerns about the conduct of the study or your rights as a research participant, you may contact the Chair of the Human Subjects Review Board at BGSU at (419) 372-7716 or at hsrb@bgsu.edu.

If you do wish to participate in this survey, please complete and return the attached survey in the enclosed envelope by Tuesday, May 12, 2009. Thank you very much for your time and participation.

Sincerely,

Eric F. Dubow, Professor
Lisa Reinemann
BGSU Department of Psychology

Kelly Lister
Sarah Domoff

Elizabeth Kryszak

**************************************CUT HERE**********************************

Please return this form only if you do <u>NOT</u> want your child to participate in the survey.

I have read the letter about the survey being conducted by graduate students from Bowling Green State University at Bowling Green Junior High School.

_____ I do **<u>NOT</u>** want my child to complete a survey about his/her text messaging behaviors.

Child's name (please print) and grade: _____

Child's teacher: _____

Signature of parent or legal guardian: _____

Thank you again for your time.

BGSU HSRB - APPROVED FOR USE
ID # H090200GFB
EFFECTIVE 04-23-09
EXPIRES 03-03-10

APPENDIX B: CHILD ASSENT FORM

Hi, our names are Kelly Lister, Liz Kryszak, Lisa Reinemann, and Sarah Domoff, and we're graduate students from Bowling Green State University. Teenagers today use text messaging more than ever before. We are doing a research project that is a survey about how much teenagers your age use text messaging for social reasons. Your honest opinions are very important to us. We would like you to fill out a survey so you can share your thoughts and opinions. This survey will take about 45 minutes to complete. We will not single out any one teenager's answers because we are interested in how teenagers as a group respond to these questions. There is also no risk in filling out the survey.

You DO NOT have to fill out this survey if you do not want to. Whether you choose to fill out this survey or not, your grades will not be affected nor will your teachers punish you for not filling out the survey. If you choose not to fill out this survey, you will be given an activity to do while you wait for your classmates to fill out the survey. If you start and then change your mind, you can stop at any time. If you do fill it out, your responses will be PRIVATE and ANONYMOUS. This means that no one will be able to know what you wrote. You will not write your name anywhere on the survey. If you agree to participate, just tear off this cover sheet and keep it for yourself.

If you have any questions for us, please feel free to ask!

Also feel free to contact us at:

Kelly Lister
Elizabeth Kryszak
Lisa Reinemann
Sarah Domoff
Eric Dubow, Professor
Psychology Department
Bowling Green State University
Bowling Green, OH 43403
(419) 372-4501

Or if you have any questions about your rights in participating in this survey, you may contact the Chair of the Human Subjects Review Board (HSRB) at (419) 372-7716 or at hsrb@bgsu.edu.

APPENDIX C: DEMOGRAPHIC AND FREQUENCY OF USE ITEMS

I'm going to read some questions, and I would like you to choose the answer that is most true for you. Please put an "X" by the answer that is most true for you.

1. Are you a _____? (PUT AN "X" IN THE BOX THAT IS TRUE FOR YOU):

☐ Boy ☐ Girl

2. How old are you? (PUT AN "X" IN THE BOX THAT IS TRUE FOR YOU):

☐ 11 years old ☐ 12 years old ☐ 13 years old

☐ 14 years old ☐ 15 years old ☐ 16 years old

☐ 17 years old ☐ 18 years old

3. What grade are you in? (PUT AN "X" IN THE BOX THAT IS TRUE FOR YOU):

☐ 7th grade ☐ 8th grade ☐ 9th grade

☐ 10th grade ☐ 11th grade ☐ 12th grade

4. What is your race or ethnic background (PUT AN "X" IN THE BOX THAT IS TRUE FOR YOU):

☐ Caucasian ☐ African American

☐ Hispanic/Latino ☐ Asian/Asian Indian/Pacific Islander

☐ Native American

☐ Biracial/Multiracial (please specify: _____)

☐ Other (please specify: _____)

Who lives in your home with you? (PUT AN "X" IN THE BOX THAT IS TRUE FOR YOU):

	Yes (1)	No (2)
5. My mother lives with me		
6. My father lives with me		
7. My guardian lives with me		

8. Do you use your parents'/guardians' cell phone?

☐ Yes ☐ No

9. Do you have your own cell phone?

☐ Yes ☐ No

10. Have you ever used text messaging?

☐ Yes ☐ No

11. About how many days <u>a week</u> do you text? (PUT AN "X" IN THE BOX THAT IS TRUE FOR YOU):

☐ Never ☐ Most days

☐ One day a week ☐ Everyday

☐ A few days a week

12. About how many text messages *do you send* in a day?

☐ None ☐ 1-5 ☐ 6-10

☐ 11-15 ☐ 16-20 ☐ 21-30

☐ 31-40 ☐ 41-50 ☐ 51-65

☐ 66-80 ☐ 81-100 ☐ over 100

13. About how many text messages *do you receive* in a day?

☐	None	☐	1-5	☐	6-10
☐	11-15	☐	16-20	☐	21-30
☐	31-40	☐	41-50	☐	51-65
☐	66-80	☐	81-100	☐	over 100

14. In general, <u>where</u> do you text most often? (PUT AN "X" IN THE BOX THAT IS TRUE FOR YOU):

☐	I never text	☐	Home	☐	Friend's house
☐	School	☐	Some other location (i.e., on the bus)		

15. In general, <u>who</u> do you text most often? (PUT AN "X" IN THE BOX THAT IS TRUE FOR YOU):

☐	My parents/guardian	☐	My friends
☐	My siblings	☐	My boyfriend/girlfriend
☐	Other family members	☐	Other

APPENDIX D: COMPULSIVITY OF TEXTING ITEMS

TEXT MESSAGING
Please tell us how you feel about the following statements (PUT AN "X" IN THE BOX THAT IS MOST TRUE FOR YOU. CHOOSE ONLY ONE ANSWER PER QUESTION)**:**

	Always (1)	Most of the time (2)	Sometimes (3)	Hardly ever (4)	Never (5)
16. How often do you not do your chores to spend more time texting?					
17. How often do you find that you text longer than you intended?					
18. How often do others in your life complain to you about the amount of time you spend texting?					
19. How often do you check your texts before doing something else that you need to do?					
20. How often do you become defensive or secretive when anyone asks you about your texting?					
21. How often do you find yourself frustrated because you want to text but you have to wait?					
22. How often do you fear that life without texting would be boring and unhappy?					
23. How often do you snap, yell, or act annoyed if someone bothers you while you are texting?					
24. How often do you lose sleep due to texting?					
25. How often do you feel preoccupied with texting or fantasize about texting?					
26. How often do you find yourself saying "just a few more minutes" when texting?					
27. How often do you try to cut down the amount of time you spend texting and fail?					
28. How often do you try to hide how much you have been texting?					
29. How often have you lied to others to cover up the amount of time you have been texting?					

APPENDIX E: DEPRESSION ITEMS

HOW DO YOU FEEL?
Below is a list of the ways you might have felt or acted. Please check how *much* you have felt this way during the *past week* (PUT AN "X" IN THE BOX THAT IS MOST TRUE FOR YOU. CHOOSE ONLY ONE ANSWER PER QUESTION)**:**

	Not at all (1)	A little (2)	Some (3)	A lot (4)
80. I was bothered by things that usually don't bother me.				
81. I did not feel like eating, I wasn't very hungry.				
82. I wasn't able to feel happy, even when my family or friends tried to help me feel better.				
83. I felt like I was just as good as other kids.				
84. I felt like I couldn't pay attention to what I was doing.				
85. I felt down and unhappy.				
86. I felt like I was too tired to do things.				
87. I felt like something good was going to happen.				
88. I felt like things I did before didn't work out right.				
89. I felt scared.				
90. I didn't sleep as well as I usually sleep.				
91. I was happy.				
92. I was more quiet than usual.				
93. I felt lonely, like I didn't have any friends.				
94. I felt like kids I know were not friendly or that they didn't want to be with me.				
95. I had a good time.				
96. I felt like crying.				
97. I felt sad.				
98. I felt people didn't like me.				
99. It was hard to get started doing things.				

APPENDIX F: LONELINESS AND QUALITY OF SOCIAL RELATIONSHIP ITEMS

FRIENDS AND HOBBIES

Please answer "yes," "no," or "sometimes" to the following questions. (PUT AN "X" IN THE BOX THAT IS TRUE FOR YOU. CHOOSE ONLY ONE ANSWER PER QUESTION)**:**

	No (1)	Sometimes (2)	Yes (3)
100. Is it easy for you to make friends at school?			
101. Do you like to read?			
102. Do you have other kids to talk to at school?			
103. Are you good at working with other kids at school?			
104. Do you watch TV a lot?			
105. Is it hard for you to make friends at school?			
106. Do you like school?			
107. Do you have lots of friends at school?			
108. Do you feel alone at school?			
109. Can you find a friend when you need one?			
110. Do you play sports a lot?			
111. Is it hard to get kids in school to like you?			
112. Do you like science?			
113. Do you have kids to play with at school?			
114. Do you like music?			
115. Do you get along with other kids at school?			
116. Do you feel left out of things at school?			
117. Are there kids you can go to when you need help in school?			
118. Do you like to paint and draw?			
119. Is it hard for you to get along with the kids at school?			
120. Are you lonely at school?			
121. Do the kids at school like you?			
122. Do you like playing card games?			
123. Do you have friends at school?			

APPENDIX G: ACADEMIC ADJUSTMENT ITEMS

BONDING

Which of the following is most true for you in school? (PUT AN "X" IN THE BOX THAT IS TRUE FOR YOU. CHOOSE ONLY ONE ANSWER PER QUESTION)**:**

	Always (1)	Usually (2)	Sometimes (3)	Hardly Ever (4)	Never (5)
124. At school, I try as hard as I can to do my best work.					
125. I care how I do in school.					
126. I feel bored at school.					

GRADES

WHAT GRADES DO YOU USUALLY GET? (PUT AN "X" IN THE BOX THAT IS TRUE FOR YOU):

☐ Mostly A's

☐ Mostly A's and B's

☐ Mostly B's

☐ Mostly B's and C's

☐ Mostly C's

☐ Mostly C's and D's

☐ Mostly D's

☐ Mostly D's and F's

☐ Mostly F's

COMPETENCE

Please tell us how you feel about the following statements (PUT AN "X" IN THE BOX THAT IS MOST TRUE FOR YOU. CHOOSE ONLY ONE ANSWER PER QUESTION)**:**

	Always (1)	Most of the time (2)	Sometimes (3)	Hardly ever (4)	Never (5)
127. Some teenagers feel that they are just as smart as others their age but other teenagers aren't so sure and wonder if they are as smart. **Do you feel that you are just as smart as others your age?**					
128. Some teenagers are pretty slow in finishing their school work but other teenagers can do their school work more quickly. **Are you pretty slow in finishing your school work?**					
129. Some teenagers do very well at their classwork but other teenagers don't do very well at their classwork. **Do you do very well at your classwork?**					
130. Some teenagers having trouble figuring out the answers in school but other teenagers almost always can figure out the answers. **Do you have trouble figuring out the answers in school?**					
131. Some teenagers feel that they are pretty intelligent but other teenagers question whether they are intelligent. **Do you feel that you are pretty intelligent?**					

APPENDIX H: AGGRESSION AND PROSOCIAL BEHAVIOR ITEMS

HOW DO YOU ACT?

Please tell us how often you do the following things (PUT AN "X" IN THE BOX THAT IS MOST TRUE FOR YOU. CHOOSE ONLY ONE ANSWER PER QUESTION)**:**

	Never (1)	Seldom (2)	Sometimes (3)	Quite often (4)	Very often (5)
132. You yell at or argue with another person.					
133. You insult another person.					
134. You tease someone.					
135. You call another person names.					
136. You say you are going to hurt someone.					
137. You plan secretly to bother someone.					
138. When talking to someone, you gossip about someone else you are angry at.					
139. You ignore someone when they talk to you.					
140. You notes to someone that criticize someone else.					
141. When talking to someone, you say bad things about someone else you have problems with.					
142. You ask someone to play a game with you.					
143. You share something with someone.					
144. You compliment someone.					
145. You say something nice about someone.					
146. You congratulate someone.					
147. You cheer someone up.					
148. When talking to someone, you invite him/her to do something with you.					
149. You help someone with his/her homework.					
150. When talking to someone, you compliment someone else.					
151. When talking to someone, you say something nice about someone else.					

APPENDIX I: INDIVIDUAL MODERATOR ITEMS

EFFORTFUL CONTROL

Please tell us how you feel about the following statements (PUT AN "X" IN THE BOX THAT IS MOST TRUE FOR YOU. CHOOSE ONLY ONE ANSWER PER QUESTION)**:**

	Not true for me (1)	A little bit true for me (2)	Somewhat true for me (3)	Very true for me (4)
153. I have a hard time finishing things on time.				
154. I do something for fun for awhile before starting my homework, even when I'm not supposed to.				
155. If I have a hard assignment to do, I get started right away.				
156. I finish my homework before the due date.				
157. I put off working on projects until right before they're due.				
158. It is easy for me to really concentrate on homework problems.				
159. I find it hard to shift gears when I go from one class to another at school.				
160. When trying to study, I have difficulty tuning out background noise and concentrating.				
161. I am good at keeping track of several different things that are happening around me.				
162. I pay close attention when someone tells me how to do something.				
163. I tend to get in the middle of one thing, then go off and do something else.				
164. It's hard for me not to open presents before I'm supposed to.				
165. When someone tells me to stop doing something, it is easy for me to stop.				
166. The more I try to stop myself from doing something I shouldn't, the more likely I am to do it.				
167. It's easy for me to keep a secret.				
168. I can stick with my plans and goals.				

CONSCIENTIOUSNESS

Please tell us how you feel about the following statements (PUT AN "X" IN THE BOX THAT IS MOST TRUE FOR YOU. CHOOSE ONLY ONE ANSWER PER QUESTION)**:**

	Not true for me (1)	A little bit true for me (2)	Somewhat true for me (3)	Very true for me (4)
154. I find ways to get things done.				
155. I do not give up easily when working on something.				
156. It is important for me to do well in the things I'm involved in.				
157. I am neat and organized in the way I dress and act.				
158. I am good at paying attention and concentrating.				
159. I plan ahead and think before I do something.				
160. I can be trusted and am dependable.				
161. I can do many things well and am talented in many ways.				
162. I think about what I'm going to say or do before I do it.				

APPENDIX J: FAMILY MODERATOR ITEMS

PARENTS' KNOWLEDGE (PUT AN "X" IN THE BOX THAT IS TRUE FOR YOU):

Please tell us how you feel about the following statements (PUT AN "X" IN THE BOX THAT IS MOST TRUE FOR YOU. CHOOSE ONLY ONE ANSWER PER QUESTION)**:**

	Not true for me (1)	A little bit true for me (2)	Don't know (3)	Somewhat true for me (4)	Very true for me (5)
169. My parents/guardian usually know(s) how much time I spend texting.					
170. My parents/guardian usually know(s) who I am texting.					
171. My parents/guardian usually know(s) who is sending me text messages.					
172. My parents/guardian usually know(s) what types of messages I am texting.					
173. My parents/guardian know(s) how I spend my money.					
174. My parents/guardian know(s) who my friends are.					
175. My parents/guardian know(s) when I'll be home.					
176. My parents/guardian make(s) me let them know where I'll be going.					
177. My parents/guardian make(s) me check in with them after school.					
178. My parents/guardian make(s) sure I know how to reach them if I am out.					
179. My parents/guardian make(s) sure I know how to reach them if they are out.					
180. My parents/guardian talk(s) to me about my daily plans.					

APPENDIX K: COMMUNITY MODERATOR ITEMS

WHAT DO YOU DO <u>OUT OF SCHOOL</u>?

How often have you done the following activities in the past year? (PUT AN "X" IN THE BOX THAT IS TRUE FOR YOU. CHOOSE ONLY ONE ANSWER PER QUESTION)**:**

	Never (1)	A little (2)	Sometimes (3)	A lot (4)
181. Played board games, puzzles, card games				
182. Did arts and crafts				
183. Built or made things (e.g., toy models, cooking, baking)				
184. Wrote or told stories				
185. Listened to music				
186. Attended religious services or did religious activities				
187. Practiced an instrument				
188. Went to parties				
189. Hung out with your friends after school during the week				
190. Hung out with your friends on weekends				
191. Played sports with friends around the neighborhood				
192. Played sports on a travel team not related to school				
193. Did athletic things like running or biking just for fun				
194. Played video games				
195. Played on the computer				
196. Babysat				

WHAT DO YOU DO IN SCHOOL?

How often have you done the following activities in the past year? (PUT AN "X" IN THE BOX THAT IS TRUE FOR YOU. CHOOSE ONLY ONE ANSWER PER QUESTION)**:**

	Never (1)	A little (2)	Sometimes (3)	A lot (4)
197. Been a member of a school sports team				
198. Took part in a school play or show				
199. Went to a school dance				
200. Helped a teacher after school				
201. Went to a meeting of a school club or group				
202. Worked on a school project outside of class				
203. Elected to some club or office				
204. Tutored other students				
205. Gone to a school sports event				

APPENDIX L: TABLES AND FIGURES

Table 1

Demographic Description of the Sample

		Gender		Race		Family Structure	
	N	Males	Females	Caucasian	Other	Intact[a]	Not Intact[b]
Total sample	211	99	112	167	40[c]	134	68[d]

[a] Households with two parents. [b] Households with less than two parents. [c] There were 13 African American, 11 Hispanic/Latino, 4 Asian/Asian Indian/Pacific Islander, 2 Native American, 9 Biracial/Multiracial, 1 Other (i.e., did not identify with race options), and 4 who did not respond to this question. [d] Nine students did not respond to this question.

Table 2

Demographic Differences in the Frequency and Compulsivity of Text Messaging

	Sex		Race		Family Structure	
MANOVA	Male	Female	Caucasian	Other	Intact	Not Intact
Overall *F*	9.36 (2, 158)**		0.62 (2, 158)		.81 (2, 158)	
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*
Frequency of text messaging[a]	3.76 (1.53)	4.11 (1.48)	3.90 (1.54)	4.10 (1.41)	3.87 (1.57)	4.13 (1.37)
(*F*)	1.03 (1, 159)		0.16 (1, 159)		0.00 (1, 159)	
Compulsivity of text messaging[b]	1.80 (.53)	2.25 (.75)	2.01 (.69)	2.17 (.74)	1.96 (.61)	2.14 (.77)
(*F*)	17.54 (1, 159)**		1.22 (1, 159)		1.30 (1, 159)	

[a]The response scale for 'frequency' was as follows: 1 = never, 2 = one day a week, 3 = a few days a week, 4 = most days, 5 = everyday.
[b]The response scale for 'compulsivity' was as follows: 1 = never, 2 = hardly ever, 3 = sometimes, 4 = most of the time, 5 = always.
**$p < .01$.

Table 3

Demographic Differences in the Adjustment Variables

	Sex		Race		Family Structure	
MANOVA	Male	Female	Caucasian	Other	Intact	Not Intact
Overall *F*	5.23 (4, 186)**		.44 (4, 186)		1.88 (4, 186)	
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*
Internalizing Symptoms[a]	-0.17 (1.23)	0.25 (1.14)	-0.03 (0.88)	0.12 (0.92)	-0.12 (1.25)	0.20 (0.98)
(*F*)	6.65 (1, 189)**		0.82 (1, 189)		3.66 (1, 189)	
Aggression[b]	.87 (.58)	0.93 (.59)	.89 (.58)	.99 (.61)	.88 (.56)	.93 (.64)
(*F*)	0.53 (1, 189)		1.15 (1, 189)		1.04 (1, 189)	
Prosocial Behavior[b]	2.37 (.74)	2.74 (.73)	2.58 (.75)	2.55 (.76)	2.67 (.71)	2.40 (.83)
(*F*)	3.77 (1, 189)		0.43 (1, 189)		3.96 (1, 189)*	
Academic Adjustment[c]	-0.27 (1.14)	0.03 (1.03)	-0.08 (0.88)	-0.15 (0.80)	0.05 (1.14)	-0.29 (0.98)
(*F*)	3.90 (1, 189)*		0.20 (1, 189)		4.99 (1, 189)*	

[a]The 'internalizing symptoms' variable was standardized.
[b]The response scales for 'aggression' and 'prosocial behavior' were as follows: 0 = never, 1 = seldom, 2 = sometimes, 3 = quite often, 4 = very often.
[c]The 'academic adjustment' variable was standardized.
*$p < .05$. **$p < .01$.

Table 4

Correlations among Compulsive Texting, Adjustment Variables, and Hypothesized Moderator Variables

	Compulsive Texting	Aggression	Prosocial Behavior	Internalizing Symptoms	Academic Adjustment	Individual Moderator	Family Moderator	Community Moderator
Compulsive Texting	__							
Aggression	.30**	__						
Prosocial Behavior	-.03	-.22**	__					
Internalizing Symptoms	.13	.32**	-.21**	__				
Academic Adjustment	-.16*	-.35**	.40**	-.28**	__			
Individual Moderator	-.27**	-.44**	.49**	-.37**	.69**	__		
Family Moderator	-.19*	-.40**	.41**	-.19*	.37**	.49**	__	
Community Moderator	.18*	.01	.44**	-.16*	.29**	.34**	.18*	__

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

Table 5

Demographic Differences in the Hypothesized Moderator Variables

	Sex		Race		Family Structure	
MANOVA	Male	Female	Caucasian	Other	Intact	Not Intact
Overall *F*	0.85 (3, 155)		1.06 (3, 155)		0.65 (3, 155)	
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*
Individual moderator (Self-control)[a]	2.06 (.46)	2.17 (.49)	2.12 (.50)	2.10 (.42)	2.18 (.46)	1.99 (.48)
(*F*)	1.39 (1, 157)		.22 (1, 157)		1.70 (1, 157)	
Family moderator (Parent knowledge)[b]	2.86 (.88)	2.99 (.85)	2.97 (.88)	2.76 (.82)	3.04 (.85)	2.76 (.82)
(*F*)	1.97 (1, 157)		1.53 (1, 157)		0.61 (1, 157)	
External moderator (involvement in extracurricular activities)[c]	1.54 (.39)	1.72 (.47)	1.62 (.44)	1.67 (.47)	1.65 (.42)	1.63 (.49)
(*F*)	0.76 (1, 157)		1.07 (1, 157)		0.82 (1, 157)	

[a]The response scale for 'self-control' was as follows: 0 = not true for me, 1 = a little bit true for me, 2 = somewhat true for me, 3 = very true for me.
[b]The response scale for 'parent knowledge' was as follows: 0 = not true for me, 1 = a little bit true for me, 2 = don't know, 3 = somewhat true for me, 4 = very true for me.
[c]The response scale for 'involvement in extracurricular activities' was as follows: 0 = never, 1 = a little, 2 = sometimes, 3 = a lot.

Table 6

Frequencies of Text Messaging

	Overall *N* (%)[c]	Sex: Males *N* (%)[c]	Sex: Females *N* (%)[c]
Days per week			
Never	33 (15.6)	17 (17.2)	16 (14.3)
One day a week	9 (4.3)	5 (5.1)	4 (3.6)
A few days a week	20 (9.5)	12 (12.1)	8 (7.1)
Most days	24 (11.4)	16 (16.2)	8 (7.1)
Everyday	125 (59.2)	49 (49.5)	76 (67.9)
Mean[a] (SD)	3.94 (1.51)	3.76 (1.53)	4.11 (1.48)
Send in a day			
None	0 (0.0)	0 (0)	0 (0)
1-30	58 (27.5)	31 (31.4)	27 (24.2)
31-65	31 (14.7)	14 (14.1)	17 (15.2)
66-100	42 (19.9)	20 (20.2)	22 (19.7)
Over 100	47 (22.3)	17 (17.2)	30 (26.8)
Mean[b] (SD)	8.25 (3.62)	7.91 (3.51)	8.53 (3.70)
Receive in a day			
None	1 (.5)	1 (1.0)	0 (0)
1-30	56 (26.5)	30 (30.4)	26 (23.3)
31-65	30 (14.3)	12 (12.1)	18 (16.1)
66-100	42 (19.9)	20 (20.2)	22 (19.7)
Over 100	49 (23.2)	19 (19.2)	30 (26.8)
Mean[b] (SD)	8.34 (3.59)	8.02 (3.55)	8.61 (3.62)

[a]The response scale for 'days per week' was as follows: 1 = never, 2 = one day a week, 3 = a few days a week, 4 = most days, 5 = everyday.
[b] The response scale for 'send in a day' and 'receive in a day' was as follows: 1 = none, 2 = 1-5, 3 = 6-10, 4 = 11-15, 5 = 16-20, 6 = 21-30, 7 = 31-40, 8 = 41-50, 9 = 51-65, 10 = 66-80, 11 = 81-100, 12 = over 100. The actual response scales had 12 options, but they were consolidated into broader ranges (none, 1-30, 31-65, 66-100, over 100) in this table for ease of readability.
[c] Total percentages do not equal 100% because some students skipped particular items, resulting in missing data.

Table 7

Compulsivity of Text Messaging

	Overall *N* (%)[b]	Sex: Males *N* (%)[b]	Sex: Females *N* (%)[b]
Never	6 (2.8)	5 (5.1)	1 (.9)
Never to hardly ever	87 (41.1)	47 (47.4)	40 (35.9)
Hardly ever	7 (3.3)	3 (3.0)	4 (3.6)
Hardly ever to sometimes	59 (27.9)	24 (24.2)	35 (31.5)
Sometimes	2 (.9)	0 (0.0)	2 (1.8)
Sometimes to most of the time	14 (6.6)	3 (3.0)	11 (9.9)
Most of the time	2 (.9)	0 (0.0)	2 (1.8)
Most of the time to always	1 (.5)	0 (0.0)	1 (.9)
Always	0 (0.0)	0 (0.0)	0 (0.0)
Mean[a] (SD)	2.04 (.69)	1.80 (.53)	2.25 (.75)

[a]The response scale for 'compulsivity of text messaging' was as follows: 1 = never, 2 = hardly ever, 3 = sometimes, 4 = most of the time, 5 = always.
[b] Total percentages do not equal 100% because some students skipped particular items, resulting in missing data.

Table 8

Hierarchical Regression Results: Predicting Internalizing Problems, Academic Adjustment, Aggression, and Prosocial Behavior from Sex, Compulsive Texting, and Self-Control

	Internalizing Problems		Academic Adjustment		Aggression		Prosocial Behavior	
Predictors	Δ R^2	β (Step)	Δ R^2	β (Step)	Δ R^2	β (Step)	Δ R^2	β (Step)
Step 1: Sex	.02	 .13	.04**	 .21**	.00	 .03	.06**	 .24**
F (Step)	*F* (1, 176) = 3.10		*F* (1, 176) = 7.80**		*F* (1, 175) = .14		*F* (1, 175) = 10.54**	
Step 2: Compulsive Texting Self-control	.15**	 -.04 -.41**	.45**	 -.02 .67**	.23**	 .18* -.39**	.22**	 .05 .49**
F (Step)	*F* (2, 174) = 15.94**		*F* (2, 174) = 76.18**		*F* (2, 173) = 25.45**		*F* (2, 173) = 26.06**	
Step 3: Compulsive Texting*Self-control	.02*	 .14*	.02*	 .13*	.00	 -.06	.04**	 .21**
F (Step)	*F* (1, 173) = 3.91*		*F* (1, 173) = 5.54*		*F* (1, 172) = .62		*F* (1, 172) = 9.65**	

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

Table 9

Hierarchical Regression Results: Predicting Internalizing Problems, Academic Adjustment, Aggression, and Prosocial Behavior from Sex, Compulsive Texting, and Parent Knowledge

	Internalizing Problems		Academic Adjustment		Aggression		Prosocial Behavior	
Predictors	ΔR^2	β (Step)	ΔR^2	β (Step)	ΔR^2	β (Step)	ΔR^2	β (Step)
Step 1: Sex	.01	.12	.05**	.21**	.00	.02	.06**	.24**
F (Step)	*F* (1, 173) = 2.50		*F* (1, 173) = 8.19**		*F* (1, 172) = .06		*F* (1, 172) = 10.47**	
Step 2: Compulsive Texting Parent Knowledge	.04*	.06 -.19*	.15**	-.19* .31**	.22**	.24** -.36**	.15**	-.02 .38**
F (Step)	*F* (2, 171) = 3.97*		*F* (2, 171) = 15.75**		*F* (2, 170) = 23.29**		*F* (2, 170) = 15.78**	
Step 3: Compulsive Texting*Parent Knowledge	.00	-.02	.01	.11	.01	-.10	.01	.10
F (Step)	*F* (1, 170) = .07		*F* (1, 170) = 2.50		*F* (1, 169) = 2.27		*F* (1, 169) = 1.91	

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

Table 10

Hierarchical Regression Results: Predicting Internalizing Problems, Academic Adjustment, Aggression, and Prosocial Behavior from Sex, Compulsive Texting, and Involvement in Extracurricular Activities

	Internalizing Problems		Academic Adjustment		Aggression		Prosocial Behavior	
Predictors	ΔR^2	β (Step)	ΔR^2	β (Step)	ΔR^2	β (Step)	ΔR^2	β (Step)
Step 1: Sex	.01	.11	.05**	.22**	.00	.01	.06**	.24**
F (Step)	*F* (1, 172) = 1.93		*F* (1, 172) = 8.58**		*F* (1, 171) = .03		*F* (1, 171) = 10.71**	
Step 2: Compulsive Texting Extracurricular Involvement	.05*	.13 -.20*	.14**	-.30** .30**	.10**	.33** -.03	.19**	-.17* .43**
F (Step)	*F* (2, 170) = 4.11*		*F* (2, 170) = 15.01**		*F* (2, 169) = 9.12**		*F* (2, 169) = 20.85**	
Step 3: Compulsive Texting* Extracurricular Involvement	.00	-.03	.01	.08	.01	-.09	.01	.07
F (Step)	*F* (1, 169) = .14		*F* (1, 169) = 1.30		*F* (1, 168) = 1.28		*F* (1, 168) = 1.06	

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

Figure 1. Self-control moderating the relation between compulsive texting and internalizing problems.

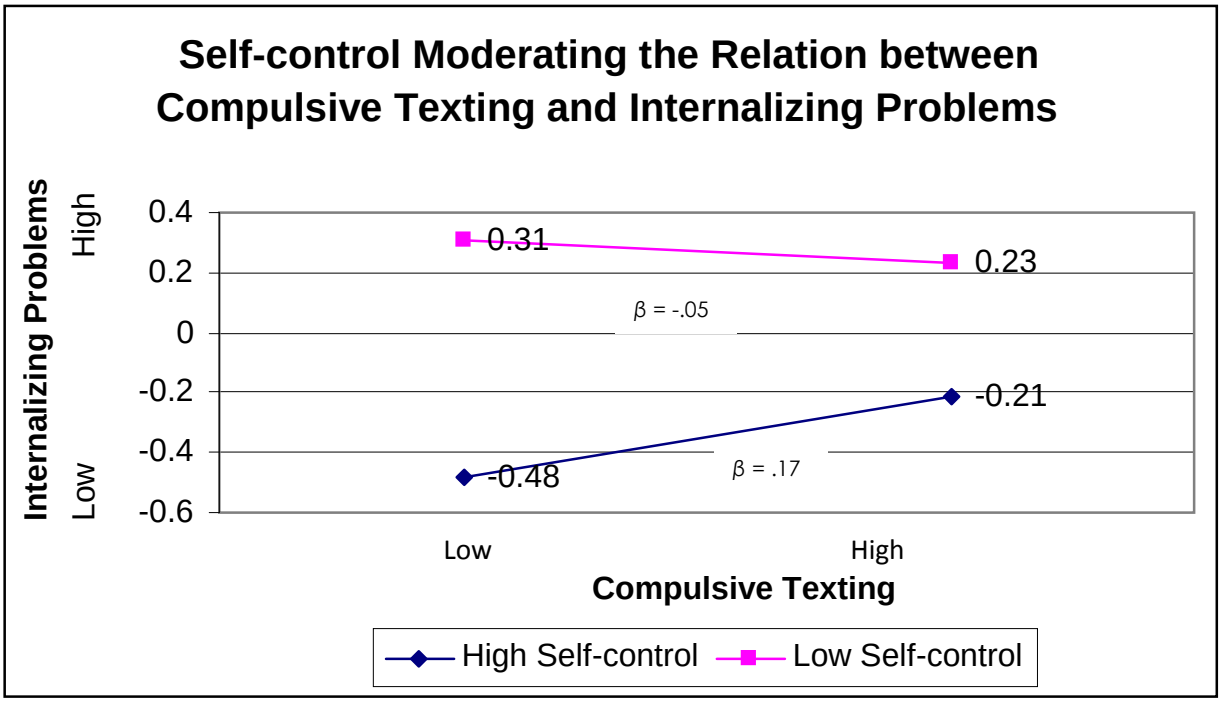
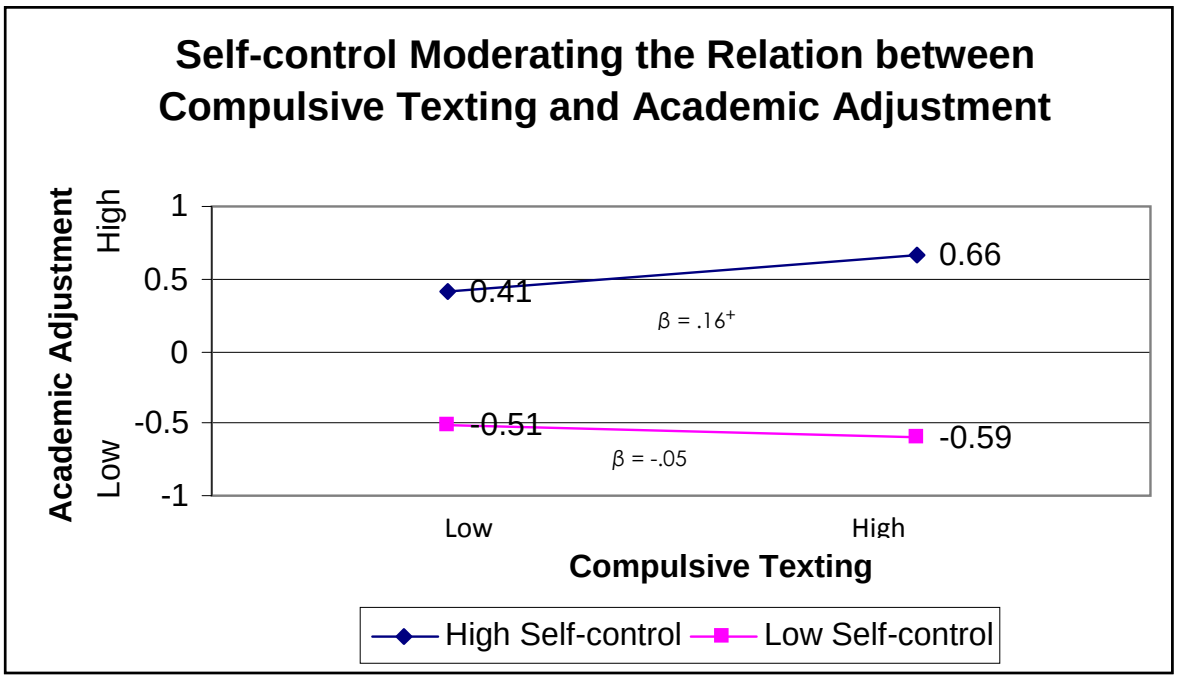
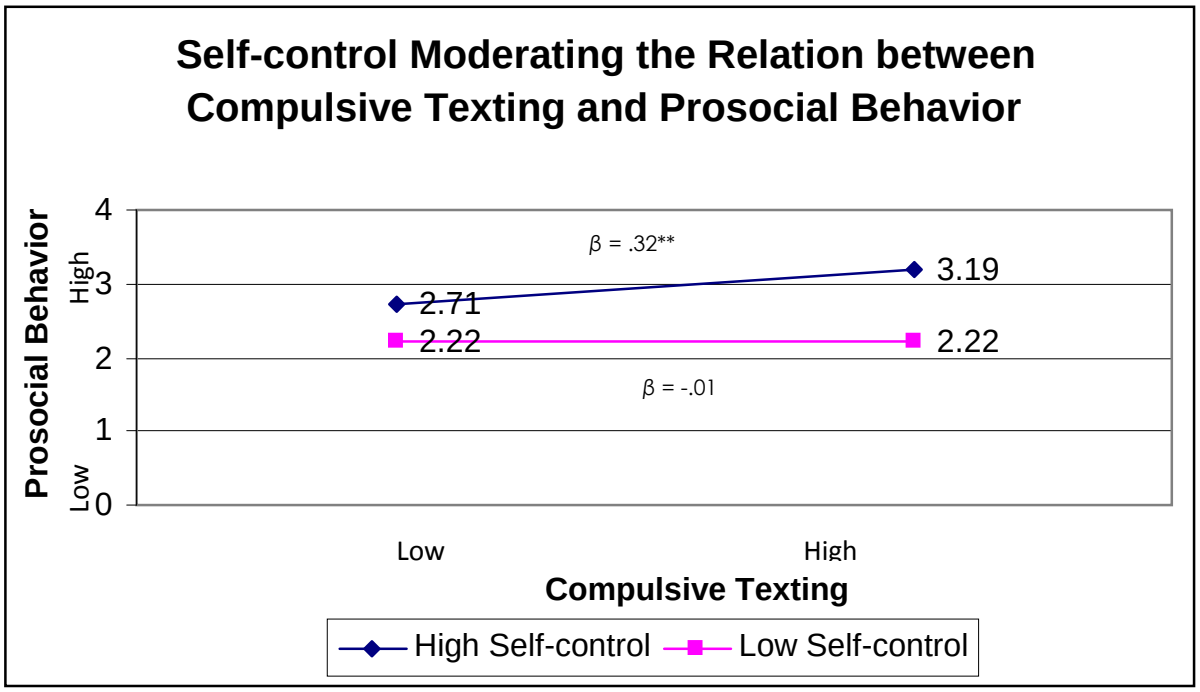


Figure 2. Self-control moderating the relation between compulsive texting and academic adjustment.



$^{+}p < .10$.

Figure 3. Self-control moderating the relation between compulsive texting and prosocial behavior.



** $p < .01$.