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Cyber Victimization, Cyber Aggression, and Adolescent Alcohol Use: Short-Term Prospective and Reciprocal Associations

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CYBER VICTIMIZATION, CYBER AGGRESSION, AND ADOLESCENT
ALCOHOL USE: SHORT-TERM PROSPECTIVE AND RECIPROCAL
ASSOCIATIONS

By

Sherilynn Faith Chan

A DISSERTATION

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CYBER VICTIMIZATION, CYBER AGGRESSION,
AND ADOLESCENT ALCOHOL USE: SHORT-TERM
PROSPECTIVE AND RECIPROCAL ASSOCIATIONS

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Cyber victimization and cyber aggression have been linked with numerous mental and physical health problems in adolescence. Emerging research suggests that cyber victimization and cyber aggression are also related to greater alcohol use; however, our understanding of these relationships remains limited. The purpose of the current study was to examine characteristics of youth involved in cyber victimization and/or cyber aggression, as well as the short-term prospective and reciprocal associations between cyber victimization, cyber aggression, and adolescents' drinking and binge drinking over the course of three months. The potential moderating role of impulse control difficulties, gender, and Hispanic ethnicity in these relationships was tested. Participants were 1140 adolescents aged 13 to 19 years (M = 15.80 years; SD = 1.21), recruited from two high schools in the Southeastern US. Adolescents completed the *Cyber Peer Experiences Questionnaire,* items from the *Youth Risk Behavior Survey*, the *Difficulties in Emotion Regulation Scale,* and the *Perceived Social Support Scales* at two time points, three months apart. Cross-lagged panel analyses within a structural equation modeling framework were conducted, using zero-inflated negative binomial regressions for the alcohol use outcomes. Youth involved in cyber victimization and/or cyber aggression differed from their uninvolved peers in terms of their alcohol use, level of impulse control difficulties, and perceived social support from family. Adolescents who

experienced more cyber victimization were more likely to abstain from drinking, but reported more frequent drinking if they were a drinker. However, cyber victimization was unrelated to later binge drinking. Adolescents who engaged in more cyber aggression toward their peers were more likely to use alcohol and conversely, adolescents who were more frequent users of alcohol engaged in more cyber aggression. Adolescents' levels of impulse control difficulties, gender, and ethnicity did not moderate any of these associations.

Cyber victimization is related to a lower likelihood of drinking, possibly because victimized youth may withdraw from peers and have fewer social opportunities to drink with peers. However, if they endorse any drinking, cyber-victimized youth appear to drink more frequently, perhaps to self-medicate. Reciprocal links between cyber aggression and alcohol use are consistent with Problem Behavior Theory. This theory suggests that youth who are aggressive or who use alcohol may select into a deviant peer group, which then increases problem behavior through socialization. Findings suggest that it may be important for prevention programs for adolescent alcohol use to evaluate, address, and monitor youths' cyber peer experiences. Drinking behaviors may also be important to assess and potentially target in anti-cyberbullying interventions.

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Chapter 1: Introduction

Cyber victimization is a prevalent problem and significant interpersonal stressor associated with adolescents' well-being. Both cyber victimization (i.e., being the target of a peer's aggressive behavior via electronic media) and cyber aggression (i.e., being the perpetrator of aggressive behavior toward another peer via electronic media) have been linked to a number of negative mental and physical health outcomes in adolescence (e.g., Gradinger, Strohmeier, & Spiel, 2009; Kowalksi & Limber, 2013; Wigderson & Lynch, 2013). Emerging evidence also indicates that cyber victimization and aggression are related to greater substance use (e.g., Chan & La Greca, 2016; Gámez-Guadix, Orue, Smith, & Calvete, 2013). Youths' substance use, especially alcohol use, is a significant public health concern. A better understanding of how cyber victimization and cyber aggression may place youth at risk for alcohol use has important implications for prevention and intervention efforts to reduce underage drinking.

Our current understanding of the relationships between cyber victimization, cyber aggression, and adolescent alcohol use remains limited in important ways. In particular, few longitudinal studies exist, reciprocal relationships are rarely examined, victimization and aggression are seldom jointly considered, and little attention has been given to potential moderating variables. To address these gaps in the literature, the current study had four primary aims and one exploratory aim. The **first** aim was to compare levels of alcohol use among cyber victims, cyber aggressors, cyber aggressor-victims, and uninvolved youth, as well as to compare other characteristics (i.e., demographic variables, impulse control difficulties, and perceived social support) among these groups. The **second** aim was to examine prospective and reciprocal associations between adolescents' cyber victimization and cyber aggression and their alcohol use. The **third**

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aim was to examine whether impulse control difficulties moderated the prospective association between cyber victimization and alcohol use and the prospective and reciprocal associations between cyber aggression and alcohol use. The **fourth** aim was to examine whether gender moderated any of these associations. The **exploratory fifth** aim was to examine the potential moderating role of ethnicity in these relationships. The following sections review the relevant literature on cyber victimization, cyber aggression, adolescent alcohol use, impulse control, and perceived social support, and address each aim in detail.

Cyber Victimization, Cyber Aggression, and Alcohol Use: Prevalence and Significance

  Cyber victimization. Cyber victimization, or peer victimization occurring through electronic media, such as social networking sites, email, and texting, is a growing concern in the United States (Lenhart, 2007). Reports indicate that a significant proportion of American teenagers experience cyber victimization, with most prevalence estimates ranging from 6% to 30% across studies (Kowalksi & Limber, 2007; Li, 2007; Patchin & Hinduja, 2012) and reaching as high as 72% (Juvonen & Gross, 2008). Moreover, cyber victimization is a growing concern worldwide, sparking interest in this problem globally, including in Canada (e.g., Mishna, Khoury-Kassabri, Gadalla, & Daciuk, 2012), Australia (e.g., Sakellariou, Carroll, & Houghton, 2012), and Europe (e.g., Sevcikova & Smahel, 2009; Slonje & Smith, 2008). Evidence suggests that cyber victimization may peak in middle school, but continues into high school, and may be just as prevalent, or even more prevalent among older youth (Ybarra & Mitchell, 2007).

Research from the Pew Research Center (Lenhart, 2015) indicates that in the United States, 92% of youth aged 13-17 go online daily, 24% report going online "almost constantly," and 89% use at least one social networking site. Additionally, 88% of youth own a cell phone, 90% of which report using text messaging, sending and receiving 30 texts each day on average. Technology use is higher among older adolescents (ages 15-17 years), who are more likely to use social media (e.g., Facebook) and own a smartphone, compared to younger adolescents (ages 13-14 years).

Social media and text messaging represent vital modes of communication and can help adolescents stay connected to their friends and enhance peer relations. At the same time, given youths' high rates of technology use and the pervasive role that electronic media play in their lives, cyber victimization represents a critically important issue with significant implications for youths' wellbeing.

A large body of literature indicates that cyber victimization is related to but distinct from "traditional" face-to-face forms of peer victimization (e.g., Dempsey, Sulkowski, Nichols, & Storch, 2009; Landoll, La Greca, Lai, Chan & Herge, 2015; Ybarra, Diener-West, & Leaf, 2007). Traditional peer victimization includes overt/physical (e.g., being the target of physical violence), relational (e.g., being socially excluded), and reputational victimization (e.g., being the target of rumors that damage one's reputation) (De Los Reyes & Prinstein, 2004). While there is some overlap between traditional and cyber victimization, peer victimization occurring via electronic media has unique characteristics that may make it especially harmful for the victim. Such characteristics include the potential for a wide audience witnessing the

victimization, potential anonymity of the perpetrator, lack of supervision, and fewer constraints on when and where the victimization may occur (Kowalksi & Limber, 2007; Patchin & Hinduja, 2006; Slonje & Smith, 2008; Sticca & Perren, 2013).

Cyber victimization has been shown to be uniquely associated with adolescent adjustment, above and beyond traditional types of peer victimization. Specifically, several studies have demonstrated that cyber victimization is uniquely related to negative mental health outcomes, including social anxiety and depressive symptoms, as well as low self-esteem, self-efficacy, and locus of control (Fredstrom, Adams, & Gilman, 2011; Landoll et al., 2015; Wigderson & Lynch, 2013). Victimized youth report feeling angry, embarrassed, sad, and scared (Mishna, Cook, Gadalla, Daciuk, & Solomon, 2010). Youth who experience cyber victimization are more also likely to report physical health problems, including somatic symptoms and sleep problems (Herge, La Greca, & Chan, 2016; Kowalksi & Limber, 2013). Furthermore, cyber victimization is associated with a higher frequency of suicidal ideation and behavior (Bauman, Toomey, & Walker, 2013; Hinduja & Patchin, 2010; Litwiller & Brausch, 2013). Given its large impact on youths' mental and physical health, cyber victimization and its associated outcomes represent a crucial area of study.

Cyber aggression. Cyber aggression, or perpetration of aggression toward peers via electronic media, also has important implications for adolescent adjustment. Cyber aggression rates among youth range from 3% to 44% (Patchin & Hinduja, 2012; Pelfrey & Weber, 2013). As with cyber victimization, prevalence estimates of cyber aggression vary widely due to definitional and methodological differences across studies. For example, while some studies examine cyber *aggression*, a large literature has focused on

cyber*bullying*, which refers to aggressive behavior that is repeated over time and involves a power differential between the perpetrator and the victim (Smith et al., 2008). Additionally, different studies ask about different time frames (e.g., past three months, past year, lifetime) or utilize samples from different populations, making it difficult to compare across studies.

Despite methodological differences across studies, evidence consistently indicates that cyber aggression/cyberbullying is related to a variety of negative outcomes, including affiliation with delinquent peers, perpetration of traditional peer aggression, drug use, and psychosocial difficulties (for a review, see Kiriakidis & Kavoura, 2010; Pelfrey & Weber, 2013; Ybarra & Mitchell, 2004; Ybarra & Mitchell, 2007). Importantly, a small but significant proportion of youth report being both cyber victims and cyber aggressors, and demonstrate various psychological and physical health problems (e.g., Kowalski & Limber, 2013; Mishna et al., 2012). The current study built upon previous work by considering cyber victimization and cyber aggression jointly and focused on one important outcome of interest, namely alcohol use.

Adolescent alcohol use. Adolescent alcohol use represents a significant public health concern. Data from 2013 indicate that 35% of high school students report drinking and 21% report binge drinking in the past month (Centers for Disease Control and Prevention [CDC], 2014). Underage drinking is related to academic and social problems, as well as short-term health risks, such as physical injury, motor vehicle accidents, and risky sexual behavior (U.S. Department of Health and Human Services, 2007). Moreover, excessive alcohol use has the potential to lead to serious long-term health consequences, including cardiovascular disease and cancer (Baan et al., 2007; Rehm,

Gmel, Sempos, Trevisan, 2003). Health risk behaviors are often initiated and established during the teenage years and alcohol use in adolescence predicts later use, dependence, and abuse (e.g., Hingson, Heeren, & Winter, 2006). Thus, an important public health goal is to reduce and delay the onset of drinking behaviors among youth.

Identifying risk factors for alcohol use is critical to inform prevention and intervention efforts to reduce drinking among youth. Risk factors may be diverse and can include individual, family, and peer variables. At the individual level, personality traits, such as impulsivity and sensation-seeking, have been linked with adolescent alcohol use (Gunning, Sussman, Rohrbach, Kniazev, & Masagutov, 2009; von Diemen, Bassani, Fuchs, Szobot, & Pechansky, 2008). Family risk factors include negative family interactions, parental substance use, and poor parental monitoring (Clark, Shamblen, Ringwalt, & Hanley, 2012; Piko & Balázs, 2012; Shorey et al., 2013), whereas perceived social support from family is a protective factor (Hamdan-Mansour, Puskar, & Sereika, 2007; Wills & Cleary, 1996; Wills, Resko, Ainette, & Mendoza, 2004; Windle & Miller-Tutzauer, 1992). Family-based interventions, such as Multidimensional Family Therapy, show promise for treating adolescent alcohol problems (Rowe & Liddle, 2006; Rowe & Liddle, 2008).

However, peers also play a key role in adolescents' alcohol use, as drinking is typically initiated and maintained in the context of peer relations. For example, peer crowd affiliation, friends' alcohol use, and peer norms are predictors of alcohol use among youth (Blanton et al., 1997; Gibbons et al., 2004; Gunning et al., 2009; La Greca, Prinstein, & Fetter, 2001; Piko, 2006; Windle, 2000). Perceived social support from friends has also been linked with greater alcohol use, often operating as suppression

effects (Wills et al., 2004; Piko, 2000; Tomcikova, Geckova, van Dijk, & Reijneveld, 2011). Cyber victimization and cyber aggression, the focus of this study, may also be important peer risk factors for alcohol use, as well as potential associated outcomes.

Linking Cyber Victimization and Cyber Aggression with Alcohol Use

The following sections present the theoretical framework guiding the current study, review findings from studies examining the relationships between cyber victimization and aggression and alcohol use, identify gaps in the literature, and discuss how the current study addressed these gaps.

Theoretical framework. The current study hypothesized a positive relationship between cyber victimization and alcohol use, drawing from the self-medication hypothesis and general strain theory. The *self-medication hypothesis* posits that individuals use substances to cope with feelings of distress (Khantzian, 1997). Cyber victimization may lead to symptoms of social anxiety and depression (e.g., Fredstrom et al., Landoll et al., 2015; Wigderson & Lynch, 2013), which in turn may lead to greater substance use (e.g., Mason, Hitch, & Spoth, 2009; Windle & Windle, 2012; Zehe, Colder, Read, Wieczorek, & Lengua, 2013). Thus, youth who are victimized may turn to substances, such as alcohol, to reduce their feelings of distress.

An alternative but complementary theory, *general strain theory*, postulates that strain produces feelings of anger and frustration, which may place individuals at risk for engaging in aggressive, deviant, or criminal behavior (Agnew, 1992). Cyber victimization is arguably a significant interpersonal stressor and source of strain that elicits negative emotions, including anger, sadness, and anxiety (e.g., Mishna et al., 2010). The effort needed to manage these emotions may deplete the resources necessary

for appropriate self-regulation, increasing the likelihood of engaging in aggressive or deviant behavior. Therefore, victimized youth may be more likely to use alcohol to self-regulate. Indirectly supporting this theory, among middle school students, a measure of general strain was related to an increased likelihood of peer aggression (Patchin & Hinduja, 2011) and cyber victimization was prospectively linked with cyber aggression six months later (Wright & Li, 2013). These theories inform a hypothesized link between cyber victimization and subsequent alcohol use (Aim 2a) and are depicted in Figure 1.

Problem Behavior Theory, which posits that problem behaviors tend to co-occur among youth, may explain a positive link between cyber aggression and alcohol use (Jessor & Jessor, 1977). According to this theory, individuals who have the willingness and ability to engage in one type of problem or delinquent behavior are at greater risk for engaging in other types of problem behaviors. Youth who are aggressive toward their peers (e.g., bullies and bully-victims) may be more likely to associate with deviant peers and engage in substance use (Rusby, Forrester, Biglan, & Metzler, 2005). In fact, adolescents' affiliation with deviant peers and their friends' substance use are strong predictors of adolescents' own substance use (Gunning et al., 2009; La Greca, Prinstein, & Fetter, 2001; Piko, 2006; Windle, 2000), findings that may be explained by two complementary processes, selection and socialization. *Selection* occurs when adolescents seek out friends who have similar characteristics as them (e.g., interest in drinking and partying); *socialization* occurs when friends influence adolescents' own substance use (e.g., Burk, Van der Vorst, Kerr, & Stattin, 2012; Mathys, Burk, & Cillessen 2013; Osgood et al., 2013). Youths' involvement in a general pattern of

problem behaviors that is modeled, supported, and reinforced by deviant peers also could explain a positive relationship between cyber aggression and drinking behaviors.

In line with Problem Behavior Theory, it is also possible that youth who use alcohol are at risk for cyber victimization and cyber aggression. Youth who use alcohol may associate with deviant peers, be involved in other problem behaviors, and thus could be more likely targets of peer victimization and perpetrators of peer aggression. Moreover, alcohol consumption may impair inhibitory control (Field, Wiers, Christiansen, Fillmore, & Verster, 2010; Fillmore & Vogel-Sprott, 2000), making youth more likely to engage in acts of cyber aggression. This theory informs hypothesized links between cyber aggression and subsequent alcohol use (Aim 2a), and between alcohol use and subsequent cyber aggression and cyber victimization (Aim 2b). These relationships are depicted in Figure 2.

Empirical evidence. Consistent with the conceptual models reviewed above, evidence generally indicates that both cyber victimization and cyber aggression are linked with greater adolescent substance use, including alcohol use. Concerning cyber victimization specifically, among high school students, it has been associated with an increased likelihood of binge drinking (Goebert, Else, Matsu, Chung-Do, & Chang, 2011) and greater general substance use (Litwiller & Brausche, 2013). Greater peer victimization, as measured by a latent variable including traditional and cyber types of victimization, has been linked with greater substance use, among a national sample of youth in grade 10 (Luk, Wang, & Simons-Morton, 2010). Internet harassment (not specific to peers) has been linked with greater alcohol use among youth aged 10-15 years (Ybarra et al., 2007). Online victimization (not specific to peers) has been associated

with greater general substance use among youth aged 10-17 years, controlling for offline forms of victimization (Mitchell, Ybarra, & Finkelhor, 2007). Greater substance use (alcohol/marijuana) among high school students/youth under the age of 18 was concurrently related to a higher likelihood of experiencing cyber victimization (Hinduja & Patchin, 2008).

Although studies vary in terms of their definition of cyber victimization, participants' age, specific substance use behaviors examined, and other methodological approaches, overall, higher levels of cyber victimization appear to be concurrently related to greater alcohol use. These findings are in line with studies demonstrating positive links between traditional peer victimization and substance use (e.g., Sullivan, Farrell, & Kliewer, 2006; Litwiller & Brausche, 2013; Tharp-Taylor, Haviland, & D'Amico, 2009). The current study built upon previous work by examining prospective and reciprocal relationships between cyber victimization and alcohol use, and testing several potential moderating variables.

A small number of cross-sectional studies have examined concurrent relationships between cyber aggression and adolescent substance use, including alcohol use. For example, among youth in grades 6 to 10, all-types bullies (including cyber) were at highest risk of using substances (i.e., smoking cigarettes, drinking alcohol, being drunk, and using marijuana), compared to social/verbal bullies and uninvolved youth (Wang, Iannotti, & Luk, 2012). Recent work indicates that cyber aggression is uniquely related to more frequent drinking and binge drinking among high school students, above and beyond traditional peer aggression (Chan & La Greca, 2016). Among a sample of youth under the age of 18 years, greater substance use (i.e., alcohol or marijuana) predicted a

higher likelihood of concurrent involvement in both cyber aggression and victimization, with stronger effects for aggression/offending (Hinduja & Patchin, 2008). Additionally, Gámez-Guadix and colleagues (2012) found that cyber bully-victims reported greater concurrent substance use than did cyber victims and uninvolved youth. These findings are consistent with studies demonstrating positive links between traditional peer aggression/bullying and substance use (e.g., Luk, Wang, Simons-Mortons, 2012; Moore et al., 2014; Nansel et al., 2001).

Although the vast majority of existing studies focus either on victimization or aggression, a select few have considered cyber victimization and cyber aggression jointly, typically using cutoff scores to categorize youth into groups (e.g., aggressors, victims, aggressor-victims, uninvolved). For example, among a large sample of middle school students, perpetrators, victims, and perpetrator-victims of cyber aggression had greater odds of past 30 day alcohol use, compared to uninvolved youth (Peleg-Oren, Cardenas, Comerford, & Galea, 2012). Similarly, among a sample of Italian middle and high school students, youth categorized as cyber bullies, bully-victims, and victims reported greater alcohol use (i.e., had so much alcohol they were really drunk at least 2-3 times), compared to uninvolved youth (Vieno, Gini, & Santinello, 2011).

To date, only three prospective studies have examined relationships between cyber victimization, cyber aggression, and adolescent substance use. Using two time points, six months apart, Gámez-Guadix and colleagues (2013) found that cyber victimization was not related to adolescents' later substance use (i.e., a composite measure of tobacco, alcohol, marijuana, cocaine, speed, LSD, ecstasy, hashish, others); in contrast, substance use predicted an increase in cyber victimization over time. Consistent

with these findings, Modecki and colleagues (2013) found that increases in problem behavior (including substance use, delinquency, and aggressive behaviors) across grades 8-10 predicted both cyber aggression and victimization in grade 11. Finally, a recent study indicated that prior alcohol use was associated with a greater frequency of technology-based interpersonal victimization one and two years later (Korchmaros, Mitchell, & Ybarra, 2014).

Gaps in the literature. Significant gains have been made in our understanding of the links between cyber victimization, cyber aggression, and adolescent alcohol use. However, several important gaps in the literature remain, which the current study sought to address.

First, the studies that examined alcohol use among cyber aggressors, cyber victims, cyber aggressor-victims, and uninvolved youth focused primarily on or included middle school students (Peleg-Oren et al., 2012; Vieno et al., 2011; Wang, Iannotti, & Nansel, 2009). Additionally, relatively little is known about demographic and psychosocial characteristics of youth in each of these groups (Kiriakidis & Kavoura, 2010). Thus, the current study's **first aim** was to compare levels of alcohol use among high school-aged cyber victims, cyber aggressors, cyber aggressor-victims, and uninvolved youth, as well as other characteristics (i.e., gender, race/ethnicity, age, impulse control difficulties, and perceived social support from family and friends) among these groups.

Second, the majority of studies are cross-sectional in nature. To date, no study has comprehensively and simultaneously examined the prospective and reciprocal relationships between cyber victimization, cyber aggression, and adolescent alcohol use

among high school students. Do cyber victimized youth turn to alcohol to self-medicate?
Are perpetrators of cyber aggression at risk for later alcohol use? Are youth who drink
more likely targets of cyber victimization and/or more likely to engage in cyber
aggression? Prospective studies are needed to answer these questions and provide some
evidence of directionality of these relationships. Thus, this study's **second aim** was to
examine prospective and reciprocal associations between adolescents' cyber
victimization and cyber aggression and their alcohol use (i.e., drinking and binge
drinking). These relationships, as well as autoregressive paths, are depicted in Figure 3.

The present study used a short-term prospective design, examining associations
between cyber experiences and alcohol use over a three-month period. Existing
prospective studies have used assessment periods ranging from six months to two years.
However, a shorter time frame (e.g., three months) may be desirable to capture the more
intermediate interplay between cyber victimization, cyber aggression, and alcohol use.
Adolescent friendships and social networks are not highly stable (Chan & Poulin, 2007)
and peer relations and networks can change even within a three-week period (Cairns,
Leung, Buchanan, & Cairns, 1995). Moreover, adolescents may show quick changes in
substance use that covary with changes in friendship selection and affiliation with
substance using peers (Dishion & Medici Skaggs, 2000; Poulin, Kiesner, Pederson, &
Dishion, 2011). Thus, a short-term assessment period may shed light on cyber
victimization and cyber aggression as proximal factors related to alcohol use, and vice
versa.

A third gap in the literature is that many existing studies focus either on cyber
victimization or on cyber aggression. Of studies that consider both, a categorical

approach is often used to classify youth into groups (e.g., uninvolved, victims, bullies, bully-victims). While informative in some respects, this approach loses information and may result in a loss of power. Therefore, in addition to examining levels of alcohol use among cyber victims, cyber aggressors, cyber aggressor-victims, and uninvolved youth (Aim 1), the current study treated cyber victimization and cyber aggression as continuous variables and examined them simultaneously in one comprehensive model (Aim 2).

A fourth notable gap is the lack of attention devoted to possible moderators of the relationships between cyber victimization, cyber aggression, and alcohol use. The present study focused on an individual difference variable, impulse control difficulties. Impulse control difficulties are one aspect of emotion dysregulation, a multidimensional construct that also includes lack of awareness of emotional responses, lack of clarity of emotional responses, nonacceptance of emotional responses, limited access to emotion regulation strategies perceived as effective, and difficulties engaging in goal-directed behaviors when experiencing negative emotions (Gratz & Roemer, 2004; Neumann, van Lier, Gratz, & Koot, 2010; Weinberg & Klonsky, 2009). Among youth, these dimensions of emotion dysregulation have been linked with psychological problems, such as depression, anxiety, suicidal ideation, eating disorders, alcohol use, and drug use (Weinberg & Klonsky, 2009). A large body of literature has linked emotion dysregulation with alcohol use and abuse in college, adult, and clinical samples (Aldao & Nolen-Hoeksema, 2010; Aldao, Nolen-Hoeksema, & Schweizer, 2010). Impulse control difficulties in particular have demonstrated bivariate relationships with alcohol use among youth aged 13-17 years (Weinberg & Klonsky, 2009) and have been related to alcohol consumption and a higher number of alcohol-related consequences among

college students (Dvorak et al., 2014). In addition to being conceptualized as an aspect of emotion dysregulation, impulse control difficulties are also considered to be a personality characteristic or trait that is linked with youth risk-taking and substance use and misuse (e.g., Feldstein Ewing et al., 2015; Pharo et al., 2011).

Impulse control difficulties may be a potential moderator of the relationship between cyber victimization and alcohol use, as it is consistent with the self-medication hypothesis and general strain theory. Specifically, cyber victimization may represent a source of strain that elicits negative emotions. The effort needed to manage these emotions may deplete the resources necessary for self-regulation or appropriate impulse control. Increased difficulties with impulse control may place youth at greater risk for using alcohol as a coping strategy to alleviate feelings of distress. Thus, a positive link between cyber victimization and subsequent alcohol use may be stronger among youth who also have difficulties with impulse control.

Impulse control difficulties also may act as a moderator of the prospective and reciprocal associations between cyber aggression and adolescent alcohol use, as it has been linked with both aggressive behavior (Herts, McLaughlin, & Hatzenbuehler, 2012; McLaughlin, Hatzenbuehler, Mennin, & Nolen-Hoeksema, 2011) and alcohol use (e.g., Weinberg & Klonsky, 2009). In particular, cyber aggression and alcohol use may be especially strongly related among youth who exhibit poor impulse control when experiencing negative emotions. Aggressive youth may be especially likely to use alcohol if they also have difficulties controlling impulses. Youth who drink may be especially likely to engage in cyber aggression if they also have difficulties controlling impulses. To test these hypotheses, the current study's **third aim** was to examine

whether adolescents' impulse control difficulties moderated the prospective associations between cyber victimization and cyber aggression and subsequent alcohol use (Aim 3a) and the prospective association between alcohol use and subsequent cyber aggression (Aim 3b).

Gender Considerations

Gender differences in cyber victimization, cyber aggression, and alcohol use have been reported. In general, girls are more likely than boys to report cyber victimization (CDC, 2014; Chan & La Greca, 2016; Dempsey et al., 2009; Mishna et al., 2010; Mishna et al., 2012; Wang et al., 2009), although some studies have not found any gender differences (Hinduja & Patchin, 2008; Wigderson & Lynch, 2013). Gender differences in cyber aggression are less clear. Some studies have found that girls are more likely than boys to engage in cyber aggression (Chan & La Greca, 2016; Kowalksi & Limber, 2007) while others have found that boys are more likely (Mishna et al., 2012; Kiriakidis & Kavoura, 2010; Wang et al., 2009). Rates of alcohol use are similar among boys and girls (CDC, 2014); however, boys may report greater binge drinking than girls (CDC, 2014; La Greca et al., 2001).

The current study's **fourth** aim was to test gender as a moderator of all associations examined in Aim 2. No a priori hypotheses were made given the mixed evidence on gender differences and limited work examining gender as a moderator of relationships between cyber victimization, cyber aggression, and alcohol use.

Ethnicity Considerations

The current study focused on a sample of predominantly Hispanic youth. Hispanics represent the largest ethnic minority in the United States (United States Census

Bureau, 2012). Furthermore, recent evidence indicates that older Hispanic adolescents are more likely to be substance-using aggressors compared to other youth (Luk et al., 2012).

Little work has examined racial/ethnic differences in cyber victimization and cyber aggression. Among high school students, White youth report the highest prevalence of cyber victimization, followed by Hispanic and then Black youth (CDC, 2014). Regarding alcohol use among high school students, White and Hispanic youth report comparable rates of drinking and binge drinking, which are higher than those reported by Black youth (CDC, 2014).

The current study's **exploratory fifth** aim was to test ethnicity (i.e., Hispanic vs. Non-Hispanic) as a moderator of prospective and reciprocal associations examined in Aim 2. Given the limited evidence for racial/ethnic differences in cyber victimization, cyber aggression, and alcohol use, Hispanic ethnicity was not expected to moderate associations between these variables.

Study Aims and Hypotheses

The current study addressed important gaps in the literature and is innovative in several respects. It examined both cyber victimization and cyber aggression in relation to alcohol use (i.e., frequency of drinking and binge drinking), utilizing a short-term prospective design (i.e., two assessments conducted three months apart) to examine prospective and reciprocal relationships. It tested impulse control difficulties, gender, and ethnicity as potential moderators of these relationships. Additionally, this study focused on high school students, who have higher rates of alcohol use than middle school

students, and on Hispanic youth, who thus far have been underrepresented in the literature. The study aims and hypotheses follow:

Aim 1 examined levels of alcohol use among cyber victims, cyber aggressors, cyber aggressor-victims, and uninvolved youth, as well as other characteristics (i.e., demographic variables, impulse control difficulties, and perceived social support) among these groups.

Hypothesis 1: In line with previous research on cyber victimization and aggression (Peleg-Oren et al., 2012; Vieno et al., 2011), it was hypothesized that compared to uninvolved youth, youth classified as cyber victims, cyber aggressors, and cyber aggressor-victims would report higher rates of alcohol use. It was also hypothesized that youth involved in cyber victimization and/or aggression would report higher levels of impulse control difficulties and lower levels of perceived social support from family and friends.

Aim 2 examined prospective and reciprocal associations between adolescents' cyber victimization and cyber aggression and their alcohol use (see Figure 3).

Hypothesis 2a: It was hypothesized that greater cyber victimization and cyber aggression at Time 1 would predict increased drinking and binge drinking at Time 2.

Hypothesis 2b: It was hypothesized that greater drinking and binge drinking at Time 1 would predict increased cyber victimization and aggression at Time 2.

Aim 3 examined whether impulse control difficulties moderated the prospective association between cyber victimization and subsequent alcohol use and the prospective and reciprocal associations between cyber aggression and alcohol use (see Figure 4).

Hypothesis 3a: It was hypothesized that impulse control difficulties would moderate the associations between cyber victimization and cyber aggression and subsequent drinking and binge drinking, such that these associations would be stronger among youth with higher levels of impulse control difficulties.

Hypothesis 3b: It was hypothesized that impulse control difficulties would moderate the association between drinking and binge drinking and subsequent cyber aggression, such that these associations would be stronger among youth with higher levels of impulse control difficulties.

Aim 4 examined whether gender moderated the prospective and reciprocal associations between adolescents' cyber victimization and cyber aggression and their alcohol use (see Figure 5). No a priori hypotheses were made.

Aim 5 was exploratory and examined whether Hispanic ethnicity moderated the prospective and reciprocal associations between adolescents' cyber victimization and cyber aggression and their alcohol use (see Figure 6). No a priori hypotheses were made.

Chapter 2: Method

Participants

Participants were 1140 adolescents (58% girls; 13-19 years; M = 15.81 years, SD = 1.21; 9th-12th grade), from two public high schools in a major metropolitan area in the Southeastern United States. The sample was racially and ethnically diverse (Race: 82% = White, 12% = Black, 4% = Asian; Ethnicity: 80% Hispanic), similar to the racial and ethnic composition of the broader community (Race: 78% = White, 19% = Black, 2% = Asian; Ethnicity: 66% Hispanic) (U.S. Census Bureau, 2013).

Procedure

This project was part of a larger study of adolescents' peer relations and was approved by the university Institutional Review Board and the local county school board. Teachers distributed parental consent forms to students enrolled in science classes, which are required for all students and thus were likely to capture a representative sample of high school students. Approximately 2250 consent forms were distributed; some adolescents received multiple forms due to enrollment in multiple science classes. Of the 1434 consent forms that were returned, 1237 (86%) parents provided consent (or adolescents provided consent if 18 years of age or older). Of these, 1177 (95%) adolescents were eligible to participate. Those who were ineligible included students who were only Spanish speakers (n = 20) or were no longer enrolled in the class at the time of data collection (n = 40). Of the eligible adolescents, 1144 (97%) participated in the study. Of these, four adolescents did not report on their gender, race/ethnicity, and age, and therefore were excluded from analyses, resulting in a final sample of 1140 participants.

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Data were collected at two time points in Spring 2011, approximately three months apart. At Time 1, 1064 adolescents participated; at Time 2, 923 of these participated, plus an additional 76 adolescents. All adolescents were included in analyses. The protocol was identical at Time 1 and Time 2 and included all measures described below. On each day of data collection, adolescents signed an assent form (or a consent form if 18 years of age or older) prior to participation. Study questionnaires were completed during class time and supervised by trained research assistants. Participants in each school were entered in a raffle to win a $50 gift card or one of two $20 gift cards. Principals and teachers also received $20 gift cards.

Measures

Demographic variables. Adolescents reported on their sex, race/ethnicity, and age. Race/ethnicity was dummy coded (White Hispanic = 1, Black = 1, Asian = 1), with Non-Hispanic White as the referent group.

Cyber peer victimization and aggression (Appendix A). The *Cyber Peer Experiences Questionnaire (C-PEQ;* Landoll et al., 2015) measures aversive peer experiences that occur via technology and was used to assess cyber victimization and cyber aggression, each with nine items. Scores from both Time 1 and Time 2 were used in analyses. *C-PEQ* items are worded to reflect peer experiences across a wide variety of electronic media (e.g., "A peer posted mean things about me publicly via electronic media"). Adolescents rated how often each event occurred to them (victimization) and whether they perpetrated these acts (aggression; e.g., "Did you do this to another peer?") in the past two months. Cyber victimization items were rated on a 5-point scale (1 = *Never* to 5 = *A few times a week*) and cyber aggression items were rated dichotomously (1

= *yes*, 0 = *no*). Scores for cyber victimization and cyber aggression were computed by averaging the victimization and aggression items, respectively.

The *C-PEQ* demonstrates acceptable to good levels of reliability among ethnically diverse adolescent samples (e.g., α = .78-.83 for cyber victimization items; Landoll et al., 2015). Furthermore, cyber victimization is incrementally predictive of adolescents' depressive symptoms, even after controlling for overt, relational, and reputational victimization (Landoll et al., 2015). In the current sample, the internal consistency of the *C-PEQ* for the cyber victimization items was .78 at Time 1 and .85 at Time 2; for the cyber aggression items, internal consistency was .69 at Time 1 and .75 at Time 2.

Alcohol use (Appendix B). Alcohol use was assessed with two items from the *Youth Risk Behavior Survey* (*YRBS*; CDC, 2011) used by the CDC to track adolescent health risk behaviors on a biennial basis. One item assessed the frequency of current drinking (i.e., "During the past 30 days, on how many days did you have at least one drink of alcohol?"). A second item assessed the frequency of current binge drinking (i.e., "During the past 30 days, on how many days did you have 5 or more drinks of alcohol in a row, that is, within a couple of hours?"). Response choices were "0 days," "1-2 days," "3-5 days," "6-9 days," "10-19 days," "20-29 days," and "all 30 days." These responses were recoded as 0, 2, 4, 8, 15, 25, and 30 days to provide a meaningful metric, and were treated as count data. The *YRBS* has been widely used and is considered to be a reliable and valid measure among diverse youth (Brener et al., 2002; Brener, Billy, & Grady, 2003; Brener, Collins, Kann, Warren, & Williams, 1995). The *YRBS* has adequate test-retest reliability over a two-week period, with kappas ranging between 68% and 82% for substance use items (Brener et al., 2002).

Impulse control difficulties (Appendix C). The *Difficulties in Emotion Regulation Scale* (*DERS*; Gratz & Roemer, 2004) assessed adolescents' difficulties in regulating their emotions. Specifically, the 6-item Impulse Control Difficulties subscale assessed adolescents' difficulties restraining from impulsive behavior when experiencing negative emotions (e.g., "When I'm upset, I feel out of control"). Adolescents were asked to think about the times they felt upset over the past two months and rate how often each statement applied to them using a 5-point Likert scale (1 = *Almost Never* to 5 = *Almost Always*). A mean score was calculated, with higher scores indicating greater difficulties with impulse control.

The *DERS* assesses multiple dimensions of emotion dysregulation, including difficulties engaging in goal-directed behavior and limited access to emotion regulation strategies, and has demonstrated high internal consistency, good test-retest reliability, and adequate construct and predictive validity in undergraduate samples (Gratz & Roemer, 2004). The factor structure of the *DERS* has been replicated among a community sample of adolescents, with excellent internal consistency for the Impulse Control Difficulties subscale for boys (α = .88) and girls (α = .83) (Neumann et al., 2010). In another study of adolescents, this subscale also demonstrated excellent internal consistency (α = .88) and good construct validity (Weinberg & Klonsky, 2009). In the current sample, this subscale showed good internal consistency at Time 1 (α = .82).

Perceived social support (Appendix D & E). The 20-item *Perceived Social Support Scale from Friends and Family* (*PSS-Fr; PSS-Fa*; Procidano & Heller, 1983) assessed adolescents' perceived emotional social support from both family and friends. Adolescents rated whether each of 20 statements described how they have felt over the

past two months (1 = *Yes*; 0 = *No*). A mean score was calculated, with separate scores obtained for friends and family and with higher scores indicating greater perceived social support. This measure has demonstrated excellent internal consistency among adolescent samples and is a commonly used measure with youth (Procidano & Heller, 1983; Sears, Graham, & Campbell, 2009). In the current sample, the *PSS-Fr* showed good internal consistency (α = .81) and the *PSS-Fa* showed excellent internal consistency (α = .91) at Time 1.

Data Analytic Plan

Preliminary analyses were conducted in SPSS Version 22. Data were examined for outliers, normality, and collinearity. Patterns of missingness were evaluated and attrition analyses were also conducted. Means and standard deviations were computed for all study variables. Bivariate correlations for all variables were also conducted. Stability of constructs over time was examined. Sex, age, racial/ethnic, and school differences in cyber victimization, cyber aggression, drinking, and binge drinking were evaluated.

Aim 1: Characterization of cyber victims, cyber aggressors, cyber aggressor-victims, and uninvolved youth. Participants were classified into four groups at Time 1: 1) cyber victims; 2) cyber aggressors; 3) cyber aggressor-victims; and 4) uninvolved. Participants who reported experiencing cyber victimization on average at least once or twice in the past two months (i.e., scored a mean equal to or greater than two on the cyber victimization items on the *C-PEQ*) were classified as "cyber victims." This cutoff is similar to that used in previous research to identify victimized youth (e.g., Kowalski & Limber, 2013; Wang et al., 2009; Vieno et al., 2011). Of note, the "victim" group

captures a notable level of victimization; that is, on average, these adolescents reported experiencing victimization once or twice in the past two months, across nine items or events. Participants who reported elevated levels of cyber aggression (i.e., scored one standard deviation above the mean, or greater than .44, on the cyber aggression items on the *C-PEQ*) were classified as "cyber aggressors." This "aggressor" group also captures a notable level of aggression; that is, these adolescents endorsed engaging in at least four acts of aggression toward their peers in the past two months. Participants who met both criteria were classified as "cyber aggressor-victims" and those who did not meet either criterion were classified as "uninvolved." Frequency of alcohol use, age, levels of impulse control difficulties, perceived social support from family, and perceived social support from friends, were compared across groups using Analysis of Variance (ANOVA). Gender, race/ethnicity, and school were compared across groups using Chi-square tests for independence.

Aim 2: Prospective and reciprocal associations between cyber victimization, cyber aggression, and alcohol use. Primary study analyses were conducted using structural equation modeling in Mplus version 7 (Muthén & Muthén, 1998-2012). Cross-lagged panel analyses were conducted, separately for drinking and binge drinking. Sex, age, and school were controlled in the model as appropriate. Additionally, because perceived social support from friends and perceived social support from family have been linked with adolescent alcohol use (e.g. Wills et al., 2004), these variables were controlled at the Time 2 alcohol use outcomes.

The drinking and binge drinking variables at Time 2 were not normally distributed, had a high number of zero values, and were overdispersed (i.e., the variance

is much greater than the mean) (see Results; Time 2 drinking variance = 17.64, mean = 2.14; Time 2 binge drinking variance = 12.53, mean = 1.27). Therefore, zero-inflated negative binomial regressions were used to examine the relationships with drinking or binge drinking as the dependent variables. This approach is appropriate for count data with many zeroes, and where there is overdispersion (Atkins et al., 2013; Atkins & Gallop, 2007). Zero-inflated negative binomial regressions provide two separate estimates, a logistic portion, and a counts portion. The logistic portion predicts the preponderance of zeroes, so that a positive coefficient indicates a higher likelihood of endorsing a zero (i.e., *abstaining* from drinking or binge drinking); coefficients are exponentiated to convert to odds ratios (OR). In contrast, for the counts portion, a positive coefficient indicates a greater frequency of drinking or binge drinking; coefficients are exponentiated to convert to incidence rate ratios (RR).

Aim 3: Impulse control difficulties as a moderator.

Aim 3a. An interaction term between impulse control difficulties and cyber victimization (Time 1) was created and included in a model as a predictor of drinking (Time 2). An interaction term between impulse control difficulties and cyber aggression (Time 1) was created and included as a predictor of drinking (Time 2) in a separate model. Parallel analyses were conducted for binge drinking in separate models.

Aim 3b. An interaction term between impulse control difficulties and drinking (Time 1) was created and included in a model as a predictor of cyber aggression (Time 2). An interaction term between impulse control difficulties and binge drinking (Time 1) was created and included as a predictor of cyber aggression (Time 2) in a separate model.

Aim 4: Moderation by gender.

Aim 4a. An interaction term between gender and cyber victimization (Time 1) was created and included in a model as a predictor of drinking (Time 2). An interaction term between gender and cyber aggression (Time 1) was created and included as a predictor of drinking (Time 2) in a separate model. Parallel analyses were conducted for binge drinking in separate models.

Aim 4b. An interaction term between gender and drinking (Time 1) was created and included in a model as a predictor of cyber victimization (Time 2). An interaction term between gender and binge drinking (Time 1) was created and included as a predictor of cyber victimization (Time 2) in a separate model. Parallel analyses were conducted for cyber aggression in separate models.

Aim 5: Moderation by ethnicity.

Aim 5a and 5b. Analyses parallel to those in Aim 4 were conducted to test whether ethnicity (Hispanic vs. non-Hispanic) moderated associations examined in Aim 2.

Chapter 3: Results

Preliminary Analyses

Missingness. The percentage of missing data varied across study variables. At Time 1, rates of missing data were as follows: cyber victimization (1.5%), cyber aggression (5.5%), frequency of drinking (8.2%), frequency of binge drinking (8.4%), impulse control difficulties (3.5%), perceived social support from family (2.9%), and perceived social support from friends (2.2%). At Time 2, rates of missing data were as follows: cyber victimization (0.7%), cyber aggression (8.3%), frequency of drinking (3.8%), and frequency of binge drinking (3.8%).

At Time 1 ($n = 1064$), 909 (85.4%) of youth had complete data on all key study variables. T-tests revealed that youth with complete data ($M = .72$, $SD = .20$) reported higher levels of perceived social support from friends than youth with missing data ($M = .66$, $SD = .21$), $t(1039) = -3.28$, $p < .001$. Youth with complete data were more likely to be girls (59.8%), $\chi^2 (1, N = 1064) = 13.83$, $p < .001$, and attend School B (24.3%), $\chi^2 (1, N = 1064) = 13.58$, $p < .001$, compared to youth with missing data (43.9% girls; 11.0% attending School B).

At Time 2 ($n = 999$), 892 (89.3%) of youth had complete data on all key study variables. T-tests revealed that youth with complete data ($M = .72$, $SD = .20$) again reported higher levels of perceived social support from friends than youth with missing data ($M = .67$, $SD = .19$), $t(904) = -2.38$, $p = .02$. Additionally, youth with complete data ($M = 1.32$, $SD = .42$) reported lower cyber victimization at Time 2 than youth with missing data ($M = 1.46$, $SD = .67$), $t(106.91) = 2.01$, $p = .047$. Because of these

differences, perceived social support from friends, gender, and school were controlled for in the cross-lagged models for all outcomes for Aim 2.

For Aims 2-5, missing data were handled with full information maximum likelihood (FIML), a procedure that utilizes all available data and has been demonstrated to provide accurate parameter estimates when data are missing at random (Kline, 2011; Peters & Enders, 2002). Therefore, although differences between youth with complete versus missing data are presented above, FIML procedures allowed for inclusion of all participants ($n = 1140$) in the cross-lagged panel analyses. For Aim 1, listwise deletion was used.

Attrition analyses. Youth who participated at both time points ($n = 923$) were more likely to attend School B compared to youth who participated at Time 1 only ($n = 141$), $\chi^2 (1, N = 1064) = 19.86$, $p < .001$, but did not significantly differ on any other key Time 1 study variables. Youth who participated at both time points reported less cyber aggression at Time 2 compared to youth who participated at Time 2 only ($n = 76$), $t(913) = 2.76$), $p = .006$, but did not differ on any other key Time 2 study variables. As noted above, all participants were included in the cross-lagged panel analyses, as missing data were handled with FIML.

Descriptive statistics. Means and standard deviations of study variables are presented in Table 1. On average, youth reported experiencing cyber victimization between zero and one or two times within the past two months, at both Time 1 and Time 2. At Time 1, on average, 91.7% of youth reported experiencing cyber victimization less than once or twice, 7.7% reported experiencing cyber victimization once or twice, and 0.6% reported experiencing cyber victimization more than once or twice within the past

two months. Similar rates were observed at Time 2: 90.6%, 7.9%, and 1.5%,

respectively. Regarding cyber aggression, 78% of youth at Time 1 and 63.4% of youth at

Time 2 endorsed at least one item on the *C-PEQ* (indicating that they had engaged in

cyber aggression). The means for cyber aggression were .22 at Time 1 and .18 at Time 2;

thus on average, youth endorsed two (Time 1) and just under two (Time 2) of nine items

assessing cyber aggression.

Frequencies of drinking and binge drinking are presented in Table 2. These

frequencies were not normally distributed at Time 1 (drinking: skewness = 3.84, kurtosis

= 18.56; binge drinking: skewness = 5.45, kurtosis = 36.35) or Time 2 (drinking:

skewness = 3.75, kurtosis = 17.73; binge drinking: skewness = 5.14, kurtosis = 33.20).

At Time 1, approximately 42% of youth reported that they had at least one drink of

alcohol in the past 30 days, and approximately 20% of youth reported that they engaged

in binge drinking in the past 30 days. Of drinkers, 48% also reported binge drinking at

Time 1. At Time 2, approximately 44% of youth reported that they had at least one drink

of alcohol in the past 30 days, and approximately 26% of youth reported that they

engaged in binge drinking in the past 30 days. Of drinkers, 59% also reported binge

drinking at Time 2. Rates of alcohol use were comparable to results from the most recent

YRBS (CDC, 2014).

Correlations. Table 1 presents bivariate correlations for key study variables.

Cyber victimization, cyber aggression, impulse control difficulties, frequency of

drinking, and frequency of binge drinking were all significantly and positively correlated

with each other at both time points (all p's < .001). Perceived social support from friends

was only significantly and positively related to cyber aggression at Time 1. In contrast,

perceived social support from family was significantly and negatively related to most of the study variables, with the exception of binge drinking at Time 1, although most of these correlations were low to modest.

Stabilities of constructs over time. Paired samples t-tests and test-retest correlations were conducted to examine the stability of constructs from Time 1 to Time 2. See Table 1 for means at each time point. Cyber victimization did not change on a group level from Time 1 to Time 2 ($t(905) = 1.65$, $p = .10$) and was moderately stable ($r = .44$, $p < .001$). Cyber aggression significantly decreased on a group level from Time 1 to Time 2 ($t(813) = 7.17$, $p < .001$) and was moderately stable ($r = .49$, $p < .001$). The frequency of drinking ($t(829) = -2.17$, $p < .05$) and binge drinking ($t(827) = -2.70$, $p < .01$) significantly increased on a group level from Time 1 to Time 2. The frequency of drinking ($r = .44$, $p < .001$) and binge drinking ($r = .42$, $p < .001$) were moderately stable over time.

Demographic and school differences in key study variables at Time 1 and Time 2. Age, gender, race/ethnicity, and school were examined as potential control variables. Older age was related to lower cyber victimization at Time 1 ($r = -.07$, $p = .03$), lower cyber aggression at Time 1 ($r = -.09$, $p = .01$), and higher frequency of drinking at Time 2 ($r = .08$, $p = .01$).

In terms of gender, girls reported greater cyber victimization ($M = 1.38$) than boys ($M = 1.31$) at Time 1, $t(1046) = -3.09$, $p = .002$. Girls also reported greater cyber aggression ($M = .24$) than boys ($M = .20$) at Time 1, $t(1003) = -3.53$, $p < .001$, and also at Time 2 (girls $M = .19$; boys $M = .15$). Additionally, girls reported greater cyber aggression ($M = .19$) than boys ($M = .15$) at Time 2, $t(914) = -2.78$, $p = .005$. In contrast,

at Time 2, boys reported a higher frequency of drinking ($M = 2.57$) than girls ($M = 1.83$), $t(632.07) = 2.51$, $p = .012$, and also a higher frequency of binge drinking ($M = 1.77$) than girls ($M = .91$), $t(548.00) = 3.39$, $p = .001$.

ANOVAs revealed no racial/ethnic differences for cyber victimization, cyber aggression, or alcohol use at Time 1 or Time 2. However, t-tests revealed that Hispanic youth ($M = 1.33$) reported lower levels of cyber victimization at Time 1 than did non-Hispanic youth ($M = 1.41$), $t(274.45) = 2.09$, $p = .04$.

At Time 1, adolescents from School A reported greater cyber victimization ($t(320.39) = -3.24$, $p = .001$), cyber aggression ($t(330.67) = -3.78$, $p < .001$), and frequency of drinking ($t(349.40) = -2.05$, $p = .04$) than those attending School B ($M = 1.43, .27, 2.46$, respectively, for School A; $M = 1.33, .21, 1.79$, respectively, for School B). At Time 2, adolescents from School A reported greater cyber aggression ($M = .20$) than adolescents attending School B ($M = .17$), $t(323.47) = -2.19$, $p = .03$). In sum, because age, gender, and school differences were found in Time 2 outcome variables, these demographic variables were controlled in subsequent analyses.

Aim 1: Characterization of Victim, Aggressor, Aggressor-Victim, and Uninvolved Groups

Ninety-one percent of youth had complete enough data to be classified into groups at Time 1. Within that subsample, most youth were classified as uninvolved (79.5%), followed by aggressors (11.9%), aggressor-victims (5.3%), and victims (3.2%). Means and frequencies of study variables across groups are presented in Table 3.

Alcohol use. One-way between subjects ANOVAs revealed significant differences among groups in frequency of drinking at Time 1, $F(3, 894) = 17.20$, $p <$

.001, frequency of binge drinking at Time 1, $F(3, 893) = 20.59$, $p < 0.001$, frequency of drinking at Time 2, $F(3, 810) = 6.43$, $p < .001$], and frequency of binge drinking at Time 2, $F(3, 811) = 6.46$, $p < .001$.

Post hoc comparisons using the Tukey HSD test were conducted and significant results are indicated in Table 3. Aggressor-victims and aggressors reported a significantly higher frequency of drinking at Time 1 than did uninvolved youth. However, victims did not significantly differ from any groups, and aggressors and aggressor-victims did not significantly differ from each other. An identical pattern was obtained for frequency of drinking and binge drinking at Time 2.

Similarly, aggressor-victims and aggressors reported a significantly higher frequency of binge drinking at Time 1 than did uninvolved youth, aggressor-victims and aggressors did not significantly differ from each other, and victims did not significantly differ from uninvolved or aggressors. However, aggressor-victims reported a higher frequency of binge drinking at Time 1 than did victims.

Demographic characteristics. One-way between subjects ANOVAs revealed significant differences among groups in age, $F(3, 959) = 5.53$, $p < .001$. Post hoc comparisons using the Tukey HSD test indicated that aggressor-victims were significantly younger than uninvolved youth (see Table 3). Chi-square tests of independence revealed significant group differences in school, $\chi^2 (3, N = 963) = 16.59$, $p < .001$, and non-Hispanic White ethnicity/race, $\chi^2 (3, N = 942) = 10.04$, $p = .02$. Post-hoc pairwise comparisons using a Bonferroni correction (MacDonald & Gardner, 2000) indicated that a greater proportion of uninvolved youth (79.5%) came from School A rather than School B, compared to victims, aggressors, and aggressor-victims. A greater

proportion of victims (26.7%) were of non-Hispanic White ethnicity/race compared to aggressors (6.3%).

No significant group differences were found for gender, χ^2 (3, N = 963) = 6.57, p = .09, Hispanic ethnicity, χ^2 (3, N = 962) = 7.38, p = .06, Black race, χ^2 (3, N = 942) = 2.63, p = .45, Asian race, χ^2 (3, N = 942) = .77, p = .86, or Hispanic White ethnicity/race, χ^2 (3, N = 942) = 5.41, p = .14.

Individual and psychosocial characteristics. One-way between subjects ANOVAs revealed a significant effect of group on impulse control difficulties, $F(3, 934)$ = 22.29, $p < .001$, and perceived social support from family, $F(3, 940) = 5.84$, $p < 0.001$, but not from friends, $F(3, 945) = .26$, $p = 0.85$. Post hoc comparisons using the Tukey HSD test indicated that aggressor-victims, victims, and aggressors reported significantly more impulse control difficulties than did uninvolved youth. Furthermore, aggressor-victims reported significantly more impulse control difficulties than did aggressors. Aggressors and aggressor-victims reported significantly less perceived social support from family than did uninvolved youth. Aggressors and aggressor-victims did not significantly differ from each other, and victims did not significantly differ from any groups on perceived social support from family.

In summary, cyber aggressors and cyber aggressor-victims, but not cyber victims, reported greater alcohol use than uninvolved youth. Additionally, youth who were highly involved in cyber victimization, cyber aggression, or both, reported significantly more impulse control difficulties and less family support, compared to their uninvolved peers. Although not always significantly different from all other groups, cyber aggressor-victims consistently reported the most frequent drinking and binge drinking, the most

impulse control difficulties, and the least family support. Cyber aggressor-victims tended to be younger than uninvolved youth, but there was little evidence for other demographic differences between groups.

Aim 2: Prospective and Reciprocal Associations Between Cyber Victimization and Cyber Aggression and Alcohol Use (Frequency of Drinking, Frequency of Binge Drinking)

See Table 4 for the full cross-lagged panel model for drinking, including all Time 1 predictor variables; in this model, R^2 was .84 for drinking, .22 for cyber victimization, and .26 for cyber aggression, all p's < .001. See Table 5 for the full cross-lagged panel model for binge drinking, including all Time 1 predictor variables; in this model, R^2 was .81 for binge drinking, .22 for cyber victimization, and .26 for cyber aggression, all p's < .001. Odds ratios (OR) are presented for significant predictors of alcohol use abstinence and rate ratios (RR) are presented for significant predictors of alcohol use frequency.

Aim 2a (Cyber victimization and cyber aggression predicting frequency of alcohol use). Consistent with hypotheses, cyber victimization predicted a greater frequency of drinking (β = .47, RR = 1.60, 95% CI [1.12, 2.26], p = .009) at Time 2. However, cyber victimization also predicted a higher likelihood of *abstaining* from drinking (β = .07, OR = 1.07, 95% CI [1.00, 1.15], p = .04), and was not related to the likelihood of *abstaining* from binge drinking (β = .06, OR = 1.06, 95% CI [.97, 1.16], p = .22) or the frequency of binge drinking (β = .10, RR = 1.11, 95% CI [.80, 1.54], p = .55) at Time 2.

Partially consistent with hypotheses, cyber aggression predicted a lower likelihood of *abstaining* from drinking (β = -.10, OR = .90, 95% CI [.84, .96], p = .002)

and binge drinking (β = -.13, OR = .88, 95% CI [.81, .95], *p* = .002). However, it was unrelated to the frequency of drinking (β = .03, RR = 1.03, 95% CI [.75, 1.41], *p* = .88) or of binge drinking (β = .14, RR = 1.15, 95% CI [.75, 1.78], *p* = .52) at Time 2.

Aim 2b (Alcohol use predicting cyber victimization and cyber aggression). The frequency of drinking (β = .05, *p* = .15) and binge drinking (β = .04, *p* = .34) at Time 1 were unrelated to cyber victimization at Time 2. In contrast, a greater frequency of drinking (β = .13, *p* = .004) and binge drinking (β = .13, *p* = .016) at Time 1 predicted greater cyber aggression at Time 2.

In sum, cyber victimization predicted a greater likelihood of abstaining from drinking but more frequent drinking among drinkers. Cyber aggression predicted a lower likelihood of abstaining from drinking and binge drinking. Frequency of drinking and binge drinking both predicted increased cyber aggression, but not increased cyber victimization.

Aim 3: Impulse Control Difficulties as a Moderator

Aim 3a (Cyber victimization and aggression predicting alcohol use, moderation by impulse control difficulties). See Table 6 for the full model for drinking and Table 7 for the full model for binge drinking, including all Time 1 predictor variables and interaction between cyber victimization and impulse control difficulties.

Although impulse control difficulties were related to a greater frequency of drinking and binge drinking in the bivariate correlations (Table 1), they were not associated with any of the alcohol outcomes in the structural models, with all other variables controlled (see Tables 6 and 7). Further, the interaction between cyber victimization and impulse control difficulties did not predict any of the Time 2 alcohol

use outcomes, including: the likelihood of abstaining from drinking (β = .00, OR = 1.00, 95% CI [.91, 1.06], *p* =.99), the frequency of drinking (β = -.04, RR = .96, 95% CI [.75, 1.23], *p* = .74), the likelihood of abstaining from binge drinking (β = -.07, OR = .97, 95% CI [.86, 1.004], *p* = .064), and the frequency of binge drinking (β = -.15, RR = .86, 95% CI [.68, 1.10], *p* = .24). Thus, contrary to study hypotheses, impulse control difficulties did not moderate the association between cyber victimization and subsequent drinking or binge drinking.

An identical pattern of results was obtained for the analysis of impulse control difficulties as a potential moderator of the association between cyber aggression and subsequent drinking or binge drinking. These results are summarized in Tables 8 (drinking) and 9 (binge drinking).

Follow-up analyses. Exploratory follow-up analyses were conducted to examine whether impulse control difficulties moderated the association between cyber victimization and subsequent drinking or binge drinking, *among distressed youth only*. At Time 1, adolescents were identified as "distressed" based on self-reported symptoms of depression (*Center for Epidemiological Studies Depression Scale [CES-D]*; Radloff, 1977) and social anxiety (*Social Anxiety Scale for Adolescents [SAS-A]*; La Greca & Lopez, 1998). If adolescents reported a total score > 16 on the *CES-D* and/or a total score of > 50 on the *SAS-A*, they were identified as "distressed" (La Greca, 1999; Young, Mufson, & Davies, 2006). Among this subsample (*n* = 305), the interaction between cyber victimization and impulse control difficulties was not significant for the likelihood of abstaining from drinking (β = -.11, OR = .90, 95% CI [.80, 1.01], *p* = .07) or binge drinking (β = -.12, OR = .89, 95% CI [.79, 1.01], *p* = .07), nor for the frequency of

drinking (β = -.08, OR = .92, 95% CI [.62, 1.39], p = .71) or binge drinking (β = .04, OR = 1.04, 95% CI [.69, 1.56], p = .85).

Aim 3b (Alcohol use predicting cyber aggression, moderation by impulse control difficulties). Similar to the above analyses, impulse control difficulties were not related to cyber aggression in the drinking and binge drinking models. Interactions revealed that impulse control difficulties did not moderate the association between drinking (see Table 10) or binge drinking (see Table 11) and subsequent cyber aggression.

In sum, impulse control difficulties were unrelated to drinking, binge drinking, and cyber aggression. Furthermore, contrary to hypotheses, there was no evidence that impulse control difficulties moderated the association between cyber victimization and subsequent drinking or binge drinking or the reciprocal associations between cyber aggression and drinking and binge drinking.

Aim 4: Gender as a Moderator

Aim 4a (Cyber victimization and aggression predicting alcohol use, moderation by gender). Overall, female gender predicted less frequent drinking and binge drinking (OR's = .47-.59, p's < .001). Specifically, follow up analyses indicated that the frequency of alcohol use remained stable for girls (drinking: $t(484)$ = -.63, p = .53, Time 1 M =1.72, Time 2 M =1.81; binge drinking: $t(483)$ = -.76, p =.45, Time 1 M = .80, Time 2 = .88), but increased for boys (drinking: $t(484)$ = -.63, p = .53, Time 1 M = 2.01, Time 2 M =2.68; binge drinking: $t(483)$ = -.76, p =.45, Time 1 M = 1.14, Time 2 = 1.84). However, gender did not moderate the association between cyber victimization and subsequent drinking (see Table 12) or binge drinking (see Table 13). Similarly,

gender did not moderate the association between cyber aggression and subsequent drinking (see Table 14) or binge drinking (see Table 15).

Aim 4b (Alcohol use predicting cyber victimization and aggression, moderation by gender). Overall, female gender predicted less cyber victimization ($\beta = -.06$, $p < .05$). Specifically, follow up analyses indicated that cyber victimization remained stable for boys ($t(379) = -1.16$, $p = .25$; Time 1 $M = 1.30$; Time 2 $M = 1.33$), but decreased for girls ($t(525) = 3.75$, $p < .001$; Time 1 $M = 1.38$; Time 2 $M = 1.31$). However, gender did not moderate the association between either drinking (see Table 16) and binge drinking (see Table 17) and subsequent cyber victimization, nor did it moderate associations between either drinking (see Table 18) and binge drinking (see Table 19) and subsequent cyber aggression.

Aim 5 (Exploratory): Ethnicity as a Moderator

Aim 5a. Hispanic ethnicity did not moderate associations between cyber victimization and subsequent drinking (see Table 20) or binge drinking (see Table 21). Similarly, Hispanic ethnicity did not moderate associations between cyber aggression and subsequent drinking (see Table 22) or binge drinking (see Table 23).

Aim 5b. Hispanic ethnicity did not moderate associations between drinking (see Table 24) or binge drinking (see Table 25) and subsequent cyber victimization. Similarly, Hispanic ethnicity did not moderate associations between drinking (see Table 26) or binge drinking (see Table 27) and subsequent cyber aggression.

Chapter 4: Discussion

Cyber victimization, cyber aggression, and adolescent alcohol use represent significant concerns affecting many youth and have been linked to various negative psychological and physical health problems. This study examined characteristics of cyber victims, aggressors, aggressor-victims, and uninvolved youth, as well as short-term prospective and reciprocal relationships between cyber victimization, cyber aggression, and adolescent alcohol use. Key findings revealed that youth involved in cyber victimization and/or cyber aggression differed from their uninvolved peers in terms of their alcohol use, level of impulse control difficulties, and perceived social support from family. Adolescents who experienced more cyber victimization were more likely to abstain from drinking, but reported more frequent drinking if they were a drinker. However, cyber victimization was unrelated to later binge drinking. In contrast, adolescents who engaged in more cyber aggression toward their peers were more likely to use alcohol and conversely, adolescents who were more frequent users of alcohol engaged in more cyber aggression. These relationships held regardless of adolescents' levels of impulse control difficulties, gender, and ethnicity.

Aim 1: Characterization of Cyber Victims, Cyber Aggressors, Cyber Aggressor-Victims, and Uninvolved Youth

The majority of youth in this sample reported low levels of cyber victimization and cyber aggression ("uninvolved" group). However, 20.5% of youth had high involvement in either cyber victimization and/or cyber aggression, which is consistent with prior studies demonstrating involvement rates of 21% (Kowalski & Limber, 2013) and 19.4% (Vieno et al., 2011). However other studies have found rates of involvement

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as low as 13.6% (Wang et al., 2009; using two items measuring bullying using a computer or cell phone after being given a definition of bullying, with a cutoff of once or twice in the past two months) and as high as 57.5% (Mishna et al., 2012; using a cutoff of any experience (six items) or perpetration (seven items) of online behaviors in the past three months).

Our prevalence rate for cyber aggressor-victims (5.3%) was strikingly similar to some prior studies on cyber victimization and aggression using cutoffs of at least once or twice in the past two months (4.5-5%; Kowalksi & Limber, 2013; Vieno et al., 2011; Wang et al., 2009). Of note, the smallest proportion of youth reported only cyber victimization, indicating that high levels of victimization rarely occur in isolation. Youth who are frequent targets of peers' aggression through electronic media are often also perpetrators of aggression; they may retaliate in response to being repeatedly victimized (often referred to as "reactive aggression"; Camodeca & Goosens, 2005; Camodeca, Goossens, Terwogt, & Mschuengel, 2002; Salmivalli & Nieminen, 2002) and/or their high levels of aggression toward others may put them at greater risk for being victimized.

However, this study identified a larger proportion of cyber aggressors (11.9%) and a smaller proportion of cyber victims (3.2%) compared to prior studies (3.8-6% for cyber aggressors, 5.3-10% for cyber victims; Kowalksi & Limber, 2013; Vieno et al., 2011; Wang et al., 2009). These discrepancies might be explained by our perhaps more lenient cutoff for cyber aggressors (i.e., scoring one standard deviation above the mean or higher) and perhaps more stringent cutoff for cyber victims (i.e., an average of at least once or twice in the past two months across nine items; approximately one and a half standard deviations above the mean) compared to previous studies (i.e., average of at

least once or twice in the past two months across fewer items). Furthermore, it is difficult to compare rates across studies due to methodological and assessment differences in assessment (e.g., definitions of cyber victimization and aggression, types of measures used) as well as age/grade and location differences in samples. Nonetheless, findings indicate that approximately one fifth of adolescents in our sample were highly involved in cyber victimization and/or cyber aggression. This is not an insignificant number, emphasizing the importance of understanding the characteristic profile of these youth and identifying potential risk factors for and associated outcomes of cyber victimization and aggression.

Overall, youth who were involved in either or both cyber victimization and aggression showed greater problems compared to uninvolved youth. However, patterns differed slightly across groups depending on the specific characteristic of interest. Regarding alcohol use, highly aggressive youth (i.e., cyber aggressors and cyber aggressor-victims) engaged in more frequent drinking and binge drinking, both concurrently and prospectively, than uninvolved youth. These findings are consistent with previous studies on middle school students in the United States (Peleg-Oren et al., 2012), Italian middle and high school students (Vieno et al., 2011), and Spanish high school students (Gámez-Guadix et al., 2012), importantly extending this research to a predominantly Hispanic sample of high school students in the United States.

In contrast, cyber victims reported levels of alcohol use that were similar to all other groups, unlike most studies of younger adolescents that found that cyber victims were more likely to use alcohol (Peleg-Oren et al., 2012) and more likely to get drunk (Vieno et al., 2011) compared to uninvolved youth. However, Gámez-Guadix and

colleagues (2012) also found that cyber victims and uninvolved youth did not differ on their frequency of substance use. It is possible that, among older adolescents, who are more likely to drink than younger adolescents, relationships between cyber victimization and alcohol use may be more complex, and other peer factors (e.g., friends' substance use, peer crowd affiliation) may play a greater role. Nevertheless, it is important to note that all the bivariate correlations between cyber victimization and frequency of drinking and binge drinking were significant; furthermore, as discussed later, cyber victimized youth may be at increased risk for more frequent drinking if they are already drinkers.

Adolescents who were frequent targets of or perpetrators of cyber aggression reported having more difficulties controlling impulses when upset, compared to uninvolved youth. This is consistent with research linking emotion dysregulation with traditional peer victimization (McLaughlin, Hatzenbuehler, & Hilt, 2009) and traditional peer aggression (Herts et al., 2012; McLaughlin et al., 2011). The current study is the first to extend these findings to cyber peer experiences, indicating that youth who have aversive interactions with peers via electronic media also exhibit impulse control difficulties, such as experiencing emotions as overwhelming and losing control over their behavior when feeling upset. Additionally, cyber aggressor-victims reported more impulse control difficulties than cyber aggressors, suggesting these difficulties may be more closely linked with victimization compared to aggression. This possibility is also supported by higher concurrent correlations between impulse control difficulties and cyber victimization, compared to cyber aggression (See Table 1).

Furthermore, highly aggressive adolescents (i.e., cyber aggressors, cyber aggressor-victims) reported perceiving less social support from their family members,

compared to uninvolved youth. This finding is in line with prior research finding that youth with greater parental support were less involved in cyber aggression (Wang et al., 2009) and research finding that family social support was a protective factor for cyberbullying (and cyber victimization) among a sample of youth living in Cyprus (Fanti, Demetriou, & Hawa, 2012). Thus, current findings add to growing evidence that support from family members may serve as a protective factor against using technology to perpetrate aggression towards peers.

Surprisingly, perceived social support from friends was similar across all groups. This finding is in contrast to some studies on traditional peer victimization and aggression, that indicate that victims report less perceived social support from friends compared to non-victims (Boulton & Underwood, 1992) and that friend support is related to lower odds of victimization (Ybarra, Mitchell, Palmer, & Reisner, 2015). Little work has examined friend social support in relation to negative cyber peer experiences. Wang and colleagues (2009) found that having more friends was not related to cyber victimization or aggression, although more friends was related to less traditional victimization and more traditional aggression (i.e., physical, verbal, relational). Further research is needed to examine these possibilities and elucidate why the role of perceived social support from friends may differ for cyber peer experiences, compared to traditional peer experiences.

Regarding demographic characteristics, cyber aggressor-victims were younger than uninvolved youth. It is possible that younger adolescents may be more likely to respond to victimization with aggression, particularly if they have not yet developed effective coping and interpersonal skills. In fact, research on traditional peer aggression

indicates that bully-victims show more reactive aggression compared to their uninvolved counterparts (Salmivalli & Nieminen, 2002) and younger age is related to more reactive aggression (Connor et al., 2004). Although gender did not differ across groups, it is interesting to note that almost three quarters of the adolescents identified as cyber aggressor-victims were girls. In fact, prior research indicates that girls are more likely than males to be cyber bully-victims (Mishna et al., 2012). This is in stark contrast to research on overt/physical victimization and aggression, where aggressor-victims tend to be boys (Kumpulainen et al., 1998; Veenstra et al., 2005).

Current findings extend the limited research on characteristics of cyber aggressors, cyber victims, cyber aggressor-victims (Gradinger et al., 2009; Kowalksi & Limber, 2013; Mishna et al., 2012) to alcohol use, impulse control difficulties, and perceived social support. Findings suggest that youth who are highly involved in cyber victimization or cyber aggression differ from their uninvolved peers in important ways. These youth may experience a host of difficulties, including frequent drinking and binge drinking, and may benefit from efforts to prevent escalation of problems. On the other hand, frequent alcohol use, difficulties with impulse control, low family support, and younger age may be indicators of concurrent victimization and/or aggression. Screening on these characteristics could be helpful in identifying at-risk youth and could be potentially useful targets for prevention and intervention.

Aim 2: Prospective and Reciprocal Relationships

Cyber victimization and adolescent alcohol use. Overall, the most complex relationships were found for cyber victimization and adolescent alcohol use. Cyber victimization predicted a greater frequency of drinking among drinkers, but a higher

likelihood of abstinence from drinking, and was unrelated to binge drinking. These findings indicate that cyber victimization may be a risk factor for increased drinking for some youth and a protective factor for others. Furthermore, differential associations with drinking and binge drinking suggest that risk factors for as well as mechanisms explaining these health risk behaviors may be different. In contrast, alcohol use does not appear to be a risk factor for increased cyber victimization, at least over a three-month period.

Consistent with hypotheses and cross-sectional studies on general substance use (e.g., Litwiller & Brausche, 2013; Luk et al., 2010; Mitchell, Ybarra, & Finkelhor, 2007), more frequent cyber victimization was related to increased drinking. As proposed earlier, this finding is in line with the self-medication hypothesis (Khantzian, 1997). Being the target of mean messages, rumors intended to damage one's reputation, and embarrassing photos posted publicly via electronic media may elicit significant symptoms of depression or social anxiety (Landoll et al., 2015). Distressed youth may use alcohol as a coping strategy to alleviate their distress. Aversive cyber peer experiences might also engender feelings of anger and frustration (Mishna et al., 2010). According to general strain theory (Agnew, 1992), self-regulatory resources may be depleted due to this strain, increasing the likelihood of engaging in aggressive or deviant behavior. Thus, cyber victimized adolescents might be at greater risk of using alcohol to self-regulate.

As indirect support for these pathways, among a sample of youth aged 13-15 living in England, coping drinking motives (e.g., "to forget my worries," "to cheer up when I am in a bad mood," "because it helps when I am depressed or nervous") acted as a partial mediator of the association between traditional school-based peer victimization

and alcohol-related problems 12 months later (Topper, Castellanos-Ryan, Macie, & Conrod, 2011). Future research could provide more direct tests of the self-medication hypothesis and general strain theory as they relate to cyber victimization and alcohol use, by specifically examining hypothesized mediational pathways including internalized distress, anger and frustration, and self-regulatory resources, in conjunction with coping motives.

Of note, cyber victimized youth reported more frequent drinking, but only if they endorsed any drinking. Cyber victimized youth were overall less likely to be a drinker. This suggests that cyber victimization may not contribute to drinking initiation (and might even protect against this), but rather contributes to drinking frequency among youth who do drink. Many factors influence drinking behaviors, including friends' substance use (Bjorkqvist, Batman, & Aman-Back, 2004; Hawkins, Catalano, & Miller, 1992), perceived peer norms (Blanton et al., 1997; Gibbons et al., 2004), perception of close friends' attitudes towards drinking (Mason et al., 2014), and ease of access to alcohol (Danielsson, Wennberg, Tengstrom, & Romelsjo, 2010; Treno, Ponicki, Remer, & Gruenewald, 2008). These factors might act as moderators of the relationship between cyber victimization and adolescents' drinking. Youth may use alcohol to self-medicate in response to cyber victimization only if they are in an environment that promotes alcohol use (e.g., have friends who use substances, believe that drinking behaviors are common, approved, and will increase social acceptance, have access to alcohol, attend parties), have prior experience with drinking, and are familiar with the physiological effects of alcohol. Current findings are consistent with the trauma literature, which indicates that among adults, substance use, including alcohol use, increases after disaster exposure, but

only among those individuals who already are users (Nandi, Galea, Ahern, & Vlahov, 2005; van der Velden & Kleber, 2009).

While cyber victimization predicted increased drinking for youth who drink, more frequently cyber victimized adolescents were overall less likely to be drinkers. One possible explanation for this finding is that youth who are not drinkers may already experience peer rejection or social isolation. As such, they may have limited social opportunities to engage in drinking (e.g., parties) and limited access to alcohol. Because the majority of adolescents drink in a social setting and few typically engage in solitary drinking (e.g., Tucker, Ellickson, Collins, & Klein, 2006), cyber victimization may contribute to fewer opportunities to drink with peers and subsequently, a lower likelihood of drinking. Additionally, cyber victimized youth who are socially anxious or depressed may withdraw from peers and avoid parties or social activities that are conducive to drinking, thus decreasing the likelihood of drinking. Youth who drink may be motivated to use alcohol to cope; thus, internalized distress resulting from cyber victimization might increase drinking frequency. However, for youth who do not drink (and who may lack access to alcohol, social opportunities to drink, and prior experience drinking), alcohol use may not be a viable or desired coping strategy to alleviate feelings of distress. Instead, youth might respond to victimization with social withdrawal.

As another possibility, adolescents who belong to peer crowds such as the "brains" (i.e., youth who enjoy academics and perform well in school; La Greca, Prinstein, & Fetter, 2001) may be more likely to get picked on or teased. Being called or labeled as a "nerd", for example, may resemble a form of verbal teasing, social exclusion, or relational peer victimization, that could occur face-to-face or through electronic media.

Brains have lower rates of drinking and smoking compared to other peer crowds (La Greca et al., 2001), which might explain the link between greater cyber victimization and lower likelihood of drinking. Future studies that examine some of these potential mediators and moderators (e.g., peer rejection, social withdrawal, peer crowd affiliation) are needed to better understand why cyber victimization is related to a lower likelihood of drinking, but also a greater frequency of drinking among those who already drink.

Interestingly, and unexpectedly, a similar pattern was not observed for binge drinking; cyber victimization was unrelated to adolescents' binge drinking. Binge drinking and drinking behaviors are highly correlated ($r = .80$ at Time 1, $r = .84$ at Time 2), but they differ in several respects, which might explain their differential associations with cyber victimization. First, binge drinking is less common than drinking. In the present study, only 20.0% of youth endorsed binge drinking at Time 1, and 25.9% at Time 2, in contrast with 41.7% of youth endorsing drinking at Time 1, and 44.2% at Time 2. Because binge drinking is a less common behavior, cyber victimization may not be related to *changes* in binge drinking. Thus, there may be less variability to predict; in fact, the standard deviations for binge drinking were smaller than those for drinking.

Second, youth who "have five or more drinks of alcohol in a row within a couple of hours" may differ in important ways from youth who drink but only in moderation. Adolescents who binge drink report poorer school performance and greater involvement in a number of health risk behaviors (e.g., smoking, using illicit drugs, being sexually active, attempting suicide) compared to adolescents who drink without binge drinking (Miller, Naimi, Brewer, & Jones, 2007). As such, youth who engage in binge drinking may be involved in a constellation of other problem behaviors. Other factors (e.g.,

deviant peer affiliation, peer aggression) may be stronger and unique predictors of binge drinking, with cyber victimization playing a limited role. Although binge drinking is less common than drinking, one study found that 64% of high school students who drink also binge drink (Miller et al., 2007). Binge drinking in high school is one of the strongest predictors of binge drinking in college (Wechsler, Dowdall, Davenport, & Castillo, 1995). Thus, identifying risk factors for this concerning health risk behavior is critical.

While cyber victimization was not a risk factor for later binge drinking, the reverse was also true – adolescents who reported more frequent binge drinking did not experience changes in cyber victimization. Furthermore, frequent drinking did not predict changes in cyber victimization. These findings are in contrast to the three existing prospective studies that found that substance use predicted increased cyber victimization six months later (Gámez-Guadix et al., 2013) and one to two years later (Korchmaros et al., 2014; Modecki et al., 2013). There are several possible explanations for the current null findings. First, this study used a time frame of three months, which may not have been sufficient time to observe significant changes in cyber victimization. If alcohol use and victimization are linked through deviant peer affiliation (i.e., youth who drink select into a deviant peer group and then are at increased risk for being the target of peers' aggression), this process may take more than three months to unfold.

Second, there could be moderators of this relationship that were not tested, such as peer rejection or peer crowd affiliation. For example, youth who drink alcohol may become more frequent targets of peers' cyber aggression, but only if they are also rejected by peers or belong to a low status peer group (e.g., "burnouts," who skip school and get in trouble, or "nonconformists," who rebel against the norm; La Greca et al.,

2001). Third, the proportion of variance in cyber victimization explained in the cross-lagged panel models was relatively low (R^2= .22 for the drinking model; R^2 = .21 for the binge drinking model). This indicates that other variables not assessed in the current study account for a significant proportion of variance in cyber victimization. Other peer factors (e.g., peer rejection, peer crowd affiliation), family factors (e.g., parental monitoring), school factors (e.g., school connectedness), or individual factors (e.g., Internet use, psychosocial characteristics) may be stronger predictors of cyber victimization experiences, with alcohol use predicting little unique variance.

The current study is only the second one to examine prospective relationships between cyber victimization and alcohol use. Interestingly, findings differ from those of Gámez-Guadix and colleagues (2013) who found no relationship between cyber victimization and later substance use. Several differences between the current study and their study are notable and may explain these discrepant findings, including the dependent variable (count frequency of drinking and binge drinking vs. a composite measure of tobacco, alcohol, marijuana, cocaine, speed, LSD, ecstasy, hashish, others), and the analytic approach used (cross-lagged panel SEM using zero-inflated negative binomial regression vs. SEM with robust maximum likelihood estimation including corrected statistics for normality assumption violation), and the sample (predominantly Hispanic high school students in the U.S. vs. high school students in Spain). Additionally, the time frame differed (three months vs. six months); it is possible that cyber victimization and drinking behaviors are related more proximally in time and that cyber victimization loses its predictive power over a longer period of time.

Taken together, findings indicate that cyber victimization and adolescent alcohol use are related in complex ways. Differential reciprocal patterns suggest that these relationships are likely mediated and moderated by various important factors, such as peer crowd affiliation, prior experience with and access to alcohol, internalized distress, and coping motives. Furthermore, the nature of these relationships may change over time (e.g., concurrently vs. over three months vs. over one year); thus, attention to how these processes may unfold over time is important.

Cyber aggression and adolescent alcohol use. Youth who were aggressive towards their peers using electronic media were more likely to both drink and binge drink. This finding is consistent with cross-sectional studies finding positive links between cyber aggression and substance/alcohol use (Wang, Iannotti, & Luk, 2012; Chan & La Greca, 2016) as well as between traditional peer aggression/bullying and substance use (Luk, Wang, Simons-Mortons, 2012; Moore et al., 2014; Nansel et al., 2001). This study is the first to demonstrate prospectively that cyber aggressive youth are at risk for increased likelihood of alcohol use. Of note, although cyber aggressive youth were more *likely* to use alcohol, they did not report increased *frequency* of alcohol use. Rather than a dose-response relationship (i.e., more frequent cyber aggression did not predict more frequent alcohol use), the more aggressive adolescents were, the more likely they were to be a drinker or a binge drinker.

While cyber aggressive youth were more likely to use alcohol, support was also found for the reciprocal relationship. Specifically, youth who drank alcohol more frequently were more aggressive toward their peers via technology. This finding is consistent with Modecki and colleagues (2013) who found that within-person increases in

problem behavior (including substance use, delinquency, and aggressive behaviors) across grades 8-10 predicted cyber perpetration in grade 11. The current study extends the literature by demonstrating prospective associations over an even shorter time frame, indicating that three months is sufficient time to observe change.

Findings are consistent with Problem Behavior Theory, which states that problem behaviors co-occur in adolescence and that increases in one behavior are associated with increases in another behavior (Jessor & Jessor, 1977). Aggressive behavior and/or frequent alcohol use may put youth at risk for peer rejection, and subsequently, affiliation with deviant peers. This affiliation then might increase the likelihood of engaging in rule-breaking behavior, such as cyber aggression, drinking, and binge drinking. Support for this parallel process model has been found linking childhood aggression-disruptiveness to early-adolescent rule breaking (Ettekal & Ladd, 2015) and might extend to cyber aggression and later adolescence.

Youth who are aggressive or who use alcohol may also choose to select more "risky" friends with similar behaviors and interests, and thus affiliate with a deviant peer group with antisocial norms, increasing the likelihood of engaging in problem behavior. Such youth may be more likely to drink and binge drink to conform to or gain approval from their peers, particularly if alcohol consumption is viewed as the norm or an indicator of high status or popularity. In support of this possibility, some work indicates that adolescents who engage in violent behaviors (i.e., bullying and fighting) report conformity motives for alcohol use; that is, youth who may belong to a peer group in which both alcohol use and violence are the norm tend to drink to fit in with their peers and to avoid social rejection (Kuntsche, Knibbe, Engels, & Gmel, 2007). Similarly,

adolescents may act aggressively to gain approval or admiration from peers. Engaging in cyber aggression may be a way to increase social status or self-esteem (Modecki et al., 2013). Thus, adolescents belonging to deviant peer groups may drink and use cyber aggression to fit in with and conform to their peers, with both behaviors predicting each other and increasing over time.

Aim 3: The Role of Impulse Control Difficulties

Youth with more impulse control difficulties reported greater cyber aggression and more frequent drinking and binge drinking at both time points, as noted in bivariate correlations, which is consistent with prior work demonstrating significant correlations between impulse control difficulties and alcohol use (e.g., Weinberg & Klonsky, 2009). However, youth with more impulse control difficulties did not report greater cyber aggression or alcohol use when controlling for other variables. This is in contrast to previous work with adolescent samples finding links between emotion dysregulation (i.e., a latent variable with poor emotional understanding, dysregulated expression of anger and sadness, and rumination as indicators) and traditional peer aggression over three-month and seven-month periods (Herts et al., 2012; McLaughlin et al., 2011). Current data suggest that impulse control difficulties specifically may be a correlate of cyber aggression and alcohol use, but not necessarily a unique risk factor.

Furthermore, impulse control difficulties did not moderate the prospective relationships examined. Adolescents who were cyber victimized reported more frequent drinking, adolescents who were perpetrators of cyber aggression toward their peers were more likely to be drinkers or binge drinkers, and adolescents who used alcohol reported

engaging in more cyber aggression, regardless of their level of impulse control difficulties.

Why did impulse control difficulties not play a significant role in predicting adolescents' behaviors? One possible explanation is that impulse control difficulties may only be an important factor for adolescents who are distressed in response to being victimized. Although cyber victimization has been consistently linked with internalized distress (e.g., Landoll et al., 2015; Wigderson & Lynch, 2013), not all youth who are targets of cyber victimization report distress or symptoms of depression (Salmivalli, Sainio, & Hodges, 2013). The impulse control difficulties subscale asks adolescents about their control over their behavior when they are upset (e.g., "When I'm upset… [I experience my emotions are overwhelming and out of control], [I lose control over my behavior]"). Thus, negative emotions may play an important role in this process; presumably, youth must have experiences of feeling upset in order to have difficulties regulating their emotions, which then might contribute to cyber aggression or alcohol use. However, follow-up analyses examining only distressed youth were inconclusive. Future research that directly examines the potential moderating role of internalizing symptoms (e.g., depression and social anxiety) is important and desirable. As for the prospective reciprocal associations between cyber aggression and alcohol use, future research might examine impulse control difficulties in conjunction with the experience of negative emotions such as anger and frustration.

Although the current study did not provide evidence that impulse control difficulties moderated the association between cyber victimization and subsequent drinking or binge drinking or the reciprocal associations between cyber aggression and

drinking and binge drinking, lack of significant moderation findings could potentially be due to limited power to detect effects. For example, follow-up cross-tab analyses indicated that a relatively small number of adolescents ($n = 88$) reported both high levels of impulse control difficulties (i.e., 1 SD above the mean) and high levels of cyber victimization (i.e., above the mean). Similarly, a small number of adolescents ($n = 78$) reported both high levels of impulse control difficulties (i.e., 1 SD above the mean) and high levels of cyber aggression (i.e., above the mean). These relatively small cell sizes may have resulted in limited power to detect moderation effects.

Results suggest that impulse control difficulties may not be an important individual characteristic exacerbating the potential negative effects of cyber victimization, cyber aggression, or alcohol use. If this is indeed the case, current findings call for identification of other relevant factors. Potential moderators might include internalized distress (e.g., symptoms of depression and social anxiety), other aspects of emotion dysregulation (e.g., nonacceptance of emotional responses, limited access to emotion regulation strategies perceived as effective; Gratz & Roemer, 2004), other peer factors (e.g., peer crowd affiliation, peer rejection), and family factors (e.g., lack of parental monitoring).

Aim 4: The Role of Gender

Regarding gender differences, girls reported more cyber victimization than did boys at Time 1, consistent with prior literature (CDC, 2014; Dempsey et al., 2009; Mishna et al., 2010; Mishna et al., 2012; Wang, Iannotti, & Nansel, 2009) as well as more cyber aggression at both Time 1 and 2, consistent with some prior literature (Kowalksi & Limber, 2007). In contrast, boys reported a higher frequency of drinking

and binge drinking at Time 2, compared to girls, consistent with some prior studies on binge drinking (CDC, 2014; La Greca et al., 2001). In the cross-lagged panel models, female gender predicted decreased cyber victimization, drinking, and binge drinking compared to boys. Specifically, cyber victimization remained stable over time for boys, but decreased over time for girls. In contrast, the frequency of alcohol use remained stable over time for girls, but increased over time for boys. These findings are in line with previous work indicating that adolescent males are increasingly likely to engage in health risk behaviors over time (Mahalik et al., 2013).

Despite these noted gender differences, the relationships between adolescents' cyber peer experiences and alcohol use were the same for boys and girls in this sample, highlighting the pervasive and ubiquitous nature of cyber victimization and cyber aggression among youth. This study is the first to examine gender moderation in these relationships using a prospective design and is consistent with cross-sectional studies finding no evidence of gender moderation of the links between cyber victimization and substance use (Chan & La Greca, 2016; Luk et al., 2010). Findings suggest that at least on a general level, efforts aimed to jointly reduce and/or monitor adolescent cyber peer experiences and alcohol use may not need to be tailored specifically for boys and girls. Nonetheless, it remains a possibility that, as with impulse control difficulties discussed above, lack of significant moderation by gender could potentially be due to limited power to detect effects.

However, it is possible that the mechanisms linking cyber victimization, cyber aggression, and drinking behaviors may be different for boys and girls. Across adolescence, girls report internalizing problems while boys report more externalizing

However, overall, as with null findings for gender moderation, current results highlight the apparent pervasiveness of cyber victimization and cyber aggression. Additionally, a strength of this study is its focus on a predominantly Hispanic sample, extending existing research on predominantly non-Hispanic White samples (e.g., Hinduja & Patchin, 2008; Litwiller & Brausche, 2013; Modecki et al., 2013). Hispanics represent the largest and fastest growing ethnic minority population in the United States and it is estimated that by the year 2050, 35% of the United States population under the age of 17 will be Hispanic, up from 20% in 2005 (Passel & Cohn, 2008; U.S. Census Bureau, 2012). Thus, research that examines the generalizability of existing findings to Hispanic youth is important and necessary.

Although Hispanic ethnicity per se did not moderate any relationships examined in the current study, issues of cultural diversity are important to consider in studies of cyber victimization, cyber aggression, and adolescent alcohol use. For example, Hispanics are the majority ethnic group in South Florida, where this study was conducted; majority vs. minority group status may be more important than ethnicity itself. In this sample, Hispanic youth reported less cyber victimization than non-Hispanic youth, similar to findings with traditional (i.e., relational, reputational, and overt) peer victimization (Herge, La Greca, & Chan, 2016). Being part of the majority population may be protective against experiencing cyber victimization. Future research may also benefit from examining particular sociocultural factors that may contribute to cyber peer experiences and alcohol use, such as ethnic identity, cultural orientation (e.g., degree of U.S. orientation, Hispanic-Latino orientation, or both), level of acculturation, and acculturative stress (Bauman & Summers, 2009; Forster et al., 2013).

Limitations and Future Directions

Although this study makes important contributions to our understanding of associations between cyber victimization, cyber aggression, and adolescent alcohol use, several limitations should be noted. First, regarding measurement issues, all measures were based on adolescent report, single items were used to assess each of frequency of drinking and binge drinking, and the internal consistency for the cyber aggression items on the *C-PEQ* at Time 1 was low ($\alpha = .69$). Self-report measures for peer victimization and aggression are commonly used among adolescents, youth are often considered to be the best informants regarding their own health risk behaviors (e.g., La Greca & Lemanek, 1996), and single items are often used to assess the frequency of alcohol use (e.g., Chan & La Greca, 2016; Mason et al., 2014; Tharp-Taylor et al., 2009; Ybarra & Mitchell, 2004). However, future studies would do well to include a measure of social desirability for self-reported data, collect and incorporate data from multiple informants (e.g., peers, parents, and teachers), and employ a multi-item scale and/or additional measures of alcohol use (e.g., physiological) to improve the reliability of assessment. Additionally, the *C-PEQ* aggression items have now been revised to employ a 5-point response scale to parallel the cyber victimization items scale (rather than a dichotomous yes/no response) and should be used in future studies.

Second, regarding study design, this short-term study used two time points over a three-month period. Reported difficulties with cyber victimization, cyber aggression, and alcohol use may have already been ongoing and it is not clear where in the process the findings fit. Future work is needed to incorporate additional time points over a longer period of time to further examine stability, change, and trajectories in the constructs of

interest. Longitudinal designs that pay specific attention to issues of development are needed. Adolescents report increases in problem behaviors across the high school years (Chun & Mobley, 2010). Relationships between problem behaviors (e.g., cyber aggression and alcohol use) might be stronger for younger youth, among whom alcohol use is less normative. Such youth may be more problematic or deviant in general, with a higher tolerance for norm-violation (Barnes, Welte, & Hoffman, 2002; Lo, 2000). On the other hand, links between cyber peer experiences and alcohol use could be stronger for older adolescents, who have increased technology usage (Lenhart, 2015) and may have easier access to alcohol. Older youth might also be more established within a particular peer group or have a more established pattern of behavior. An examination of adolescents' age or grade as a moderator of these associations might yield useful information with important implications for when the timing of prevention efforts might be most effective.

Future research could also examine relationships over a shorter period of time. For example, an incident of cyber victimization could possibly trigger an adolescent to drink that evening or that weekend, but may not necessarily predict drinking behaviors several months or years later. As another example, an adolescent attending a party may be more likely to post embarrassing photos of peers on social media or send a mean text message if she is intoxicated and has a reduced ability to inhibit her impulses, moderate her social behavior, and anticipate the consequences of her actions. Future studies could employ approaches such as ecological momentary assessment or daily diaries to examine the more proximal temporal interplay between cyber peer experiences and drinking behaviors.

Third, this study has some limitations related to conceptual issues. Although study aims and hypotheses were informed by several theories (i.e., self-medication hypothesis, general strain theory, problem behavior theory), mechanisms underlying these particular theories were not directly tested. For a comprehensive test of these theories of underlying mechanisms linking cyber victimization, cyber aggression, and alcohol use, future studies might evaluate symptoms of anxiety and depression (self-medication hypothesis), feelings of frustration and anger (general strain theory), and deviant peer association (problem behavior theory) as potential mediating variables. Peer rejection, popularity or social status, and drinking motives also represent potentially interesting avenues for future research on mediators and moderators.

Additionally, small effects were found for cyber victimization, cyber aggression, and frequency of drinking and binge drinking. This indicates that other variables not assessed in the current study, perhaps at the individual, peer, family, school, and community levels, are also operating and important in predicting these peer experiences and health risk behaviors. For example, the current study only assessed one family variable (i.e., perceived social support from family). Because family and parental factors, such as nurturance, monitoring, and attitudes, play an important role in adolescent alcohol use (e.g., Wood, Read, Mitchell, & Brand, 2004), an important next step would be to test additional family variables in conjunction with cyber peer experiences to examine how they may jointly influence drinking behaviors among youth.

Fourth, in terms of scope, this study focused solely on alcohol use. However, adolescents' use of other substances also represents an important concern. For example, among high school students, 16% report smoking and 23% report using marijuana in the

past 30 days (CDC, 2014). Marijuana use in particular is potentially a critical issue moving forward, given its increasing legalization in various states. Additionally, some evidence provides support for the self-medication hypothesis in relation to cannabis dependence among youth (Cascone, Zimmermann, Auckenthaler, & Robert-Tissot, 2011). Several cross-sectional studies have examined links between cyber peer experiences and general substance use including marijuana use (e.g., Litwiller & Brausche, 2013; Luk et al., 2010; Mitchell et al., 2007); however, little work has examined marijuana use specifically (e.g., Goebert et al., 2011). Future research would do well to extend aspects of the current study (e.g., examination of prospective and reciprocal relationships, including both cyber victimization and cyber aggression, testing of moderators) to marijuana use.

Lastly, the large representation of Hispanic youth in this sample may limit the generalizability of findings. However, as noted earlier, this also represents a key strength of this study as much literature in this area to date has focused on non-ethnic minority adolescents.

Implications

In addition to the potential future directions for research noted above, this study has important research implications. It demonstrates the importance and utility of using appropriate statistical techniques (i.e., zero-inflated negative binomial regression) for zero-inflated count data (e.g., adolescent alcohol use). Current findings suggest that different processes are involved for cyber peer experiences and drinking behaviors (i.e., abstinence vs. frequency of alcohol use); therefore, there is great utility in modeling these processes separately. Given the complexity of these relationships, research on cyber

victimization, cyber aggression, and adolescent alcohol use needs to be theory-driven and aimed at identifying mechanisms to continue to move this field forward. In line with recommendations of Grant and colleagues (2006) for research on stress and child and adolescent psychopathology, future studies on cyber peer experiences and substance use should "integrate moderator and mediator research by testing for specific mediators in relation to particular moderating contexts" (p. 273).

Findings also have important clinical implications. When working with youth who are targets or perpetrators of cyber aggression, clinicians should assess and monitor their alcohol use. Youth who use alcohol in order to self-medicate in response to negative peer experiences occurring via electronic media may benefit from developing more adaptive coping skills. Youth who are identified as cyber aggressors may potentially be involved in a deviant peer group and also involved in other problem behaviors; promoting healthy peer relationships and addressing their motives for drinking might be helpful. Conversely, pediatric psychologists who work with adolescents to reduce their drinking behaviors might assess and address their cyber peer experiences and peer relationships, as being the target of and/or perpetrator of cyber aggression may potentially contribute to greater alcohol use.

With regards to implications for prevention, it may be important for prevention programs for adolescent alcohol use to evaluate, address, and monitor youths' cyber peer experiences. Reviews and meta-analyses of school-based prevention interventions indicate that some critical elements of the most effective interventions included the following: they are theory-driven (especially with a focus on the social influences model), address social norms pertaining to alcohol use, and foster personal and social

skills to help youth resist pressure to drink (see Stigler, Neusel, & Perry, 2011). In keeping with these elements, attention to cyber peer experiences could be incorporated into such programs. For example, programs might be informed by the self-medication hypothesis and problem behavior theory and help youth identify cyber-related social influences to drink (e.g., to cope with cyber victimization for victimized youth or pressure to conform to peers for cyber aggressive youth). Interventions could also incorporate a focus on building healthy coping skills to manage potential distress associated with victimization. Aggressive youth who may use alcohol to gain peers' approval or attempt to improve their social status or image may benefit from developing personal and social skills. If such youth drink to enhance their positive mood or obtain certain social rewards, identifying and promoting alternative ways to do so could be helpful.

Of note, most school-based programs to prevent and reduce alcohol use target middle school students and few effective programs for high school students exist (Stigler et al., 2011). In a review of school-based alcohol prevention interventions (Spoth, Greenberg, & Turrisi, 2008; 2009), for high school students, there was only one intervention that was classified as being "most promising" (Project Toward No Abuse; Sussman et al., 2002) and only one other intervention had "mixed or emerging evidence" (Project Northland; Perry et al., 2002). Currently, there is insufficient empirical evidence for or against the efficacy of school-based alcohol prevention programs for high school students, either in the short-term or long-term (Stigler et al., 2011). However, given the prevalence of alcohol use in high school and the numerous problems associated with underage drinking, continued intervention throughout the high school years is crucial

(Stigler et al., 2011). There exists a crucial need for the development and refinement

effective prevention programs for older youth. The current study suggests that

addressing peer victimization and peer aggression, particularly in the cyber realm, might

be an important component to consider for such interventions. However, the small effect

sizes found for cyber victimization and cyber aggression in the current study indicate that

negative peer experiences occurring via technology are only one of many factors

potentially contributing to youths' drinking behaviors. Comprehensive interventions

targeting multiple domains – at the individual, family, school, and community level – are

likely necessary to effectively reduce adolescent alcohol use in the long run (Spoth et al.,

2008; 2009; Stigler et al., 2011).

Current findings can also be used to inform anti-cyber bullying interventions.

Because youth who drink and binge drink report using more cyber aggression against

their peers, drinking behaviors may be important to assess and potentially target in anti-

bullying interventions. If drinking leads to cyber aggression by means of decreasing

inhibition (Field et al., 2010; Fillmore & Vogel-Sprott, 2000), increasing youths'

awareness of the effects of alcohol on decision-making and aggressive behavior may

prove useful. Given the reciprocal relationships between cyber aggression and alcohol

use (potentially through deviant peer affiliation or other shared pathways), interventions

might do well to jointly target both these behaviors. Additionally, efforts to reduce cyber

victimization and cyber aggression might have a positive impact on alcohol use; thus,

alcohol use may represent an important outcome of interest to assess and monitor.

Finally, this study has potential public health implications. Successful efforts to

decrease the prevalence and frequency of underage drinking may reduce the incidence of

short-term health risks (e.g., physical injury, motor vehicle accidents, risky sexual behavior), physical health problems later on in life (e.g., alcohol dependence and abuse, cardiovascular disease, cancer), as well as reduce the overall health care burden and costs of increased health care utilization associated with such problems.

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Figure 1. Conceptual model linking cyber victimization and subsequent adolescent alcohol use.
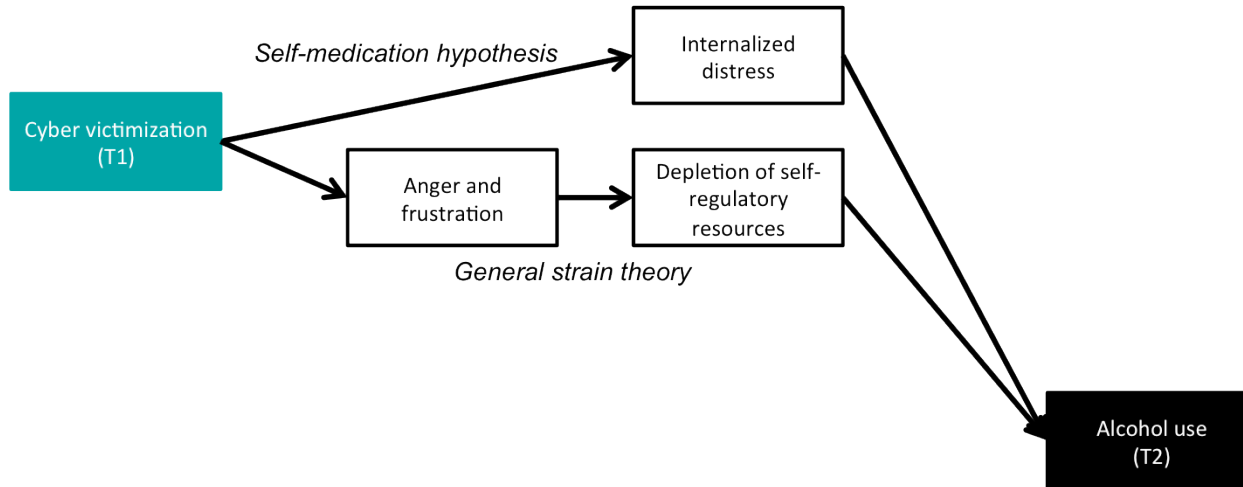
Figure 2. Conceptual model reciprocally linking cyber aggression and adolescent alcohol use, and linking alcohol use and subsequent cyber victimization.
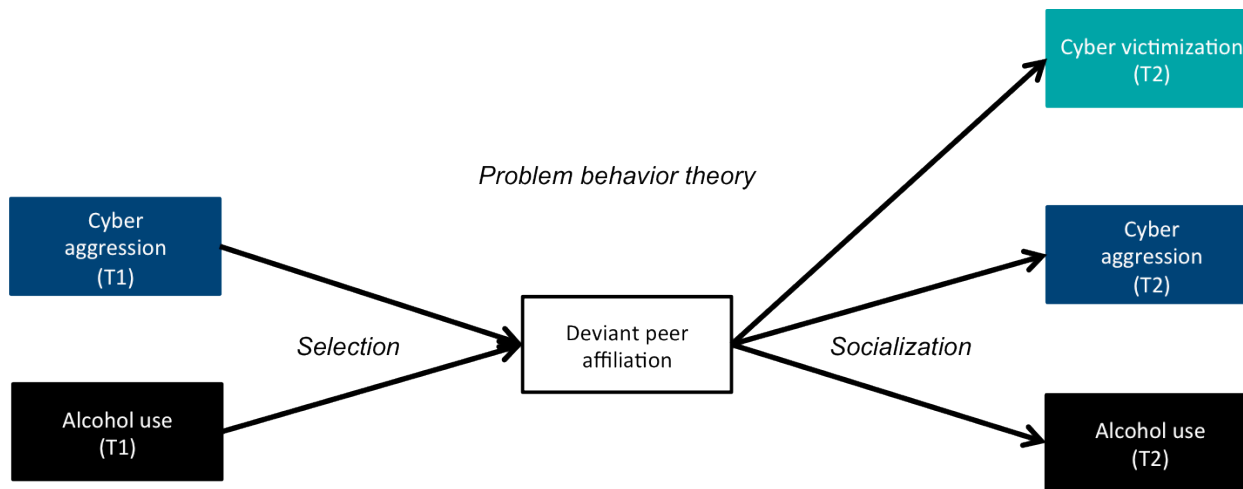
Figure 3. Prospective and reciprocal relationships between cyber victimization, cyber aggression, and adolescent alcohol use.
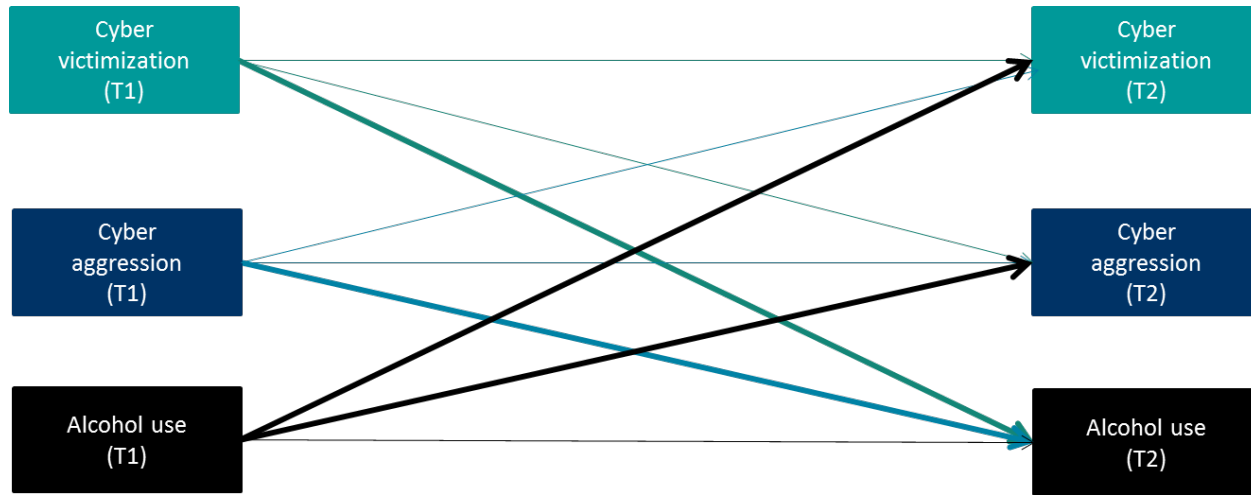
Figure 4. Impulse control difficulties as a moderator of the prospective association between cyber victimization and subsequent alcohol use and the prospective and reciprocal associations between cyber aggression and alcohol use.
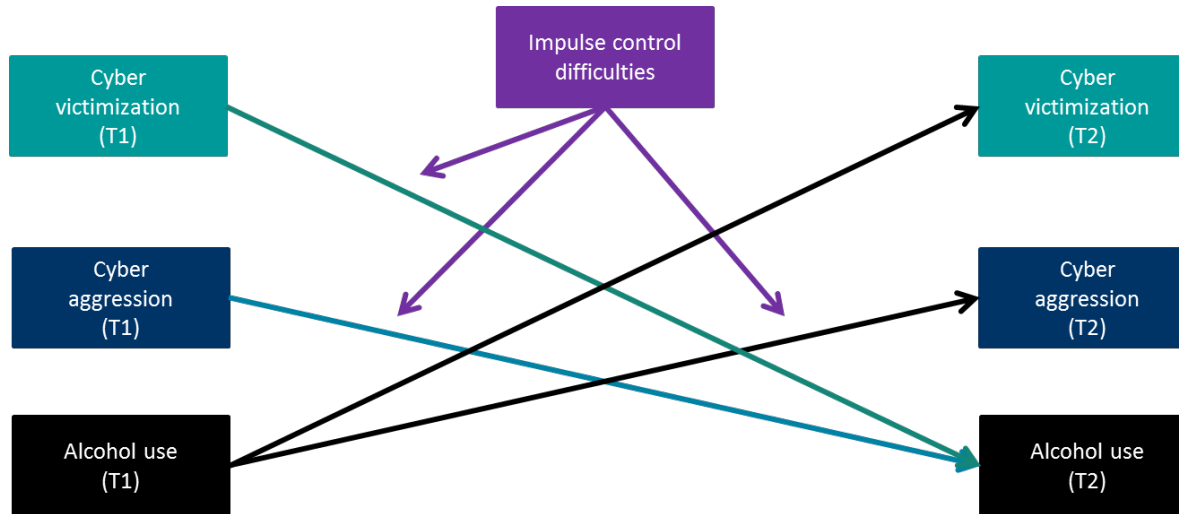
Figure 5. Gender as a moderator of the prospective and reciprocal relationships between cyber victimization, cyber aggression, and adolescent alcohol use.
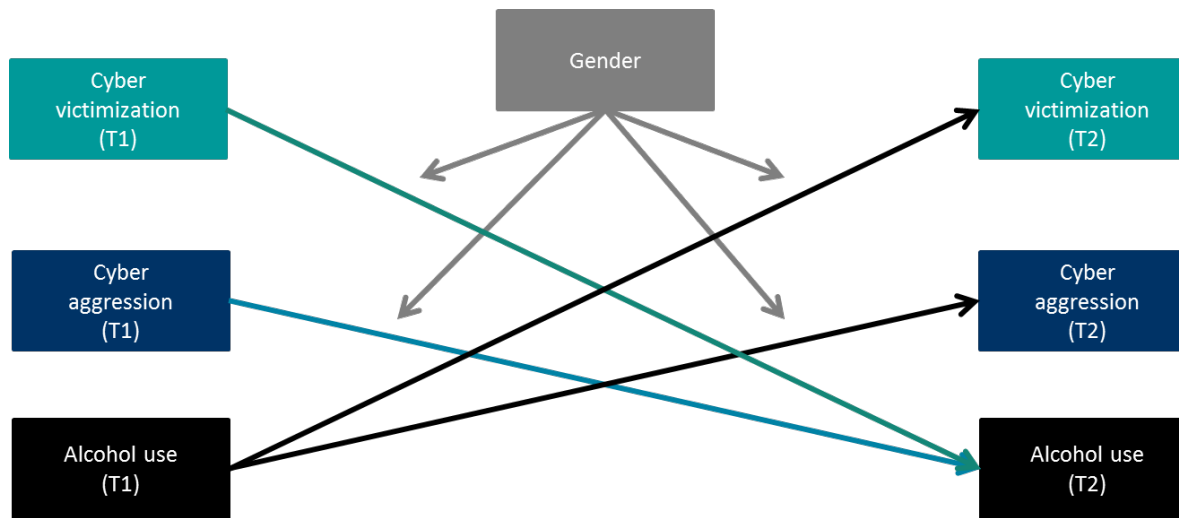
Figure 6. Ethnicity as a moderator of the prospective and reciprocal relationships between cyber victimization, cyber aggression, and adolescent alcohol use.
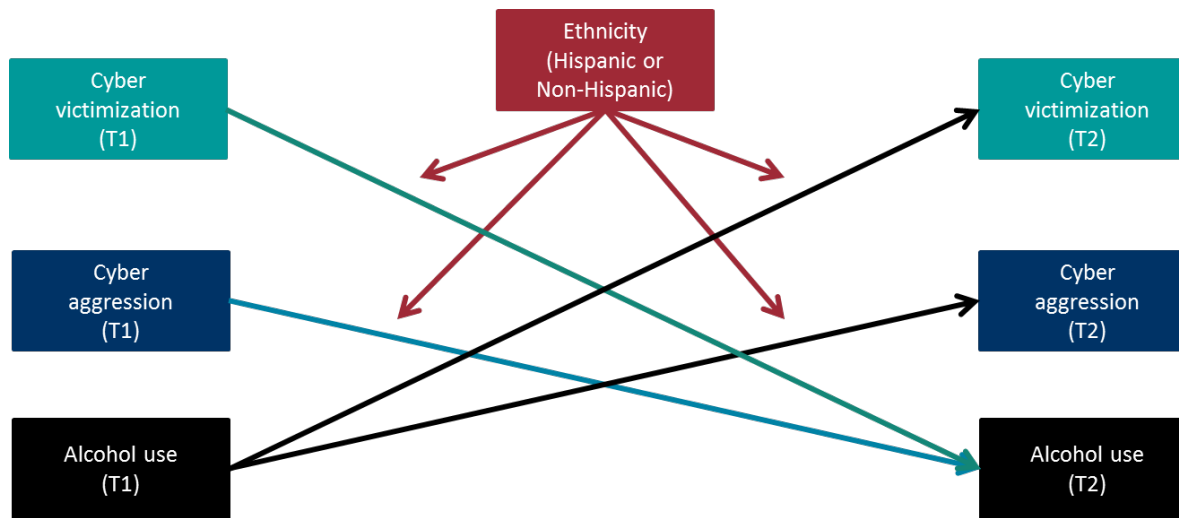
Table 1. Means, Standard Deviations, Ranges, and Bivariate Correlations Among Key Study Variables

	1	2	3	4	5	6	7	8	9	10	11
1. Cyber victimization (T1)	1										
2. Cyber aggression (T1)	.61***	1									
3. Frequency of drinking (T1)	.22***	.30***	1								
4. Frequency of binge drinking (T1)	.24***	.28***	.80***	1							
5. Cyber victimization (T2)	.44***	.36***	.16***	.17***	1						
6. Cyber aggression (T2)	.40***	.49***	.27***	.26***	.53***	1					
7. Frequency of drinking (T2)	.21***	.22***	.44***	.37***	.32***	.24***	1				
8. Frequency of binge drinking (T2)	.15***	.21***	.41***	.42***	.30***	.19***	.84***	1			
9. IC difficulties (T1)	.34***	.26***	.20***	.22***	.19***	.22***	.13***	.09**	1		
10. PSS – Friends (T1)	-.02	.08*	.04	.02	-.01	.02	.04	.00	-.04	1	
11. PSS – Family (T1)	-.16***	-.15***	-.07*	-.05	-.14***	-.12**	-.08*	-.08*	-.23***	.33***	1
Mean	1.35	.22	1.95	1.04	1.33	.18	2.14	1.27	1.81	.72	.64
Standard Deviation	.39	.20	4.00	3.32	.46	.20	4.20	3.54	.75	.20	.29
Range at Time 1	1-5	0-1	0-30	0-30	1-5	0-1	0-30	0-30	1-5	0-1	0-1

Note: *p <.05. **p < .01. ***p < .001.
T1 = Time 1; T2 = Time 2; PSS = Perceived social support; IC = Impulse control

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Table 2. Frequencies of Drinking and Binge Drinking.

Alcohol Use in Past 30 Days	% Endorsed at Time 1	% Endorsed at Time 2
Frequency of drinking	**(*n* = 977)**	**(*n* = 961)**
None in the past 30 days	58.3	55.8
1-2 days	23.5	22.7
3-5 days	9.0	12.0
6-9 days	5.3	5.4
10-19 days	2.8	3.0
20-29 days	0.5	0.4
All 30 days	0.5	0.7
Frequency of binge drinking	**(*n* = 975)**	**(*n* = 961)**
None in the past 30 days	80.0	74.1
1-2 days	11.3	13.5
3-5 days	3.1	6.8
6-9 days	3.7	3.1
10-19 days	1.1	1.8
20-29 days	0.4	0.0
All 30 days	0.4	0.7

Note: Valid percents (excluding missing data) are reported.

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Table 3. Characterization of Groups: Means (SD) and Percentages on Demographic and Study Variables

Variable	Uninvolved (n = 766)	Cyber Victims (n = 31)	Cyber Aggressors (n = 115)	Cyber Aggressor-Victims (n = 51)
Demographics				
Female	58.0%	61.3%	53.91%	74.5%
Hispanic ethnicity	80.0%	64.5%	82.6%	70.6%
Hispanic White	73.0%	60.0%	78.4%	66.0%
Non-Hispanic White	11.1%[a,b]	26.7%[a]	6.3%[b]	12.0%[a,b]
Black	12.3%	6.7%	10.8%	18.0%
Asian	3.7%	6.7%	4.5%	4.0%
Age	15.87 (1.23)[a]	16.00(1.21)[a, b]	15.56(1.16)[a, b]	15.29(1.15)[b]
Alcohol Use				
T1 drinking	1.47(3.02)[a]	2.41(3.76)[a, b]	3.64(5.88)[b]	4.15(5.90)[b]
T1 binge drinking	.61(2.22)[a]	1.26(2.61)[a b]	2.34(5.31)[b, c]	3.36(5.64)[c]
T2 drinking	1.83(3.80)[a]	2.19(3.92)[a, b]	3.37(4.88)[b]	3.76(5.38)[b]
T2 binge drinking	1.01(3.23)[a]	1.08(2.42)[a, b]	2.39(4.18)[b]	2.43(3.96)[b]
Psychosocial Variables				
Impulse control difficulties	1.72(.71)[a]	2.31(.69)[b, c]	2.06(.77)[b]	2.38(.97)[c]
PSS-Friends	.72(.20)	.69(.20)	.73(.17)	.72(.21)
PSS-Family	.66(.29)[a]	.63(.24)[a, b]	.58(.30)[b]	.51(.28)[b]

Note: PSS = Perceived Social Support
Row superscripts with the same letter do not differ significantly, $p < .05$.

Table 4. Aim 2: Cross-Lagged Panel Analyses for Cyber Victimization, Cyber Aggression, and Frequency of Drinking

	Time 2 Outcomes					
	Cyber Victimization	Cyber Aggression	Logistic Portion (Drinking abstinence)		Counts Portion (Frequency of drinking)	
Time 1 Predictors	β (SE)	β (SE)	β (SE)	OR	β (SE)	RR
Gender (Female)	-0.07 (0.03)*	0.03 (0.03)	0.02 (0.03)	1.02	-0.51 (0.14)***	0.60***
Age	0.02 (0.03)	0.01 (0.03)	-0.08 (0.03)**	0.92**	0.12 (0.18)	1.13
School	-0.06(0.02)*	-0.01 (0.03)	-0.01 (0.02)	0.99	-0.04 (0.12)	0.96
Cyber victimization	0.37 (0.05)***	0.14 (0.05)**	0.07 (0.04)*	1.07*	0.47 (0.18)**	1.60**
Cyber aggression	0.14 (0.05)**	0.35 (0.05)***	-0.10 (0.03)**	0.90**	0.03 (0.16)	1.03
Drinking	0.05 (0.03)	0.13 (0.04)**	-0.89 (0.02)***	0.41***	0.51 (0.19)**	1.67**
PSS-Friends	0.01(0.03)	-0.02 (0.04)	-0.03 (0.03)	0.97	0.34 (0.19)†	1.40†
PSS-Family			-0.01 (0.03)	0.99	-0.35 (0.16)*	0.70*
R^2	.22***	.26***	.84***			

Note: †$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.
Standardized coefficients are reported.
SE = Standard Error; OR = Odds Ratio; RR = Rate Ratio; PSS = Perceived Social Support

Table 5. Aim 2: Cross-Lagged Panel Analyses for Cyber Victimization, Cyber Aggression, and Frequency of Binge Drinking

| | Time 2 Outcomes | | | | | |
| | Cyber Victimization | Cyber Aggression | Logistic Portion (Binge drinking abstinence) | | Counts Portion (Frequency of binge drinking) | |
Time 1 Predictors	β (SE)	β (SE)	β (SE)	OR	β (SE)	RR
Gender (Female)	-0.06 (0.03)*	0.03 (0.03)	0.03 (0.03)	1.03	-0.74 (0.35)*	0.48*
Age	0.01 (0.03)	0.01 (0.03)	-0.13 (0.03)***	0.88***	-0.33 (0.26)	0.72
School	-0.06(0.03)*	-0.01 (0.03)	0.03 (0.03)	1.03	-0.10 (0.17)	0.90
Cyber victimization	0.36 (0.05)***	0.14 (0.05)**	0.06 (0.05)	1.06	0.10 (0.17)	1.11
Cyber aggression	0.14 (0.05)**	0.36 (0.05)***	-0.13 (0.04)**	0.88**	0.14 (0.22)	1.15
Binge drinking	0.04 (0.04)	0.13 (0.05)*	-0.86 (0.04)***	0.42***	0.39 (0.23)	1.48
PSS-Friends	0.01 (0.04)	-0.01 (0.04)	0.01 (0.03)	1.01	0.50 (0.33)	1.65
PSS-Family			0.04 (0.03)	1.04	-0.33 (0.27)	0.72
R^2	.22***	.26***	.81***			

Note: *p < .05. **p < .01. ***p < .001.
Standardized coefficients are reported.
SE = Standard Error; OR = Odds Ratio; RR = Rate Ratio; PSS = Perceived Social Support

Table 6. Aim 3a: Cyber Victimization x Impulse Control Difficulties (ICD) Predicting Frequency of Drinking

	Time 2 Outcomes					
	Cyber Victimization	Cyber Aggression	Logistic Portion (Drinking abstinence)		Counts Portion (Frequency of drinking)	
Time 1 Predictors	β (SE)	β (SE)	β (SE)	OR	β (SE)	RR
Gender (Female)	-0.06 (0.03)*	0.03 (0.03)	0.02 (0.03)	1.02	-0.52 (0.14)***	1.82***
Age	0.02 (0.03)	0.01 (0.03)	-0.08 (0.03)**	0.92**	0.12 (0.18)	1.13
School		0.02 (0.03)				
Cyber victimization	0.35 (0.05)***	0.14 (0.05)**	0.06 (0.04)	1.06	0.42 (0.19)*	1.52*
Cyber aggression	0.14 (0.05)**	0.35 (0.05)***	-0.11 (0.03)**	0.90**	-0.01 (0.16)	0.99
Drinking	0.05 (0.03)	0.13 (0.04)**	-0.90 (0.03)***	0.41***	0.49 (0.19)**	1.63**
PSS-Friends			-0.03 (0.03)	0.97	0.33 (0.19)†	1.39†
PSS-Family			-0.00 (0.03)	1.00	-0.30 (0.16)*	0.74
ICD			0.04 (0.03)	1.04	0.20 (0.18)	1.22
Cyber victimization x ICD			0.04 (0.04)	1.04	-0.04 (0.13)	0.96
R^2	.21***	.26***	.84***			

Note: $^{†}p < .10$. $*p < .05$. $**p < .01$. $***p < .001$.
Standardized coefficients are reported.
SE = Standard Error; OR = Odds Ratio; RR = Rate Ratio; PSS = Perceived Social Support

Table 7. Aim 3a: Cyber Victimization x Impulse Control Difficulties (ICD) Predicting Frequency of Binge Drinking

	Time 2 Outcomes					
	Cyber Victimization	Cyber Aggression	Logistic Portion (Binge drinking abstinence)		Counts Portion (Frequency of binge drinking)	
Time 1 Predictors	β (SE)	β (SE)	β (SE)	OR	β (SE)	RR
Gender (Female)	-0.06 (0.03)*	0.03 (0.03)	0.03 (0.03)	1.03	-0.76 (0.33)*	0.47*
Age	0.02 (0.03)	0.02 (0.03)	-0.13 (0.03)***	0.88**	-0.32 (0.25)	0.73
School		0.02 (0.03)				
Cyber victimization	0.35 (0.05)***	0.13 (0.05)**	0.07 (0.05)	1.07	0.26 (0.26)	1.30
Cyber aggression	0.14 (0.05)**	0.35 (0.05)***	-0.12 (0.04)**	0.89**	0.09 (0.21)	1.09
Binge drinking	0.04 (0.04)	0.13 (0.05)*	-0.85 (0.04)***	0.43***	0.39 (0.22)†	1.48†
PSS-Friends			0.00 (0.03)	1.00	0.43 (0.30)	1.54
PSS-Family			0.04 (0.03)	1.04	-0.24 (0.24)	0.79
ICD			0.00 (0.03)	1.00	0.08 (0.29)	1.08
Cyber victimization x ICD			-0.07 (0.04)†	0.93†	-0.15 (0.12)	0.86
R^2	.21***	.26***	.83***			

Note: †$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.
Standardized coefficients are reported.
SE = Standard Error; OR = Odds Ratio; RR = Rate Ratio; PSS = Perceived Social Support

Table 8. Aim 3a: Cyber Aggression x Impulse Control Difficulties (ICD) Predicting Frequency of Drinking

	Time 2 Outcomes					
	Cyber Victimization	Cyber Aggression	Logistic Portion (Drinking abstinence)		Counts Portion (Frequency of drinking)	
Time 1 Predictors	β (SE)	β (SE)	β (SE)	OR	β (SE)	RR
Gender (Female)	-0.06 (0.03)*	0.03 (0.03)	0.02 (0.03)	1.02	-0.51 (0.15)*	0.60*
Age	0.02 (0.03)	0.01 (0.03)	-0.08 (0.03)**	0.92**	0.12 (0.18)	1.13
School		0.01 (0.03)				
Cyber victimization	0.35 (0.05)***	0.14 (0.05)**	0.06 (0.04)†	1.06†	0.40 (0.18)*	1.49*
Cyber aggression	0.14 (0.05)**	0.35 (0.05)***	-0.11 (0.04)**	0.90**	-0.02 (0.17)	0.98
Drinking	0.05 (0.04)	0.13 (0.04)**	-0.89 (0.03)***	0.41***	0.50 (0.20)*	1.65*
PSS-Friends			-0.03 (0.03)	0.97	0.34 (0.19)†	1.40†
PSS-Family			-0.00 (0.03)	1.00	-0.33 (0.17)†	0.72
ICD			0.04 (0.03)	1.04	0.12 (0.20)	1.13
Cyber aggression x ICD			0.01 (0.03)	1.01	0.10 (0.14)	1.11
R^2	.21***	.26***	.84***			

Note: †$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.
Standardized coefficients are reported.
SE = Standard Error; OR = Odds Ratio; RR = Rate Ratio; PSS = Perceived Social Support

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Table 9. Aim 3a: Cyber Aggression x Impulse Control Difficulties (ICD) Predicting Frequency of Binge Drinking

	Time 2 Outcomes					
	Cyber Victimization	Cyber Aggression	Logistic Portion (Binge drinking abstinence)		Counts Portion (Frequency of binge drinking)	
Time 1 Predictors	β (SE)	β (SE)	β (SE)	OR	β (SE)	RR
Gender (Female)	-0.06 (0.03)*	0.03 (0.03)	0.03 (0.03)	1.03	-0.75 (0.33)*	0.47*
Age	0.02 (0.03)	0.02 (0.03)	-0.13 (0.03)***	0.88***	-0.34 (0.25)	0.72
School		0.02 (0.03)				
Cyber victimization	0.35 (0.05)***	0.14 (0.05)**	0.06 (0.05)	1.06	0.17 (0.20)	1.19
Cyber aggression	0.14 (0.05)**	0.36 (0.05)***	-0.12 (0.04)**	0.89**	0.13 (0.22)	1.14
Binge drinking	0.04 (0.04)	0.13 (0.05)**	-0.85 (0.04)***	0.43***	0.39 (0.23)†	1.48†
PSS-Friends			0.01 (0.03)	1.01	0.48 (0.31)	1.62
PSS-Family			0.04 (0.03)	1.04	-0.28 (0.26)	0.76
ICD			-0.00 (0.03)	1.00	-0.01 (0.32)	0.99
Cyber aggression x ICD			-0.04 (0.04)	0.96	-0.07 (0.16)	0.93
R^2	.21***	.26***	.82***			

Note: †$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.
Standardized coefficients are reported.
SE = Standard Error; OR = Odds Ratio; RR = Rate Ratio; PSS = Perceived Social Support

Table 10. Aim 3b: Drinking Frequency x Impulse Control Difficulties (ICD) Predicting Cyber Aggression

Time 1 Predictors	Cyber Victimization β (SE)	Cyber Aggression β (SE)	Logistic Portion (Drinking abstinence) β (SE)	OR	Counts Portion (Frequency of drinking) β (SE)	RR
Gender (Female)	-0.06 (0.03)*	0.03 (0.03)	0.02 (0.03)	1.02	-0.51 (0.15)***	0.60***
Age	0.02 (0.03)	0.01 (0.03)	-0.08 (0.03)**	0.92**	0.12 (0.18)	1.13
School		0.02 (0.03)				
Cyber victimization	0.36 (0.05)***	0.13 (0.05)**	0.07 (0.04)*	1.07	0.47 (0.18)**	1.60**
Cyber aggression	0.13 (0.05)**	0.35 (0.05)***	-0.11 (0.03)**	0.90**	0.02 (0.17)	1.02
Drinking	0.05 (0.03)	0.13 (0.05)*	-0.89 (0.02)***	0.41***	0.51 (0.20)**	1.67**
PSS-Friends			-0.03 (0.03)	0.97	0.34 (0.19)†	1.40†
PSS-Family			-0.01 (0.03)	0.99	-0.34 (0.17)*	0.72*
ICD		0.04 (0.03)				
Drinking x ICD		-0.01 (0.05)				
R^2	.21***	.26***	.84***			

Note: $^{†}p < .10$. $*p < .05$. $**p < .01$. $***p < .001$.
Standardized coefficients are reported.
SE = Standard Error; OR = Odds Ratio; RR = Rate Ratio; PSS = Perceived Social Support

Table 11. Aim 3b: Binge Drinking Frequency x Impulse Control Difficulties (ICD) Predicting Cyber Aggression

	Time 2 Outcomes					
	Cyber Victimization	Cyber Aggression	Logistic Portion (Binge drinking abstinence)		Counts Portion (Frequency of binge drinking)	
Time 1 Predictors	β (SE)	β (SE)	β (SE)	OR	β (SE)	RR
Gender (Female)	-0.06 (0.03)*	0.03 (0.03)	0.02 (0.03)	1.02	-0.51 (0.15)***	0.60***
Age	0.02 (0.03)	0.01 (0.03)	-0.08 (0.03)**	0.92**	0.12 (0.18)	1.13
School		0.02 (0.03)				
Cyber victimization	0.36 (0.05)***	0.13 (0.05)**	0.07 (0.04)*	1.07	0.46 (0.18)**	1.58**
Cyber aggression	0.13 (0.05)**	0.35 (0.05)***	-0.11 (0.03)**	0.90**	0.01 (0.16)	1.01
Binge drinking	0.05 (0.03)	0.13 (0.05)*	-0.89 (0.02)***	0.41***	0.52 (0.20)**	1.68**
PSS-Friends			-0.03 (0.03)	0.97	0.35 (0.19)†	1.42†
PSS-Family			-0.01 (0.03)	0.99	-0.34 (0.17)*	0.72
ICD		0.04 (0.03)				
Binge drinking x ICD		-0.02 (0.05)				
R^2	.21***	.26***	.84***			

Note: †$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.
Standardized coefficients are reported.
SE = Standard Error; OR = Odds Ratio; RR = Rate Ratio; PSS = Perceived Social Support

Table 12. Aim 4a: Cyber Victimization x Gender Predicting Frequency of Drinking

	Time 2 Outcomes					
	Cyber Victimization	Cyber Aggression	Logistic Portion (Drinking abstinence)		Counts Portion (Frequency of drinking)	
Time 1 Predictors	β (SE)	β (SE)	β (SE)	OR	β (SE)	RR
Gender (Female)	-0.06 (0.03)*	0.03 (0.03)	0.02 (0.03)	1.02	-0.52 (0.14)***	0.59***
Age	0.02 (0.03)	0.01 (0.03)	-0.08 (0.03)**	0.92**	0.14 (0.18)	1.15
School		0.01 (0.03)				
Cyber victimization	0.35 (0.05)***	0.14 (0.05)**	0.02 (0.05)	1.02	0.35 (0.21)	1.42
Cyber aggression	0.13 (0.05)**	0.35 (0.05)***	-0.10 (0.03)**	0.90**	0.02 (0.16)	1.02
Drinking	0.05 (0.03)	0.12 (0.04)**	-0.90 (0.03)***	0.41***	0.51 (0.20)**	1.67**
PSS-Friends			-0.03 (0.03)	0.97	0.36 (0.19)†	1.43†
PSS-Family			-0.01 (0.03)	0.99	-0.33 (0.16)*	0.72
Cyber victimization x Gender			0.06 (0.04)	1.06	0.14 (0.18)	1.15
R^2	.21***	.26***	.85***			

Note: †$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.
Standardized coefficients are reported.
SE = Standard Error; OR = Odds Ratio; RR = Rate Ratio; PSS = Perceived Social Support

Table 13. Aim 4a: Cyber Victimization x Gender Predicting Frequency of Binge Drinking

			Time 2 Outcomes			
	Cyber Victimization	Cyber Aggression	Logistic Portion (Binge drinking abstinence)		Counts Portion (Frequency of binge drinking)	
Time 1 Predictors	β (SE)	β (SE)	β (SE)	OR	β (SE)	RR
Gender (Female)	-0.06 (0.03)*	0.03 (0.03)	0.03 (0.03)	1.03	-0.74 (0.14)*	0.48*
Age	0.02 (0.03)	0.02 (0.03)	-0.13 (0.03)***	0.88**	-0.34 (0.26)	0.72
School		0.02 (0.03)				
Cyber victimization	0.36 (0.05)***	0.14 (0.05)**	0.07 (0.07)	1.07	0.10 (0.19)	1.11
Cyber aggression	0.14 (0.05)**	0.35 (0.05)***	-0.12 (0.04)**	0.89**	0.15 (0.23)	1.16
Drinking	0.04 (0.04)	0.12 (0.05)*	-0.86 (0.04)***	0.42***	0.40 (0.24)	1.49
PSS-Friends			0.01 (0.03)	1.01	0.48 (0.33)	1.62
PSS-Family			0.04 (0.03)	1.04	-0.29 (0.26)	0.75
Cyber victimization x Gender			-0.02 (0.05)	0.98	0.00 (0.18)	1.00
R^2	.21***	.26***	.82***			

Note: *p < .05. **p < .01. ***p < .001.
Standardized coefficients are reported.
SE = Standard Error; OR = Odds Ratio; RR = Rate Ratio; PSS = Perceived Social Support

Table 14. Aim 4a: Cyber Aggression x Gender Predicting Frequency of Drinking

	Time 2 Outcomes					
	Cyber Victimization	Cyber Aggression	Logistic Portion (Drinking abstinence)		Counts Portion (Frequency of drinking)	
Time 1 Predictors	β (SE)	β (SE)	β (SE)	OR	β (SE)	RR
Gender (Female)	-0.06 (0.03)*	0.03 (0.03)	0.02 (0.03)	1.02	-0.52 (0.14)***	0.59***
Age	0.02 (0.03)	0.01 (0.03)	-0.08 (0.03)**	0.92**	0.13 (0.17)	1.14
School		0.02 (0.03)				
Cyber victimization	0.36 (0.05)***	0.14 (0.05)**	0.07 (0.04)	1.07	0.44 (0.18)*	1.55*
Cyber aggression	0.13 (0.05)**	0.35 (0.05)***	-0.13 (0.05)**	0.88**	-0.05 (0.21)	0.95
Drinking	0.05 (0.03)	0.12 (0.04)**	-0.89 (0.02)***	0.41***	0.52 (0.20)**	1.68**
PSS-Friends			-0.03 (0.03)	0.97	0.35 (0.18)†	1.42†
PSS-Family			-0.01 (0.03)	0.99	-0.31 (0.16)*	0.73*
Cyber aggression x Gender			0.03 (0.04)	1.03	0.13 (0.19)	1.14
R^2	.22***	.26***	.84***			

Note: †$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.
Standardized coefficients are reported.
SE = Standard Error; OR = Odds Ratio; RR = Rate Ratio; PSS = Perceived Social Support

Table 15. Aim 4a: Cyber Aggression x Gender Predicting Frequency of Binge Drinking

	Time 2 Outcomes					
	Cyber Victimization	Cyber Aggression	Logistic Portion (Binge drinking abstinence)		Counts Portion (Frequency of binge drinking)	
Time 1 Predictors	β (SE)	β (SE)	β (SE)	OR	β (SE)	RR
Gender (Female)	-0.06 (0.03)*	0.03 (0.03)	0.03 (0.03)	1.03	-0.75 (0.33)*	0.47*
Age	0.02 (0.03)	0.02 (0.03)	-0.13 (0.03)**	0.88**	-0.32 (0.24)	0.73
School		0.02 (0.03)				
Cyber victimization	0.36 (0.05)***	0.14 (0.05)**	0.06 (0.05)	1.06	0.08 (0.16)	1.60
Cyber aggression	0.14 (0.05)**	0.36 (0.05)***	-0.12 (0.05)*	0.89**	0.02 (0.21)	1.02
Drinking	0.04 (0.04)	0.12 (0.05)**	-0.86 (0.04)***	0.42***	0.40 (0.20)†	1.49†
PSS-Friends			0.01 (0.03)	1.01	0.48 (0.31)†	1.62†
PSS-Family			0.04 (0.03)	1.04	-0.26 (0.24)	0.77
Cyber aggression x Gender			0.00 (0.04)	1.00	0.18 (0.19)	1.20
R^2	.21***	.26***	.82***			

Note: †$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.
Standardized coefficients are reported.
SE = Standard Error; OR = Odds Ratio; RR = Rate Ratio; PSS = Perceived Social Support

Table 16. Aim 4b: Drinking Frequency x Gender Predicting Cyber Victimization

	Time 2 Outcomes					
	Cyber Victimization	Cyber Aggression	Logistic Portion (Drinking abstinence)		Counts Portion (Frequency of drinking)	
Time 1 Predictors	β (SE)	β (SE)	β (SE)	OR	β (SE)	RR
Gender (Female)	-0.06 (0.03)*	0.03 (0.03)	0.02 (0.03)	1.02	-0.51 (0.15)***	0.60***
Age	0.02 (0.03)	0.01 (0.03)	-0.08 (0.03)**	0.92**	0.12 (0.18)	1.13
School		0.02 (0.03)				
Cyber victimization	0.36 (0.05)***	0.15 (0.05)**	0.07 (0.04)*	1.07*	0.47 (0.18)**	1.60**
Cyber aggression	0.13 (0.05)**	0.35 (0.05)***	-0.11 (0.03)**	0.90**	0.02 (0.16)	1.02
Drinking	0.03 (0.04)	0.12 (0.04)*	-0.89 (0.02)***	0.41***	0.51 (0.20)**	1.67**
PSS-Friends			-0.03 (0.03)	0.97	0.34 (0.19)†	1.40†
PSS-Family			-0.01 (0.03)	0.99	-0.34 (0.17)*	0.72*
Drinking x Gender	0.03 (0.04)					
R^2	.22***	.26***	.84***			

Note: †$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.
Standardized coefficients are reported.
SE = Standard Error; OR = Odds Ratio; RR = Rate Ratio; PSS = Perceived Social Support

Table 17. Aim 4b: Binge Drinking Frequency x Gender Predicting Cyber Victimization

| | Time 2 Outcomes | | | | | |
| | Cyber Victimization | Cyber Aggression | Logistic Portion (Binge drinking abstinence) | | Counts Portion (Frequency of binge drinking) | |
Time 1 Predictors	β (SE)	β (SE)	β (SE)	OR	β (SE)	RR
Gender (Female)	-0.06 (0.03)*	0.03 (0.03)	0.03 (0.03)	1.03	-0.74 (0.35)***	0.48***
Age	0.02 (0.03)	0.01 (0.03)	-0.13 (0.03)***	0.88***	-0.35 (0.26)	0.70
School		0.02 (0.03)				
Cyber victimization	0.36 (0.05)***	0.14 (0.05)**	0.06 (0.05)	1.06	0.10 (0.18)	1.11
Cyber aggression	0.14 (0.05)**	0.35 (0.05)***	-0.12 (0.04)**	0.89**	0.14 (0.22)	1.15
Binge drinking	0.05 (0.05)	0.12 (0.05)*	-0.86 (0.04)***	0.42***	0.39 (0.24)	1.48
PSS-Friends			0.01 (0.03)	1.01	0.49 (0.33)	1.63
PSS-Family			0.04 (0.03)	1.04	-0.32 (0.28)	0.73
Binge drinking x Gender	-0.01 (0.04)					
R^2	.21***	.26***			.81***	

Note: *$p < .05$. **$p < .01$. ***$p < .001$.
Standardized coefficients are reported.
SE = Standard Error; OR = Odds Ratio; RR = Rate Ratio; PSS = Perceived Social Support

Table 18. Aim 4b: Drinking Frequency x Gender Predicting Cyber Aggression

	Time 2 Outcomes					
	Cyber Victimization	Cyber Aggression	Logistic Portion (Drinking abstinence)		Counts Portion (Frequency of drinking)	
Time 1 Predictors	β (SE)	β (SE)	β (SE)	OR	β (SE)	RR
Gender (Female)	-0.06 (0.03)*	0.03 (0.03)	0.02 (0.03)	1.02	-0.51 (0.15)***	0.60***
Age	0.02 (0.03)	0.01 (0.03)	-0.08 (0.03)**	0.92**	0.12 (0.18)	1.13
School		0.01 (0.03)				
Cyber victimization	0.36 (0.05)***	0.14 (0.05)**	0.07 (0.04)*	1.07	0.47 (0.18)**	1.60**
Cyber aggression	0.13 (0.05)**	0.35 (0.05)***	-0.11 (0.03)**	0.90**	0.02 (0.16)	1.02
Drinking	0.05 (0.03)	0.11 (0.07)†	-0.89 (0.02)***	0.41***	0.51 (0.20)**	1.67**
PSS-Friends			-0.03 (0.03)	0.97	0.34 (0.19)†	1.40†
PSS-Family			-0.01 (0.03)	0.99	-0.34 (0.17)*	0.72*
Drinking x Gender		0.02 (0.05)				
R^2	.22***	.26***	.84***			

Note: $^†p < .10$. $^*p < .05$. $^{**}p < .01$. $^{***}p < .001$.
Standardized coefficients are reported.
SE = Standard Error; OR = Odds Ratio; RR = Rate Ratio; PSS = Perceived Social Support

Table 19. Aim 4b: Binge Drinking Frequency x Gender Predicting Cyber Aggression

	Time 2 Outcomes					
	Cyber Victimization	Cyber Aggression	Logistic Portion (Binge drinking abstinence)		Counts Portion (Frequency of binge drinking)	
Time 1 Predictors	β (SE)	β (SE)	β (SE)	OR	β (SE)	RR
Gender (Female)	-0.06 (0.03)*	0.03 (0.03)	0.03 (0.03)	1.03	-0.74 (0.35)*	0.48*
Age	0.02 (0.03)	0.02 (0.03)	-0.13 (0.03)***	0.88***	-0.35 (0.26)	0.70
School		0.02 (0.03)				
Cyber victimization	0.36 (0.05)***	0.14 (0.05)**	0.06 (0.05)	1.06	0.10 (0.17)	1.11
Cyber aggression	0.14 (0.05)**	0.35 (0.05)***	-0.12 (0.04)**	0.89**	0.14 (0.22)	1.15
Binge drinking	0.04 (0.04)	0.12 (0.08)	-0.86 (0.04)***	0.42***	0.39 (0.24)	1.48
PSS-Friends			0.01 (0.03)	1.01	0.49 (0.33)	1.63
PSS-Family			0.04 (0.03)	1.04	-0.32 (0.28)	0.73
Binge drinking x Gender		0.01 (0.05)				
R^2	.21***	.26***	.81***			

Note: *p < .05. **p < .01. ***p < .001.
Standardized coefficients are reported.
SE = Standard Error; OR = Odds Ratio; RR = Rate Ratio; PSS = Perceived Social Support

Table 20. Aim 5a: Cyber Victimization x Hispanic Ethnicity Predicting Frequency of Drinking

	Time 2 Outcomes					
	Cyber Victimization	Cyber Aggression	Logistic Portion (Drinking abstinence)		Counts Portion (Frequency of drinking)	
Time 1 Predictors	β (SE)	β (SE)	β (SE)	OR	β (SE)	RR
Gender (Female)	-0.06 (0.03)*	0.03 (0.03)	0.02 (0.03)	1.02	-0.52 (0.14)***	0.59***
Age	0.02 (0.03)	0.01 (0.03)	-0.08 (0.03)**	0.92**	0.13 (0.18)	1.14
School		0.02 (0.03)				
Cyber victimization	0.36 (0.05)***	0.14 (0.05)**	0.03 (0.05)	1.03	0.31 (0.17)†	1.36†
Cyber aggression	0.13 (0.05)**	0.35 (0.05)***	-0.10 (0.03)**	0.90**	0.03 (0.16)	1.03
Drinking	0.05 (0.03)	0.12 (0.04)**	-0.89 (0.02)***	0.41***	0.50 (0.18)**	1.65**
PSS-Friends			-0.03 (0.03)	0.97	0.34 (0.17)	1.40
PSS-Family			-0.01 (0.03)	0.99	-0.32 (0.16)*	0.73*
Hispanic			-0.02 (0.02)	0.98	0.03 (0.15)	1.03
Cyber victimization x Hispanic			0.05 (0.04)	1.05	0.20 (0.18)	1.22
R^2	.21***	.26***	.85***			

Note: †$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.
Standardized coefficients are reported.
SE = Standard Error; OR = Odds Ratio; RR = Rate Ratio; PSS = Perceived Social Support

Table 21. Aim 5a: Cyber Victimization x Hispanic Ethnicity Predicting Frequency of Binge Drinking

	Time 2 Outcomes					
	Cyber Victimization	Cyber Aggression	Logistic Portion (Binge drinking abstinence)		Counts Portion (Frequency of binge drinking)	
Time 1 Predictors	β (SE)	β (SE)	β (SE)	OR	β (SE)	RR
Gender (Female)	-0.06 (0.03)*	0.03 (0.03)	0.03 (0.03)	1.03	-0.77 (0.34)*	0.46*
Age	0.02 (0.03)	0.02 (0.03)	-0.13 (0.04)***	0.88***	-0.31 (0.25)	0.73
School		0.02 (0.03)				
Cyber victimization	0.36 (0.05)***	0.14 (0.05)**	0.02 (0.06)	1.02	-0.10 (0.16)	1.11
Cyber aggression	0.13 (0.05)**	0.35 (0.05)***	-0.12 (0.04)**	0.89**	0.11 (0.20)	1.12
Binge drinking	0.04 (0.04)	0.13 (0.05)*	-0.87 (0.04)***	0.42***	0.36 (0.18)†	1.43†
PSS-Friends			0.01 (0.03)	1.01	0.43 (0.31)	1.54
PSS-Family			0.04 (0.03)	1.04	-0.25 (0.25)	0.78
Hispanic			-0.05 (0.03)†	0.95†	-0.16 (0.20)	0.85
Cyber victimization x Hispanic			0.09 (0.06)	1.09	0.34 (0.23)	1.40
R^2	.21***	.26***	.83***			

Note: †$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.
Standardized coefficients are reported.
SE = Standard Error; OR = Odds Ratio; RR = Rate Ratio; PSS = Perceived Social Support

Table 22. Aim 5a: Cyber Aggression x Hispanic Ethnicity Predicting Frequency of Drinking

	Time 2 Outcomes					
	Cyber Victimization	Cyber Aggression	Logistic Portion (Drinking abstinence)		Counts Portion (Frequency of drinking)	
Time 1 Predictors	β (SE)	β (SE)	β (SE)	OR	β (SE)	RR
Gender (Female)	-0.06 (0.03)*	0.03 (0.03)	0.02 (0.03)	1.02	-0.51 (0.14)***	0.60***
Age	0.02 (0.03)	0.01 (0.03)	-0.09 (0.03)**	0.91**	0.11 (0.18)	1.12
School		0.02 (0.03)				
Cyber victimization	0.36 (0.05)***	0.14 (0.05)**	0.07 (0.04)†	1.07†	0.45 (0.18)*	1.57*
Cyber aggression	0.13 (0.05)**	0.36 (0.05)***	-0.11 (0.05)*	0.90*	0.21 (0.31)	1.23
Drinking	0.05 (0.03)	0.12 (0.04)**	-0.89 (0.03)***	0.41***	0.53 (0.20)**	1.70**
PSS-Friends			-0.03 (0.03)	0.97	0.35 (0.19)†	1.42
PSS-Family			-0.00 (0.03)	1.00	-0.32 (0.16)†	0.73†
Hispanic			-0.02 (0.02)	0.98	0.09 (0.16)	1.09
Cyber aggression x Hispanic			0.00 (0.05)	1.00	-0.23 (0.29)	0.79
R^2	.22***	.26***		.84***		

Note: $^{†}p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.
Standardized coefficients are reported.
SE = Standard Error; OR = Odds Ratio; RR = Rate Ratio; PSS = Perceived Social Support

Table 23. Aim 5a: Cyber Aggression x Hispanic Ethnicity Predicting Frequency of Binge Drinking

| | Time 2 Outcomes | | | | | |
| | Cyber Victimization | Cyber Aggression | Logistic Portion (Binge drinking abstinence) | | Counts Portion (Frequency of binge drinking) | |
Time 1 Predictors	β (SE)	β (SE)	β (SE)	OR	β (SE)	RR
Gender (Female)	-0.06 (0.03)*	0.03 (0.03)	0.03 (0.03)	1.03	-0.72 (0.31)*	0.49*
Age	0.02 (0.03)	0.02 (0.03)	-0.14 (0.03)***	0.87**	-0.34 (0.24)	0.71
School		0.02 (0.03)				
Cyber victimization	0.36 (0.05)***	0.13 (0.05)**	0.06 (0.05)	1.06	0.20 (0.19)	1.22
Cyber aggression	0.13 (0.05)**	0.36 (0.05)***	-0.20 (0.09)*	0.82*	-0.40 (0.36)	0.67
Binge drinking	0.04 (0.04)	0.12 (0.05)*	-0.86 (0.04)***	0.42***	0.32 (0.20)†	1.38†
PSS-Friends			0.01 (0.03)	1.01	0.46 (0.30)	1.58
PSS-Family			0.04 (0.03)	1.04	-0.23 (0.23)	0.79
Hispanic			-0.06 (0.03)*	0.94*	-0.22 (0.24)	0.80
Cyber aggression x Hispanic			0.08 (0.07)	1.08	0.54 (0.40)	1.72
R^2	.21***	.26***	.82***			

Note: $^{\dagger}p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.
Standardized coefficients are reported.
SE = Standard Error; OR = Odds Ratio; RR = Rate Ratio; PSS = Perceived Social Support

Table 24. Aim 5b: Drinking Frequency x Hispanic Ethnicity Predicting Cyber Victimization

	Time 2 Outcomes					
	Cyber Victimization	Cyber Aggression	Logistic Portion (Drinking abstinence)		Counts Portion (Frequency of drinking)	
Time 1 Predictors	β (SE)	β (SE)	β (SE)	OR	β (SE)	RR
Gender (Female)	-0.06 (0.03)*	0.03 (0.03)	0.02 (0.03)	1.02	-0.51 (0.14)***	0.60***
Age	0.02 (0.03)	0.02 (0.03)	-0.08 (0.03)**	0.92**	0.12 (0.18)	1.13
School		0.02 (0.03)				
Cyber victimization	0.36 (0.05)***	0.14 (0.05)**	0.07 (0.04)*	1.07*	0.47 (0.18)**	1.60**
Cyber aggression	0.13 (0.05)**	0.35 (0.05)***	-0.11 (0.05)**	0.90*	0.02 (0.17)	1.02
Drinking	0.09 (0.07)	0.12 (0.04)**	-0.89 (0.02)***	0.41***	0.51 (0.20)**	1.66**
PSS-Friends			-0.03 (0.03)	0.97	0.34 (0.19)†	1.40
PSS-Family			-0.01 (0.03)	0.99	-0.34 (0.17)*	0.71*
Hispanic	-0.03 (0.03)					
Drinking x Hispanic	0.04 (0.06)					
R^2	.22***	.26***	.84***			

Note: $^{†}p < .10$. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.
Standardized coefficients are reported.
SE = Standard Error; OR = Odds Ratio; RR = Rate Ratio; PSS = Perceived Social Support

Table 25. Aim 5b: Binge Drinking Frequency x Hispanic Ethnicity Predicting Cyber Victimization

	Time 2 Outcomes					
	Cyber Victimization	Cyber Aggression	Logistic Portion (Binge drinking abstinence)		Counts Portion (Frequency of binge drinking)	
Time 1 Predictors	β (SE)	β (SE)	β (SE)	OR	β (SE)	RR
Gender (Female)	-0.06 (0.03)*	0.03 (0.03)	0.03 (0.03)	1.03	-0.74 (0.36)*	0.48*
Age	0.02 (0.03)	0.02 (0.03)	-0.13 (0.03)***	0.88***	-0.35 (0.26)	0.70
School		0.03 (0.03)				
Cyber victimization	0.35 (0.05)***	0.14 (0.05)**	0.06 (0.05)	1.06	0.09 (0.17)	1.09
Cyber aggression	0.14 (0.05)**	0.35 (0.05)***	-0.12 (0.04)**	0.89**	0.15 (0.23)	1.16
Binge drinking	0.09 (0.08)	0.13 (0.05)*	-0.86 (0.04)***	0.42***	0.39 (0.24)	1.48
PSS-Friends			0.01 (0.03)	1.01	0.49 (0.33)	1.63
PSS-Family			0.04 (0.03)	1.04	-0.32 (0.28)	0.73
Hispanic	-0.03 (0.03)					
Binge drinking x Hispanic	-0.06 (0.07)					
R^2	.21***	.26***	.81***			

Note: *$p < .05$. **$p < .01$. ***$p < .001$.
Standardized coefficients are reported.
SE = Standard Error; OR = Odds Ratio; RR = Rate Ratio; PSS = Perceived Social Support

Table 26. Aim 5b: Drinking Frequency x Hispanic Ethnicity Predicting Cyber Aggression

	Time 2 Outcomes					
	Cyber Victimization	Cyber Aggression	Logistic Portion (Drinking abstinence)		Counts Portion (Frequency of drinking)	
Time 1 Predictors	β (SE)	β (SE)	β (SE)	OR	β (SE)	RR
Gender (Female)	-0.06 (0.03)*	0.03 (0.03)	0.02 (0.03)	1.02	-0.51 (0.15)***	0.60***
Age	0.02 (0.03)	0.02 (0.03)	-0.08 (0.03)**	0.92**	0.12 (0.18)	1.13
School		0.03 (0.03)				
Cyber victimization	0.36 (0.05)***	0.15 (0.05)**	0.07 (0.04)*	1.07*	0.47 (0.18)**	1.60**
Cyber aggression	0.13 (0.05)*	0.35 (0.05)***	-0.11 (0.03)**	0.90*	0.02 (0.17)	1.02
Drinking	0.05 (0.03)	0.15 (0.08)†	-0.89 (0.02)***	0.41***	0.51 (0.20)**	1.66**
PSS-Friends			-0.03 (0.03)	0.97	0.34 (0.19)†	1.40
PSS-Family			-0.01 (0.03)	0.99	-0.34 (0.17)*	0.71*
Hispanic		-0.04 (0.03)				
Drinking x Hispanic		-0.04 (0.08)				
R^2	.21***	.26***	.84***			

Note: †$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.
Standardized coefficients are reported.
SE = Standard Error; OR = Odds Ratio; RR = Rate Ratio; PSS = Perceived Social Support

Table 27. Aim 5b: Binge Drinking Frequency x Hispanic Ethnicity Predicting Cyber Aggression

| | Time 2 Outcomes | | | | | |
| | Cyber Victimization | Cyber Aggression | Logistic Portion (Binge drinking abstinence) | | Counts Portion (Frequency of binge drinking) | |
Time 1 Predictors	β (SE)	β (SE)	β (SE)	OR	β (SE)	RR
Gender (Female)	-0.06 (0.03)*	0.03 (0.03)	0.03 (0.03)	1.03	-0.74 (0.36)*	0.48*
Age	0.02 (0.03)	0.02 (0.03)	-0.13 (0.03)***	0.88***	0.35 (0.26)	1.42
School		0.04 (0.03)				
Cyber victimization	0.36 (0.05)***	0.14 (0.05)**	0.06 (0.05)	1.06	0.09 (0.17)	1.09
Cyber aggression	0.13 (0.05)**	0.35 (0.05)***	-0.12 (0.04)**	0.89**	0.15 (0.23)	1.16
Binge drinking	0.04 (0.04)	0.13 (0.10)	-0.86 (0.04)***	0.42***	0.39 (0.24)	1.48
PSS-Friends			0.01 (0.03)	1.01	0.49 (0.33)	1.63
PSS-Family			0.04 (0.03)	1.04	-0.32 (0.28)	0.73
Hispanic		0.04 (0.03)				
Binge drinking x Hispanic		-0.01 (0.10)				
R^2	.21***	.26***	.81***			

Note: *p < .05. **p < .01. ***p < .001.
Standardized coefficients are reported.
SE = Standard Error; OR = Odds Ratio; RR = Rate Ratio; PSS = Perceived Social Support

Using this scale, **rate how often these peer experiences have happened to you. Then also circle whether or not you have done these things to another peer.** For each item, "electronic media" refers to any internet site, Social Networking Site (SNS), text messaging, email, instant messaging and picture messaging accessed via a computer, cell phone or other mobile device.

In the past two months…	Never	Once or twice	A few times	About once a week	A few times a week		Did you do this to another peer?	
1. A peer I wanted to be friends with via electronic media ignored my friend request.	1	2	3	4	5		Yes	No
2. A peer removed me from his/her list of friends via electronic media.	1	2	3	4	5		Yes	No
3. A peer made me feel bad by not listing me in his/her "Top 8" or "Top Friends" list.	1	2	3	4	5		Yes	No
4. A peer that I liked became my "friend" via electronic media.	1	2	3	4	5		Yes	No
5. A peer posted mean things about me publicly via electronic media.	1	2	3	4	5		Yes	No
6. A peer posted mean things about me anonymously via electronic media.	1	2	3	4	5		Yes	No
7. A peer posted pictures of me that made me look bad via electronic media.	1	2	3	4	5		Yes	No
8. A peer sent embarrassing pictures or videos of me to others via electronic media.	1	2	3	4	5		Yes	No
9. A peer tried to get me in trouble with parents, teachers or others by posting pictures or comments about me via electronic media.	1	2	3	4	5		Yes	No
10. A peer sent me a nice message via electronic media.	1	2	3	4	5		Yes	No
11. A peer publicly spread rumors about me or revealed secrets I had told them via electronic media.	1	2	3	4	5		Yes	No
12. A peer sent me a mean message via electronic media.	1	2	3	4	5		Yes	No
13. A peer pretended to be me via electronic media and did things to make me look bad/damage my friendships.	1	2	3	4	5		Yes	No
14. A peer prevented me from joining a group via electronic media that I really wanted to join.	1	2	3	4	5		Yes	No
15. A peer posted pictures of me having fun and spending time with them via electronic media.	1	2	3	4	5		Yes	No
16. A peer created a group via electronic media to be mean and hurt my feelings.	1	2	3	4	5		Yes	No
17. I found out that I was excluded from a party or social event via electronic media.	1	2	3	4	5		Yes	No
18. A peer I was dating broke up with me using electronic media.	1	2	3	4	5		Yes	No
19. A peer made me feel jealous by "messing" with my girlfriend/boyfriend via electronic media.	1	2	3	4	5		Yes	No
20. A peer complimented me publicly via electronic media.	1	2	3	4	5		Yes	No

Appendix B
Alcohol Use

Health Behaviors
(Remember, your answers are completely confidential).

This questionnaire is about health behavior. It has been developed so you can tell us what you do that may affect your health. The answers you give will be kept private. No one will know what you write. Answer the questions based on what you really do. Completing the questionnaire is voluntary. If you are not comfortable answering a question, leave it blank.

What is your height?   _____   **What is your weight?**   _____

Please check the box below indicating your answer.

During the **past 30 days**, on how many days did you:	0	1 or 2 days	3 to 5 days	6 to 9 days	10 to 19 days	20 to 29 days	All 30 days
1. **Smoke cigarettes**?	☐	☐	☐	☐	☐	☐	☐
2. Have **at least one drink of alcohol?**	☐	☐	☐	☐	☐	☐	☐
3. **Have 5 or more drinks of alcohol in a row,** that is, within a couple of hours?	☐	☐	☐	☐	☐	☐	☐

During the **past 30 days**, on the days you smoked:	I did not smoke during the past 30 days	Less than one cigarette per day	1 cigarette per day	2 to 5 days	6 to 10 days	11 to 20 days	More than 20 per day
4. **How many cigarettes** did you smoke per day?	☐	☐	☐	☐	☐	☐	☐

Have you **ever:**	Yes	No
5. **Smoked cigarettes daily**, that is, **at least one cigarette every day for 30 days**?	☐	☐

During **your life,** on how many days:	0	1 or 2 days	3 to 5 days	6 to 9 days	10 to 19 days	20 to 39 days	40 to 99 days	100 or more days
6. Have you had **at least one drink of alcohol?**	☐	☐	☐	☐	☐	☐	☐	☐

Appendix C
DERS

Thinking about the <u>times that you've felt upset over the past two months</u>, please rate how often the following statements have applied to you.

When I'm upset…	Almost never	Some-times	About half the time	Most of the time	Almost always
1. I experience my emotions as overwhelming and out of control.	1	2	3	4	5
2. I become out of control.	1	2	3	4	5
3. I feel out of control.	1	2	3	4	5
4. I feel I can remain in control over my behavior.	1	2	3	4	5
5. I have difficulty controlling my behavior.	1	2	3	4	5
When I'm upset…					
6. I lose control over my behavior.	1	2	3	4	5
7. I have difficulty getting work done.	1	2	3	4	5
8. I have difficulty focusing on other things.	1	2	3	4	5
9. I can still get things done.	1	2	3	4	5
10. I have difficulty concentrating.	1	2	3	4	5
When I'm upset…					
11. I have difficulty thinking about anything else.	1	2	3	4	5
12. I believe I'll remain that way for a long time.	1	2	3	4	5
13. I believe that I'll end up very depressed.	1	2	3	4	5
14. I know that I can find a way to feel better.	1	2	3	4	5
15. I believe there is nothing I can do to feel better.	1	2	3	4	5
When I'm upset…					
16. I start to feel very bad about myself.	1	2	3	4	5
17. I believe that wallowing in it is all I can do.	1	2	3	4	5
18. It takes me a long time to feel better.	1	2	3	4	5
19. My emotions feel overwhelming.	1	2	3	4	5
20. I turn to others for help and support.	1	2	3	4	5

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Appendix D
PSS-Fr

Directions: The statements below refer to feelings and experiences that occur to most people at one time or another in their relationships with **friends**. For each statement, there are three possible answers: Yes, No, Don't know. Please circle the answer for each item that best describes how you have felt over the **past two months**.

1. My friends give me the moral support I need.	Yes	No	Don't know
2. Most other people are closer to their friends than I am.	Yes	No	Don't know
3. My friends enjoy hearing about what I think.	Yes	No	Don't know
4. Certain friends come to me when they have problems or need advice.	Yes	No	Don't know
5. I rely on friends for emotional support.	Yes	No	Don't know
6. If I felt that one or more of my friends were upset with me, I'd just keep it to myself.	Yes	No	Don't know
7. I feel that I'm on the fringe in my circle of friends.	Yes	No	Don't know
8. There is a friend I could go to if I were just feeling down, without feeling funny about it later.	Yes	No	Don't know
9. My friends and I are very open about what we think about things.	Yes	No	Don't know
10. My friends are sensitive to my personal needs.	Yes	No	Don't know
11. My friends come to me for emotional support.	Yes	No	Don't know
12. My friends are good at helping me solve problems.	Yes	No	Don't know
13. I have a deep sharing relationship with a number of friends.	Yes	No	Don't know
14. My friends get good ideas about how to do things or make things for me.	Yes	No	Don't know
15. When I confide in friends, it makes me feel uncomfortable.	Yes	No	Don't know
16. My friends seek me out for companionship.	Yes	No	Don't know
17. I think that my friends feel that I'm good at helping them solve problems.	Yes	No	Don't know
18. I don't have a relationship with a friend that is as intimate as other people's relationships with friends.	Yes	No	Don't know
19. I've recently gotten a good idea about how to do something from a friend.	Yes	No	Don't know
20. I wish my friends were much different.	Yes	No	Don't know

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Directions: The statements below refer to feelings and experiences that occur to most people at one time or another in their relationships with their **families**. For each statement, there are three possible answers: Yes, No, Don't know. Please circle the answer you choose for each item that best describes how you have felt over the **past two months**.

1.	My family gives me the moral support I need.	Yes	No	Don't know
2.	I get good ideas about how to do things or make things from my family.	Yes	No	Don't know
3.	Most other people are closer to their family than I am.	Yes	No	Don't know
4.	When I confide in the members of my family who are closest to me, I get the idea that it makes them uncomfortable.	Yes	No	Don't know
5.	My family enjoys hearing about what I think.	Yes	No	Don't know
6.	Members of my family share many of my interests.	Yes	No	Don't know
7.	Certain members of my family come to me when they have problems or need advice.	Yes	No	Don't know
8.	I rely on my family for emotional support.	Yes	No	Don't know
9.	There is a member of my family I could go to if I were just feeling down, without feeling funny about it later.	Yes	No	Don't know
10.	My family and I are very open about what we think about things.	Yes	No	Don't know
11.	My family is sensitive to my personal needs.	Yes	No	Don't know
12.	Members of my family come to me for emotional support.	Yes	No	Don't know
13.	Members of my family are good at helping me solve problems.	Yes	No	Don't know
14.	I have a deep sharing relationship with a number of members of my family.	Yes	No	Don't know
15.	Members of my family get good ideas about how to do things or make things from me.	Yes	No	Don't know
16.	When I confide in members of my family, it makes me uncomfortable.	Yes	No	Don't know
17.	Members of my family seek me out for companionship.	Yes	No	Don't know
18.	I think that my family feels that I'm good at helping them solve problems.	Yes	No	Don't know
19.	I don't have a relationship with a member of my family that is as close as other people's relationships with family members.	Yes	No	Don't know
20.	I wish my family were much different.	Yes	No	Don't know

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