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# Peer Victimization and Adolescent Substance Use: The Moderating Roles of Gender and Peer Aggression

Sherilynn Chan

*University of Miami*, [sherilynnchan@gmail.com](mailto:sherilynnchan@gmail.com)

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UNIVERSITY OF MIAMI

PEER VICTIMIZATION AND ADOLESCENT SUBSTANCE USE:  
THE MODERATING ROLES OF GENDER AND PEER AGGRESSION

By

Sherilynn F. Chan

A THESIS

Submitted to the Faculty  
of the University of Miami  
in partial fulfillment of the requirements for  
the degree of Master of Science

Coral Gables, Florida

June 2012

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Sherilynn F. Chan

Approved:

\_\_\_\_\_  
Annette M. La Greca, Ph.D.  
Professor of Psychology and Pediatrics

\_\_\_\_\_  
Dean of the Graduate School

\_\_\_\_\_  
Monica Webb Hooper, Ph.D.  
Assistant Professor of Psychology

\_\_\_\_\_  
Alan Delamater, Ph.D.  
Professor of Pediatrics and Psychology

CHAN, SHERILYNN  
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Peer victimization (PV) is a salient interpersonal stressor that has been linked with a variety of mental and physical health outcomes in adolescence. However, limited research has focused on the links between PV and substance use, specifically cigarette and alcohol use. The present study examined the relationship between four subtypes of PV (overt, relational, reputational, and cyber) and adolescent cigarette and alcohol use. Gender and peer aggression were also examined as potential moderators. Participants were 811 adolescents aged 13 to 19 years ( $M = 15.79$  years;  $SD = 1.21$ ), who were recruited from two high schools in the Miami-Dade County Public School system. Adolescents completed the *Revised Peer Experiences Questionnaire*, the *Cyber Victimization Scale for Adolescents*, and items from the *Youth Risk Behavior Survey*. Results indicated that aggressive boys who reported high levels of overt PV and aggressive boys who reported low levels of relational PV were most likely to report greater cigarette use. Overtly victimized youth were more likely to report a higher frequency of drinking and binge drinking. Cyber victimization represented a risk factor for all health risk behaviors. Findings suggest important targets for prevention and intervention efforts to reduce cigarette and alcohol use among youth. Peer-based interventions that address issues related to PV may be important in reducing adolescent substance use.

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## CHAPTER 1: BACKGROUND

Adolescence is a unique developmental period, characterized by significant physical, cognitive, and psychosocial changes. Peer relations become especially salient during these years and have important implications for adolescents' adjustment (e.g., La Greca & Harrison, 2005). In particular, peer victimization (PV) is an important aspect of peer relations that affects the lives of many youth. It is prevalent in middle and high schools, with approximately 30-50% of adolescents reporting experiencing victimization during the school year (Dinkes, Cataldi, & Lin-Kelly, 2007; Rigby, 1998). Numerous studies have demonstrated the links between PV and mental health problems, including depressive symptoms and social anxiety (e.g., Prinstein, Boergers, & Vernberg, 2001; Siegel, La Greca, & Harrison, 2009). PV has also been positively associated with poor physical health outcomes, including frequency of stomachaches, headaches, sleeping problems, and medicine use (Rigby, 1998; Rigby, 1999; Wang, Iannotti, Luk, & Nansel, 2010).

Some evidence suggests that adolescents who experience high levels of PV may also be at increased risk for engaging in substance use, such as cigarette and alcohol use (e.g. Luk, Wang, & Simons-Morton, 2010; Tharp-Taylor, Haviland, & D'Amico, 2009). These findings are consistent with the substantial body of research that has shown that psychological stress plays an important role in youth's substance use (e.g., Booker et al., 2008; King, Molina, & Chassin, 2009). Substance use is an important area of health risk behavior to study as it has the potential to lead to severe health consequences (Centers for Disease Control and Prevention, 2010). Understanding how a salient interpersonal stressor like PV may be associated with substance use is crucial in order to further

understand the impact of PV, inform prevention and intervention efforts, and reduce substance use in youth.

Given that research on the association between PV and adolescent substance use is still in its nascency, our understanding of this relationship is very limited. Few studies have included and differentiated between various subtypes of PV; of particular note, a dearth of studies has examined cyber victimization (Luk et al., 2010; Mitchell, Ybarra, & Finkelhor, 2007; Ybarra, Diener-West, & Leaf, 2007). In addition, gender differences in the relationship between PV and substance use remain unclear. Furthermore, previous studies have not taken into account whether victimized adolescents also engage in peer aggression and how this may influence substance use.

In order to replicate and extend previous research, the current study had five specific aims. The first aim was to examine the unique contributions of traditional subtypes of PV (i.e., overt, relational, reputational) to substance use, specifically cigarette and alcohol use. The second aim was to examine the unique contribution of cyber victimization to substance use, above and beyond other subtypes of PV. The third aim was to examine gender as a moderator of the relationship between adolescents' PV experiences and substance use. The fourth aim was to examine whether peer aggression moderated the relationship between adolescents' PV experiences and substance use. The fifth and final aim was to explore whether patterns of peer aggression moderation varied by gender. The sections below review the relevant literature and address each aim in greater detail.

## Peer Victimization

**Definition and prevalence.** Generally, PV has been defined as being the target of peers' aggressive behavior (Hawker & Boulton, 2000). It differs from bullying, which refers to aggressive behavior that is repeated over time and typically involves a power differential between the bully and the victim (Olweus, 1993; Roland & Idsoe, 2001). Initial work identified two subtypes of PV: *overt PV*, which refers to acts of physical violence and threats of harm, and *relational PV*, which refers to acts intended to damage one's peer relationships, such as social exclusion, friendship withdrawal, and rumor spreading (Crick & Bigbee, 1998; Crick & Grotpeter, 1996). Later research offered further differentiation by recognizing *relational PV*, which is characterized by negative interactions, often with close friends, such as friendship withdrawal and social exclusion, and *reputational PV*, which is characterized by actions intended to damage a peer's reputation, such as through rumor spreading or embarrassment (De Los Reyes & Prinstein, 2004). Relational and reputational PV will be referred to as interpersonal subtypes of PV.

A new subtype of PV that has received increased attention in recent years is *cyber* victimization. Cyber victimization reflects PV that occurs through newer forms of technology, such as social networking sites, instant messaging, email, and cell phones (Kowalski & Limber, 2007; Landoll & La Greca, 2010). Although a growing area of interest, few studies have focused on cyber victimization relative to the other subtypes of PV. With 93% of youth aged 12-17 using the Internet (Lenhart, Madden, Smith, & Macgill, 2007) and youth's frequent use of other forms of modern technology, this subtype of PV merits study.

Prevalence rates of PV indicate that it is a common experience for many adolescents and represents a significant problem that warrants further attention.

Traditional subtypes of PV are a frequent problem affecting many adolescents, with approximately 25% of public schools in the United States reporting that PV is a daily or weekly problem (Dinkes et al., 2007). Cyber victimization has been on the rise in recent years (Patchin & Hinduja, 2006; Wolak, Mitchell, & Finkelhor, 2007; Ybarra et al., 2007). Estimates indicate that 32% of youth who use the Internet experience online harassment, such as having someone spread a rumor or post an embarrassing picture of them online without their permission (Lenhart, 2007).

The present study first examined the unique contributions of traditional subtypes of PV to adolescent substance use. Overt, relational, and reputational PV are moderately correlated, suggesting that they are related, but distinct constructs (De Los Reyes & Prinstein, 2004; Siegel et al., 2009). The present study also examined the unique contribution of cyber victimization to adolescent substance use, controlling for traditional subtypes of PV. While there is some overlap between traditional subtypes of PV and cyber victimization, a significant proportion of youth who are victimized online are not victimized at school (Ybarra et al., 2007). Given its distinct nature and context, cyber victimization may have unique implications for adolescents' adjustment (Fredstrom, Adams, & Gilman, 2011). Efforts to disentangle unique associations of different subtypes of PV with adolescent substance use are necessary to provide a more precise understanding of PV and its correlates among adolescents.

**Peer victimization and health.** PV has been related to various mental and physical health outcomes in adolescence. While the outcome of interest in the present

study is substance use, most studies of adolescent PV have focused on associations between PV and psychological distress. Specifically, PV has been associated with adjustment problems and poor mental health outcomes in both children and adolescents. Numerous cross-sectional studies have demonstrated a link between PV and psychosocial maladjustment, such as depressive symptoms, loneliness, generalized and social anxiety, general and global self-esteem, and social self-concept (see Hawker & Boulton, 2000 for a review). Relational PV in particular has been associated with internalizing symptoms in youth (La Greca & Harrison, 2005; Prinstein et al., 2001). There is also evidence that relational PV predicts increases in social anxiety and symptoms of social phobia over time (Siegel et al., 2009; Storch, Masia-Warner, Crisp, & Klein, 2005). Furthermore, PV, especially of a relational nature, was found to be both a predictor and consequence of youth's reports of social anxiety over time, providing support for a reciprocal relation between PV and social anxiety (Siegel et al., 2009).

Less research has specifically examined mental health correlates of reputational PV and cyber victimization among adolescents. Some work suggests that reputational PV is linked with depressive symptoms (La Greca, Chan, Landoll, & Siegel, 2012). A small but growing body of research suggests that cyber victimization is related to negative mental health outcomes, including depressive symptoms (Mitchell et al., 2007; Perren, Dooley, Shaw, & Cross, 2010) and feelings of frustration, anger, and sadness (Patchin & Hinduja, 2006). Controlling for other subtypes of PV, cyber victimization has been found to be associated with greater symptoms of social anxiety among middle school students (Dempsey, Sulkowski, Nichols, & Storch, 2009) and reports of lower self-esteem and

higher social stress, anxiousness, and depressive symptoms among ninth grade students (Fredstrom et al., 2011).

Although PV research has predominantly focused on mental health outcomes, global measures of adolescent PV have also been associated with some physical health outcomes, such as a higher frequency of medically attended injuries and injuries due to physical violence (Engstrom, Hallqvist, Moller, & Laflamme, 2005; Wang et al., 2010). PV has also been positively related to reports of somatic symptoms (i.e., headaches and stomachaches), nervousness, difficulties in getting to sleep, as well as increased medicine use for these difficulties (Due, Hansen, Merlo, Andersen, & Holstein, 2007; Rigby, 1998; Wang et al., 2010). Additionally, several studies have focused on overweight youth, finding that PV is associated with decreased physical activity (Gray, Janicke, Ingerski, & Silverstein, 2008; Storch et al., 2007) and changes in body mass index (Adams & Bukowski, 2008).

PV appears to be a potent stressor linked with a variety of mental and physical health outcomes. However, much of this research has not disentangled the various subtypes of PV and how they are related to outcomes; reputational PV and cyber victimization, in particular, have received relatively less attention. Moreover, limited research has examined PV in relation to substance use, which is the focus of this study. In the section below, the rationale for examining adolescent substance use as an outcome of PV is discussed.

### **Adolescent Substance Use**

**Prevalence.** The present study focuses on adolescent cigarette and alcohol use as two key health risk behaviors that may be associated with PV. These behaviors were

chosen because they are priority health risk behaviors that have been identified by the Centers for Disease Control and Prevention (CDC) as related to the leading causes of morbidity and mortality among youth and adults in the United States (CDC, 2010). Understanding factors (i.e., PV) that contribute to substance use is an important step in targeting and reducing these health risk behaviors, as well as the disease and deaths associated with these behaviors. Moreover, adolescent substance use has been associated with the presence of stressors (e.g., Booker et al., 2008; Windle & Windle, 1996) and thus could be an important outcome linked with PV.

A significant proportion of youth engage in substance use, although prevalence rates for adolescent cigarette and alcohol use have been declining in the past decade (CDC, 2010). Results from the most recent Youth Risk Behavior Survey (YRBS) (CDC, 2010) indicated that cigarette use is common among high school students, grades 9-12. Of the students surveyed, 19.5% reported smoking cigarettes on at least 1 day during the 30 days before the survey and 46.3% had ever tried smoking. Alcohol use is even more prevalent among high school students. Of the students surveyed, 41.8% of students reporting consuming at least one drink of alcohol on at least 1 day during the 30 days before the survey and 72.5% of students reported consuming at least one drink of alcohol on at least 1 day during their life. Furthermore, 24.2% of students had had five or more drinks of alcohol in a row (i.e., within a couple of hours) on at least 1 day during the 30 days before the survey. As the results from the YRBS indicate, a substantial percentage of adolescents report cigarette and alcohol use (CDC, 2010). Furthermore, these health risk behaviors may have serious short-term and long-term health consequences, including physical injury, motor vehicle accidents, cardiovascular disease, and cancer (CDC, 2010).



As a preventable behavior, adolescent substance use is a crucial area to study. The current study sought to illuminate how different subtypes of PV may contribute to cigarette and alcohol use.

**Linking peer victimization and substance use.** PV represents a significant interpersonal stressor for adolescents (e.g., La Greca & Landoll, 2011) and may therefore be a risk factor for substance use. Numerous studies have documented a positive association between stress and adolescent smoking (e.g., Booker et al., 2008; Byrne, Byrne, & Reinhart, 1995; Byrne & Mazanov, 2003; Wills, 1986; Wills, Sandy, & Yaeger, 2002). Many studies have also demonstrated a positive link between stress and adolescent drinking (e.g., Hussong & Chassin, 1994; Windle & Windle, 1996; Wills, 1986). Thus, it is likely that PV is also a significant factor contributing to adolescent substance use.

Several theoretical models have been proposed to explain the relationship between stress and substance use. For example, the *stress/strain model* posits that substance use is a maladaptive way of coping with internal and external distress (Khantzian, 1985). The *stress-coping model for drug use* posits that drug use is an avoidance coping strategy employed to reduce negative emotional arousal associated with stressful experiences (Wills & Filer, 1996). Similarly, the *stress-negative affect model of substance use* postulates that substance use is an attempt to reduce negative affect associated with stressors (Hussong & Chassin, 1994). These models provide a conceptual framework for hypothesizing that adolescents who experience higher levels PV, a salient interpersonal stressor that has been linked with negative affect, may be more likely to use substances as a maladaptive strategy to cope with and alleviate their distress. Guided by

this framework, the current study examined the link between various subtypes of PV and adolescent cigarette and alcohol use.

Research on PV and adolescent substance use is still in its early stages; however, several studies suggest that victimized youth may be at increased risk for substance use. In a study of 926 ethnically diverse adolescents in grades 6-8, physical (i.e., overt) PV was associated with increased cigarette use among both genders, and increased risk for alcohol use among girls only, after controlling for prior substance use (Tharp-Taylor et al., 2009). These authors found that interpersonal PV (i.e., relational and reputational PV) was associated with increased risk for alcohol and cigarette use among boys and girls. While important, this study focused only on younger adolescents. Furthermore, the authors did not differentiate between relational and reputational PV and did not examine cyber victimization.

Similar results were replicated in a sample of 276 predominantly African American eighth graders (Sullivan, Farrell, & Kliwer, 2006). Physical (i.e., overt) PV was associated with increased cigarette use among both boys and girls and relational PV was also associated with increased cigarette and alcohol use among both boys and girls, controlling for physical PV (Sullivan et al., 2006). However, in contrast to findings of Tharp-Taylor and colleagues (2009), physical PV was associated with increased alcohol and advanced alcohol use among boys, and decreased alcohol and advanced alcohol use among girls (Sullivan et al., 2006). Although important, this study's operational definition of relational PV included aspects of reputational PV, so it is not clear whether relational or reputational PV contributed to their findings; furthermore, cyber victimization was not examined. Additionally, the sample was comprised of solely

eighth graders and represented predominantly underprivileged African American youth. As such, it is unclear how these findings generalize to youth of older ages and different ethnic and socioeconomic backgrounds.

Research has also examined specific substance use behaviors, such as binge drinking. In a study of Swiss eighth and ninth graders, youth who reported drinking excessively alone also reported greater victimization than youth who do not drink excessively or drink excessively in social settings (Kuntsche & Gmel, 2004). While this study provides important data on the association between PV and binge drinking, PV was assessed with only one item and did not reflect the various subtypes of PV. Furthermore, gender was not examined as a moderating variable and as with the studies described above, the focus was on early to middle adolescence.

As noted above, little research has examined cyber victimization in relation to adolescent substance use. In a national online survey of 1,588 adolescents aged 10-15 years, alcohol use was related to elevated odds of also reporting being a victim of frequent Internet harassment (Ybarra et al., 2007). While important, this survey focused exclusively on Internet harassment and did not examine PV experienced through other forms of technology (e.g., cell phones). Online victimization has also been associated with increased substance use among youth aged 10-17 years, after controlling for offline forms of victimization (Mitchell et al., 2007). However, this study was not limited to PV, but examined various forms of victimization that may have been perpetrated by siblings, adults, or strangers (Mitchell et al., 2007).

Overall, results from studies of younger adolescents suggest that interpersonal subtypes of PV are associated with increased cigarette and alcohol use among both boys

and girls. While overt PV has been associated with increased cigarette use among both genders, results have been mixed regarding alcohol use. One study linked overt PV with increased alcohol use among girls only (Tharp-Taylor et al., 2009) while another study linked overt PV with increased alcohol use among boys and decreased alcohol use among girls (Sullivan et al., 2006). These varying results suggest the possibility that different subtypes of PV may be differentially associated with substance use and that these relationships may vary by gender and type of substance used.

Studies of older adolescents, who are more likely to smoke and use alcohol, have been sparse. In one yet unpublished study of high-school aged youth, reputational PV was concurrently and positively associated with smoking, drinking, and binge drinking, controlling for overt and relational PV (Chan & La Greca, 2011). This association was observed among adolescent girls, but not among boys (Chan & La Greca, 2011). While important in distinguishing between relational and reputational PV, this study did not assess cyber victimization. PV, as measured by a latent construct reflecting overt, relational, reputational, and cyber subtypes, has been linked with greater substance use in a national sample of tenth graders in the United States (Luk et al., 2010). This relationship was mediated by depressive symptoms for girls but not boys (Luk et al., 2010). Although a latent variable of PV was used to account for measurement error, which is a strength of the Luk et al. study, unique contributions of each subtype of PV were not examined. Similarly, the use of a latent variable of substance use prohibited examining whether PV is differentially associated with different substances.

**Gaps in the literature.** Although previous research suggests a positive link between PV and adolescent substance use, there are several important gaps in the

literature. First, most studies to date have focused on early adolescents and it is unclear whether results can be generalized to older adolescents. The relationship between subtypes of PV and substance use may change across development. Older youth (i.e., high school students) are an especially important population to study because substance use increases from early to late adolescence (CDC, 2010). Although research generally indicates that the prevalence of PV decreases with age, with PV experiences peaking toward the end of middle school and declining as adolescents progress through high school, PV continues to be a salient stressor for older adolescents (e.g., Nansel, Overpeck, Pilla, Ruan, Simons-Morton, & Scheidt, 2001).

Second, there has been an inconsistent inclusion and differentiation of subtypes of PV. For example, previous studies have used a composite measure of PV (Luk et al., 2010), subsumed reputational PV under relational PV (Sullivan et al., 2006; Tharp-Taylor et al., 2009), or examined victimization that was not specific to peers (Mitchell et al., 2007). There is a need to examine and differentiate between subtypes of PV among older youth because subtypes may be differentially associated with substance use and therefore might require different strategies for intervention. Although it is difficult to hypothesize what patterns might be expected, one could argue that interpersonal subtypes of PV may be unique predictors of substance use among older youth, above and beyond contributions of overt PV. In later adolescence, covert forms of PV, such as relational and reputational PV are more common than experiences of overt PV (e.g., Siegel et al., 2009). Furthermore, the importance of friendships increases through adolescence, as peers become adolescents' primary source of social support (Kuttler, La Greca, & Prinstein, 1999). Therefore, threats to friendships, social acceptance, and inclusion may

be especially distressing to adolescents. Moreover, relational and reputational PV are less obvious than overt PV, potentially making them more difficult for others (e.g., peers, teachers, parents) to detect and mitigate. Thus, interpersonal subtypes of PV may represent especially significant stressors that are associated with substance use among older youth.

Above and beyond contributions of traditional PV subtypes, cyber victimization may confer unique risk for adolescents' substance use, although this has rarely been examined. However, existing research suggests that the medium through which PV is experienced may have unique implications for adolescents' adjustment (Mitchell et al., 2007; Ybarra et al., 2007). Cyber victimization can be made extremely public and broadcasted for the online world to see; furthermore, it may also be hard to detect and reduce given its potentially anonymous nature. Previous research suggests that cyber victimization is linked with greater internalizing symptoms, controlling for traditional subtypes of PV (Dempsey et al., 2009; Fredstrom et al., 2011). A similar association might be expected for adolescent substance use.

A third gap in the literature pertains to the role of gender, and specifically to the way in which gender moderates the relationship between PV and adolescent substance use. Research has consistently shown that adolescent boys experience overt PV more often than adolescent girls (e.g., De Los Reyes & Prinstein, 2004; La Greca & Harrison, 2005; Prinstein et al., 2001; Sullivan et al., 2006), whereas prevalence rates of interpersonal PV appear to be comparable among adolescent boys and girls (De Los Reyes & Prinstein, 2004; Prinstein et al., 2001; Siegel et al., 2009; Sullivan et al., 2006). However, some studies have found that adolescent girls are relationally victimized more

than boys (Dukes, Stein, & Zane, 2010; Peskin, Tortolero, & Markham, 2006). Additionally, adolescent girls show higher rates of reputational PV compared to boys, based on peer reports (De Los Reyes & Prinstein, 2004). In terms of substance use, adolescent boys and girls do not differ significantly on rates of lifetime smoking, daily cigarette use, current cigarette use, current alcohol use, or binge drinking (CDC, 2010), although boys have been found to report more alcohol use and binge drinking than girls (e.g., La Greca, Prinstein, & Fetter, 2001).

In addition to gender differences in levels of PV or in substance use behaviors, potential gender differences in the relationship between PV and adolescent substance use need to be further examined. Preliminary findings for older adolescents suggest that reputational PV is associated with increased cigarette and alcohol use among girls but not among boys (Chan & La Greca, 2011). Compared to boys, girls place a greater value on social bonds (Crick & Zahn-Waxler, 2003), perceive interpersonal PV as more hurtful, experience greater negative affect in response to interpersonal PV, and ruminate about these experiences more (Galen & Underwood, 1997; Paquette & Underwood, 1999). These findings suggest the possibility that girls may be more sensitive to interpersonal PV problems than boys and that PV may be an especially stressful experience among girls. Therefore, it may be expected that the relationship between interpersonal subtypes of PV and substance use may be stronger for adolescent girls than boys.

A fourth limitation of the existing research is that studies have not examined whether victimized adolescents are also aggressors, and how an adolescent's aggressor status may moderate the relationship between PV and substance use. Peer aggression is an important variable to examine, as peer aggression in both childhood and adolescence

has been linked to adolescent substance use (e.g., Choquet, Menke, & Manfredi, 1991; Houbre, Tarquinio, Thuillier, & Hergott, 2006; Nansel et al., 2001). A body of literature has also identified a subgroup of youth who are both victims and aggressors. These bully-victims, also called reactive bullies or provocative victims, have been shown to be at increased risk for a variety of internalizing and externalizing symptoms, compared to youth who are victims only or bullies only. Bully-victims appear to be at greatest risk for poor psychosocial functioning (Nansel et al., 2001) and represent a high-risk group for problem behavior, involvement in deviant peer groups, depressive symptoms, lower social competence, and worse school functioning (Haynie et al., 2001). Compared to victims and bullies, youth who are bully-victims have been found to report higher levels of anxiety, depressive symptoms, psychosomatic symptoms, and severe suicidal ideation (Kaltiala-Heino, Rimpela, Marttunen, Rimpela, & Rantanen, 1999; Kaltiala-Heino, Rimpela, Rantanen, & Rimpela, 2000).

Given the empirical findings suggesting that bully-victims are a high-risk group associated with greater internalizing and externalizing symptoms, it may be the case that victimized adolescents who also engage in peer aggression are more likely to engage in substance use, compared to adolescents who are victims only. If these youth experience greater stress and negative affect relative to their peers, they may be more likely to use substances to reduce their distress, a prediction consistent with models of substance use (Khantzian, 1985; Hussong & Chassin, 1994; Wills & Filer, 1996). Furthermore, aggression has been associated with increased substance use and thus, victims who also engage in peer aggression may be more likely to use substances, compared to youth who are victims only.



Findings from a small number of studies provide support for this hypothesis. In a large study of Finnish youth aged 14-16 years, bully-victims reported greater excessive drinking than victims (Kaltiala-Heino et al., 2000). In a study of 1,312 adolescent boys in grades 7-12, bully-victims reported more problem behaviors, including cigarette and alcohol use, compared to bullies, victims, and youth who were neither bullies nor victims (Stein, Dukes, & Warren, 2007). In a study of 1,771 ethnically diverse youth, bully-victims in sixth grade were especially at high risk for smoking initiation two years later (Weiss, Mouttapa, Cen, Johnson, & Unger, 2011).

Results from previous studies suggest that adolescents who are classified as bully-victims engage in higher levels of substance use compared to adolescents who are victims only. While these studies provide preliminary evidence for the combined contribution of PV and peer aggression to substance use, further research is needed to better understand this relationship. Specifically, research has not examined peer aggression as a variable that moderates the relationship between PV subtypes and level of substance use. The present study addressed this gap in the literature and examined whether different subtypes of PV are stronger predictors of substance use among aggressors compared to non-aggressors.

Finally, further research is needed to illuminate how PV, peer aggression, and gender may interact to predict substance use. Some research suggests that boys are more likely to be bullies or bully-victims than girls (e.g., Kumpulainen et al., 1998) and overt and relational PV have been found to be more strongly associated with overt and relational aggression among boys than girls (Sullivan et al., 2006). The role of peer

aggression as a moderator of the relationship between PV subtypes and substance use may differ for adolescent boys and girls; however, such patterns remain to be explored.

In sum, the current study addressed the gaps in the literature by examining the relationships between four subtypes of PV (overt, relational, reputational, and cyber) and substance use and examining the potential moderating roles of gender and peer aggression among a sample of older adolescents (grades 9-12). The specific aims and hypotheses of the current study are summarized below.

### **Aim 1: Unique Contributions of Traditional Subtypes of PV to Substance Use**

The unique contributions of overt, relational, and reputational PV were examined to determine which subtypes of PV were associated with cigarette and alcohol use. It was hypothesized that overt PV would be positively associated with cigarette and alcohol use, controlling for demographic variables. It was also hypothesized that relational and reputational PV would each be positively associated with cigarette and alcohol use, controlling for overt PV and demographic variables.

### **Aim 2: Unique Contribution of Cyber Victimization to Substance Use**

The unique contribution of cyber victimization to adolescent cigarette and alcohol use, above and beyond the contributions of traditional subtypes of PV, was examined. It was hypothesized that cyber victimization would be positively associated with cigarette and alcohol use, controlling for overt, relational, and reputational PV as well as for demographic variables.

### **Aim 3: The Moderating Role of Gender**

Gender was examined as a moderator of the relationship between PV and substance use. It was hypothesized that the association between interpersonal subtypes of

PV and adolescent cigarette and alcohol use would be stronger for adolescent girls than for adolescent boys, consistent with previous literature (Chan & La Greca, 2011). Given mixed findings on gender moderation for overt PV and substance use (Sullivan et al., 2006; Tharp-Taylor, 2009) and the lack of research on gender moderation for cyber victimization and substance use, no specific a priori hypotheses were made for these two PV subtypes. Overall, this aim was approached in a more exploratory manner, given the limited and inconsistent literature on the role of gender to date.

#### **Aim 4: The Moderating Role of Peer Aggression**

Peer aggression was also examined as a moderator of the relationship between PV and substance use. It was hypothesized that PV subtypes would be more strongly associated with cigarette and alcohol use among adolescents who are aggressors, compared to adolescents who are non-aggressors. However, given the examination of four PV subtypes and the limited existing research on the role of aggression, analyses for this aim were also approached in an exploratory manner.

#### **Aim 5: Gender Differences in the Moderating Role of Peer Aggression**

Where interactions between PV and peer aggression were found, exploratory analyses examined these patterns separately among boys and girls. No a priori hypotheses were made regarding gender differences in these interactions.

## CHAPTER 2: METHOD

### Participants

Of 2375 consent forms that were distributed among classrooms in two high schools in the Miami-Dade County Public School (MDCPS) system, 1467 (61.8%) were returned. Of these, 1270 (86.6%) parents consented (or adolescents 18 years of age or older consented). Of these, 1177 (92.7%) adolescents were eligible to participate in the study. Those who were ineligible included 20 adolescents (1.6% of sample) who were Spanish speakers, 33 (2.6%) who were enrolled in multiple classes, and 40 (3.1%) who were no longer enrolled in the class at the time of data collection. Of eligible adolescents, 1067 (90.7%) participated in the study, resulting in an overall participation rate of 44.9%.

Of the 1067 adolescents who participated in the current study, 811 (76.0%) adolescents completed data on all study variables. Missing data was handled with listwise deletion for regression analyses. T-tests revealed that adolescents with missing data reported higher levels of reputational PV ( $t(1070) = 2.05, p < .05$ ), overt PV ( $t(380.97) = 3.52, p < .001$ ), and overt aggression ( $t(403.70) = 2.74, p < .01$ ) than adolescents with complete data. Adolescents with missing data also reported a greater number of cigarettes smoked ( $t(177.30) = 2.42, p < .05$ ), and higher frequency of drinking ( $t(219.18) = 1.99, p < .05$ ) and binge drinking ( $t(209.74) = 2.24, p < .05$ ). Additionally, boys were less likely to have complete data compared to girls ( $p < .001$ ), and participants from School A were less likely to have complete data than those from School B ( $p < .01$ ). See Table 1 for a comparison of means and standard deviations of these variables. Adolescents with and without missing data did not differ on any other key study variables.

The final participating sample was composed of 811 adolescents (61% girls), 13 to 19 years of age ( $M = 15.79$  years;  $SD = 1.21$ ). Regarding age, 1% of the sample was 13 years old, 14.5% was 14 years old, 31.2% was 15 years old, 24.3% was 16 years old, 20.7% was 17 years old, 8.6% was 18 years old, and .5% was 19 years old. The grade composition was as follows Grade 9 (33.6%), Grade 10 (29.9%), Grade 11 (22.2%), and Grade 12 (14.2%). Most of the participants ( $n = 615$ ; 75.8% of sample) were recruited from School A; 196 participants (24.2% of sample) were recruited from School B. The sample was ethnically diverse and predominantly Hispanic (73.2% Hispanic White, 11.6% Black, 11.1% Non-Hispanic White, 4.1% Asian), reflecting the composition of the broader community.

Of the 811 adolescents with complete data, 564 (69.9%) endorsed having had at least one drink in their lifetime. This subset was used in analyses of drinking outcomes (frequency of drinking, frequency of binge drinking). Among this subsample (58.5% girls), 77.1% of the sample came from School A, 22.9% of the sample came from School B. The grade composition was as follows: Grade 9 (32.6%), Grade 10 (29.7%), Grade 11 (23.1%), and Grade 12 (14.6%). The subsample was ethnically diverse (75.0% Hispanic White, 10.6% Black, 11.2% Non-Hispanic White, 3.2% Asian). Adolescents who endorsed having had at least one drink in their lifetime reported higher levels of relational PV ( $t(809) = -1.97, p < .05$ ), reputational PV ( $t(809) = -2.54, p < .05$ ), overt PV ( $t(586.65) = -2.76, p < .01$ ), and cyber victimization ( $t(622.44) = -4.12, p < .001$ ) than adolescents who have never had a drink. They also reported higher levels of relational aggression ( $t(569.65) = -5.74, p < .001$ ), reputational aggression ( $t(568.64) = -2.80, p < .01$ ), overt aggression ( $t(686.07) = -4.71, p < .001$ ), and cyber aggression ( $t(593.72) = -$

7.07,  $p < .001$ ) than adolescents who have never had a drink. They were also more likely to be classified as an aggressor ( $\chi^2(1, N = 811) = 22.83, p < .001$ ). Additionally, adolescents who endorsed having had at least one drink in their lifetime reported a higher frequency of cigarette smoking ( $t(727.13) = -6.10, p < .001$ ), greater number of cigarettes smoked ( $t(805.90) = -4.95, p < .001$ ), and higher frequency of drinking ( $t(633.14) = -19.01, p < .001$ ), and binge drinking ( $t(563.00) = -11.63, p < .001$ ). Boys were more likely to endorse having had at least one drink compared to girls ( $\chi^2(1, N = 811) = 4.49, p < .05$ ). See Table 2 for a comparison of means and standard deviations on these variables. Adolescents who did or did not endorse having had a drink in their lifetime did not differ by age, ethnicity, or school.

### **Procedure**

This project was part of a larger multi-wave study of adolescents' peer relations (La Greca, 2010). Institutional Review Board and MDCPS approval was obtained. School principals were then contacted to recruit school participation in this study. After obtaining principal and teacher permission to recruit students directly, letters and parental consent forms were distributed by teachers to students. Letters and parental consent forms were given in both English and Spanish. Teachers were asked to encourage students to return the consent forms and collect them. As compensation for their assistance and cooperation with this project, \$20 gift certificates were provided to all participating principals and teachers. Students who participated in this study were also entered in a raffle to win a \$50 gift certificate, or one of two \$20 gift certificates (a separate raffle was conducted for each school).

On the day of data collection, adolescents signed an assent form, or consent form if they were 18 years of age or older. Study questionnaires were completed during class time and supervised by trained research assistants and doctoral graduate students.

### **Measures**

Study questionnaires were given in English only, as students in public high school generally demonstrate sufficient English proficiency, as seen in previous research with this population. Completion of questionnaires took between 30-45 minutes.

**Demographic variables (Appendix A).** A questionnaire that included questions about adolescents' gender, ethnicity, and age, was administered. Dummy codes for ethnicity were created, with Hispanic as the reference group (*Black* = 1, *Asian* = 1, *White* = 1).

**Peer victimization and aggression (Appendix B).** The *Revised Peer Experiences Questionnaire (R-PEQ)*; De Los Reyes & Prinstein, 2004) is an 18-item scale that assesses peer victimization and aggression in adolescents. Overt, relational, and reputational PV are represented by three subscales, each composed of three items. Sample items include "A peer hit, kicked, or pushed me in a mean way" (overt PV), "Some peers left me out of an activity that I really wanted to be included in" (relational PV), and "A teen gossiped about me so others would not like me" (reputational PV). Overt, relational, and reputational peer aggression are measured with parallel items. Participants rate how often each event occurred to them (PV) and how often they perpetrated these acts (peer aggression) in the past two months using a 5-point scale. Responses range from 1 (*Never*) to 5 (*A few times a week*), with higher scores reflecting greater victimization or aggression, respectively. Subscale scores for PV were computed

by centering the mean of the three items in each PV subscale. Similarly, subscale scores for peer aggression were computed by centering the mean of the three items in each peer aggression subscale. A variable for traditional peer aggression status was computed where adolescents were classified as an aggressor, based on whether they reported engaging in above average levels (i.e., above the mean) of peer aggression for any of the three subtypes of peer aggression (1 = *aggressor*, 0 = *non-aggressor*). This approach for coding peer aggression has been used in previous research (Herge, Landoll, & La Greca, 2010).

The *R-PEQ* has been shown to have satisfactory reliability and validity with adolescents and has been used in multi-ethnic samples (e.g., De Los Reyes & Prinstein, 2004; La Greca & Harrison, 2005; Siegel et al., 2009). Internal consistencies for the PV subscales range from .59-.78 for overt PV, .75-.84 for relational PV, and .80-.87 for reputational PV (De Los Reyes & Prinstein, 2004; Siegel et al., 2009). Internal consistencies for the aggression subscales have been found to be .83 for overt peer aggression, .68 for relational aggression, and .76 for reputational peer aggression (De Los Reyes & Prinstein, 2004). In the present sample, internal consistencies were .65 for overt PV, .73 for relational PV, and .79 for reputational PV. Internal consistencies for the aggression subscales in the present sample were .76 for overt peer aggression, .70 for relational peer aggression, and .63 for reputational peer aggression. The initial version of the *Peer Experiences Questionnaire* demonstrated test-retest reliability ranging from .48 to .52 over a 6-month interval (Prinstein et al., 2001).

**Cyber victimization (Appendix C).** The *Cyber Victimization Scale for Adolescents (CVS-A*; Landoll & La Greca, in preparation) assesses positive and negative



peer experiences that occur via electronic media. The original *Cyber Victimization Scale* (*CVS*; Landoll & La Greca, 2011) consisted of 12 items that measure aversive peer experiences specifically as they occur on social networking sites, such as Facebook and MySpace (e.g., “A peer posted pictures of me on a social networking site that made me look bad,” “A peer sent me a mean message on a social networking site”). The scale has subsequently been reworded in the *CVS-A* to reflect experiences across a wider variety of electronic media. Electronic media encompasses social networking sites (e.g., Facebook, MySpace), web sites (e.g., Formspring, YouTube), texting, and instant messaging. The *CVS-A* consists of 20 items, 16 of which assess negative peer experiences occurring online (e.g., “A peer posted pictures of me that made me look bad via electronic media,” “A peer posted mean things about me publicly via electronic media”) and four of which assess positive peer experiences occurring online (e.g., “A peer sent me a nice message via electronic media,” “A peer complimented me publicly via electronic media). Participants rate how often each event has occurred to them over the past two months using a 5-point scale (1 = *Never* to 5 = *A few times a week*). Furthermore, unlike the *CVS*, which assessed PV only, the *CVS-A* simultaneously assesses adolescents’ experiences of PV and peer aggression. This change was made in an effort to parallel the structure of the *R-PEQ*. For each of the 20 items that assess cyber victimization, adolescents indicate (*yes/no*) whether they have behaved that way towards another peer.

For the present study, a variable for cyber victimization was computed by centering the mean of 13 items that reflect negative peer experiences. These 13 items were chosen due to preliminary evaluation of the psychometric properties of the *CVS-A*, which indicated support of a single negative factor structure using these 13 items. A

variable for cyber peer aggression status was computed where adolescents were classified as a cyber aggressor (1 = *aggressor*, 0 = *non-aggressor*), based on whether they reported engaging in above average levels (i.e., above the mean) of cyber peer aggression. For data analysis, adolescents were classified as an aggressor if they were coded as an aggressor for either traditional peer aggression or cyber peer aggression.

The *CVS-A* and *CVS* have demonstrated good to high levels of reliability among ethnically diverse adolescent and young adult samples ( $\alpha = .81-.91$  for negative cyber victimization items). In the present sample, the internal consistency of the *CVS-A* is .79 for the 13 negative victimization items. In support of the validity of the *CVS*, Landoll and La Greca (2011) found that cyber victimization was strongly associated with traditional subtypes of PV, yet remained a distinct construct. Furthermore, cyber victimization was found to be incrementally predictive of both social anxiety and depressive symptoms, even after controlling for the effects of overt and relational PV.

**Substance use (Appendix D).** Adolescents' substance use was assessed with five items from the *Youth Risk Behavior Survey* (YRBS; CDC, 2009). One item assesses the frequency of current cigarette smoking ("During the past 30 days, on how many days did you smoke cigarettes?"); one item assesses the frequency of current alcohol use ("During the past 30 days, on how many days did you have at least one drink of alcohol?"); one item assesses the frequency of current binge drinking ("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 range from "0 days," "1-2 days," "3-5 days," "6-9 days," "10-19 days," "20-29 days," and "all 30 days." A fourth item assesses the number of cigarettes smoked per day on days that the participant smoked ("During the past 30 days,

on the days you smoked, how many cigarettes did you smoke per day?”). Response choices are “I did not smoke during the past 30 days,” “less than one cigarette per day,” “1 cigarette per day,” “2-5 days,” “6-10 days,” “11-20 days,” and “more than 20 per day.”

A fifth item was included that assesses lifetime alcohol use (“During your life, on how many days have you had at least one drink of alcohol?”). Responses choices are “0 days,” “1-2 days,” “3-5 days,” “6-9 days,” “10-19 days,” “20-39 days,” “40-99 days,” and “100 or more days.” This item was used as a screener to exclude participants who have never had at least one drink of alcohol from regression analyses of alcohol use. For such participants, there would presumably be no association between PV and alcohol use.

In the present sample, frequency of cigarette smoking was not normally distributed (skewness = 4.88, kurtosis = 26.60) nor was the number of cigarettes smoked (skewness = 4.55, kurtosis = 22.20). A logarithmic transformation was applied to these variables, reducing skewness and kurtosis (frequency of cigarette smoking: skewness = 3.63, kurtosis = 12.92; number of cigarettes smoked: skewness = 3.70, kurtosis = 13.10). However, these variables remained positively skewed and leptokurtic, which is to be expected and consistent with the prevalence of this health risk behavior in adolescence. All subsequent analyses for smoking outcomes were conducted with log-transformed variables.

Frequency of drinking had acceptable skewness and kurtosis (skewness = 1.85, kurtosis = 3.58) and frequency of binge drinking had nearly acceptable skewness and kurtosis (skewness = 3.12, kurtosis, 10.62). Among the subset of adolescents ( $n = 564$ ) who endorsed having had at least one drink in their lifetime, frequency of drinking had

acceptable skewness and kurtosis (skewness = 1.40, kurtosis = 1.96); binge drinking also had acceptable skewness and kurtosis (skewness = 2.46, kurtosis = 6.31). Therefore, these variables were not log transformed.

The five substance use items chosen for the current study are included in the *YRBS*, which is used by the CDC to evaluate adolescents' health behaviors and substance use on an annual basis. Previous work supports the reliability and validity of these items among ethnically diverse samples. The *YRBS* has been demonstrated to have adequate test-retest reliability over a 2-week period, with kappas ranging between 67.6% and 81.9% for substance use items (Brener, Kann, McManus, Kinchen, Sundberg, & Ross, 2002). In support of the validity of the *YRBS*, substance use items have been positively linked with risky sexual behaviors (Yan, Chiu, Stoesen, & Wang, 2007), physical fighting, and carrying weapons (MacDonald, Piquero, Valois, & Zullig, 2005; Rudatsikira, Muula, & Siziya, 2008). Using similar items, La Greca and colleagues (2001) found that higher levels of substance use were associated with adolescents' affiliation with deviant peer crowds.

### **Data Analytic Plan**

**Preliminary Analysis.** Data were examined for outliers and linear relationships between variables. Preliminary analyses were conducted for means and standard deviations of all study variables. Bivariate correlations for all variables were also conducted. Age and ethnic differences in outcome variables were evaluated as potential variables to control in main study analyses. Consistent with previous data analytic approaches using similar outcome measures (La Greca et al., 2001; Prinstein, Choukas-

Bradley, Helms, Brechwald, & Rancourt, 2011), hierarchical regressions were conducted to address study aims.

**Aim 1: Unique Contributions of Traditional Subtypes of PV to Substance**

**Use.** Hierarchical regressions were used to examine the unique contributions of overt, relational, and reputational PV to cigarette and alcohol use. Age, ethnicity dummy codes, and gender were entered on step 1. Overt PV was entered on step 2, followed by relational and reputational PV on step 3. A separate regression was conducted for each of the four outcomes: frequency of cigarette smoking, frequency of alcohol use, frequency of binge drinking, and the number of cigarettes smoked on days that participants smoked.

**Aim 2: Unique Contribution of Cyber Victimization to Substance Use.**

Hierarchical regressions were used to examine the unique contribution of cyber victimization to cigarette and alcohol use, above and beyond the contributions of overt, relational, and reputational PV. Steps 1-3 were identical to those in Aim 1. Cyber victimization was entered on step 4. A separate regression was conducted for each of the four outcomes.

**Aim 3: The Moderating Role of Gender.** Hierarchical regressions were used to examine gender as a moderator of the relationship between PV subtypes and substance use. Steps 1-4 were identical to those in Aim 2. Interactions between gender and each PV subtype were entered independently on step 5. A Bonferroni correction (alpha level of  $p < .01$ ) for interaction terms was applied to account for Type I error. This more conservative approach was taken for interaction terms, as these represented more preliminary analyses. A separate regression was conducted for each of the four outcomes.

**Aim 4: The Moderating Role of Peer Aggression.** Hierarchical regressions were used to examine peer aggression as a moderator of the relationship between PV subtypes and substance use. Steps 1-4 were identical to those in Aim 2. Peer aggression was then entered on step 5. Interactions between peer aggression and each PV subtype were entered independently on step 6. A Bonferroni correction (alpha level of  $p < .01$ ) for interaction terms was applied to account for Type I error. Again, this more conservative approach was taken for interaction terms, as these represented more preliminary analyses. A separate regression was conducted for each of the four outcomes.

**Aim 5: Gender Differences in Peer Aggression Moderation.** Finally, significant interactions observed in Aim 4 were analyzed in separate regressions for boys and girls.

## CHAPTER 3: RESULTS

### Preliminary Analysis

Key outcome variables were examined for outliers and normality. No outliers were identified. Logarithmic transformations were applied to skewed outcome variables, as previously discussed. Tolerance values did not indicate problems with multicollinearity.

*Descriptive statistics.* Means and standard deviations of study variables are presented in Table 3. On average, youth reported experiencing each PV subtype between zero and one or two times within the past two months. Based on the criteria previously described, 26% of the sample was classified as an aggressor.

Frequencies and amount of substance use are presented in Table 4. Approximately 9% of the sample reported that they smoked on at least one day in the last 30 days, including 4% of the sample who indicated that they smoked at least one cigarette on days that they smoked. The frequency of cigarette smoking in the current sample is much lower than that observed in the most recent YRBS (CDC, 2010), where 19.5% of high school students reported smoking on at least one day in the past 30 days.

Youth in the current sample were more likely to use alcohol than they were to use cigarettes, with approximately 41% of youth reporting that they had at least one drink of alcohol in the past 30 days, and approximately 19% of youth reporting that they binge drank in the past 30 days. Rates of alcohol use were comparable to results from the most recent YRBS (CDC, 2010).

*Correlations.* Nearly all key study variables were significantly and positively correlated with each other. Table 5 presents bivariate correlations for key study variables.

Given the large sample size, only correlations significant at the  $p < .01$  level are marked. Overt PV was related to all substance use behaviors. Cyber victimization was also related to all substance use behaviors, with the exception of the number of cigarettes smoked ( $p < .05$ ). Reputational PV was related to drinking but not smoking behaviors. Relational PV was not related to any substance use outcomes. The frequency of cigarette smoking and number of cigarettes smoked were highly correlated,  $r = .88, p < .001$ . The frequency of drinking and frequency of binge drinking were also highly correlated,  $r = .78, p < .001$ .

*Demographic differences.* Age was positively related to the number of cigarettes smoked in the full sample,  $r = .09, p < .05$ , and among the subsample of youth who reported having at least one drink in their lifetime,  $r = .09, p < .05$ . Age was not significantly related to other outcome variables. Significant ethnic differences in reputational PV were found,  $F(3, 807) = 4.30, p < .01$ . Specifically, Asian adolescents reported higher levels of reputational PV than did Hispanic adolescents,  $p < .05$ . Furthermore, Non-Hispanic White adolescents reported a higher frequency of binge drinking, compared to Black adolescents,  $F(3, 807) = 3.06, p < .05$ . No other ethnic differences in outcome variables were found.

Regarding gender differences, boys reported higher levels of overt PV than did girls,  $t(548.67) = 3.61, p < .001$ , whereas girls reported higher levels of relational PV,  $t(809) = -2.46, p < .05$ , and reputational PV,  $t(785.08) = -5.95, p < .001$ , than did boys. Boys and girls were equally likely to be classified as an aggressor,  $\chi^2(1, N = 811) = 3.12, p = .08$ . Boys reported a higher frequency of cigarette smoking than did girls,  $t(521.35) = 2.30, p < .05$ . No gender differences in other outcomes were found. However, boys



reported greater lifetime alcohol use than did girls,  $t(637.96) = 2.92, p < .01$ , and were more likely to have had at least one drink in their lifetime than were girls,  $t(706.72) = 2.15, p < .05$ ).

*School differences.* Participants from School A reported a greater number of cigarettes smoked compared to School B,  $t(455.60) = 2.15, p < .05$ . In the full sample, participants from School B reported a greater frequency of drinking than participants from School A,  $t(281.04) = -2.35, p < .05$ . Among the subsample of drinkers, participants from School B reported greater frequency of drinking,  $t(182.93) = -3.26, p < .01$ , and binge drinking,  $t(182.38) = -2.14, p < .05$ , compared to School A.

In sum, differences in some outcome variables were found based on age, ethnicity, gender, and school. Therefore, these demographic variables were controlled for in all regression analyses.

### **Aim 1: Unique Contributions of Traditional Subtypes of PV to Substance Use**

Hierarchical regressions examined the unique contributions of overt, relational, and reputational PV to cigarette and alcohol use. Age, gender, ethnicity, and school were entered on step 1. Overt PV was entered on step 2, followed by relational and reputational PV on step 3. A separate regression was conducted for each of the four outcomes: frequency of cigarette smoking, the number of cigarettes smoked on days that participants smoked, frequency of drinking, and frequency of binge drinking.

Regression results for cigarette use outcomes are presented in Table 6. As expected, controlling for demographic variables, higher levels of overt PV were associated with a higher frequency of cigarette smoking ( $\beta = .18, p < .001$ ) and greater number of cigarettes smoked ( $\beta = .14, p < .001$ ). Contrary to hypotheses, relational and

reputational PV were not associated with smoking, above and beyond contributions of overt PV.

Regression results for alcohol use outcomes are presented in Table 7. As expected, among the participants who endorsed having a drink in their lifetime, higher levels of overt PV were associated with a higher frequency of drinking ( $\beta = .17, p < .001$ ) and binge drinking ( $\beta = .21, p < .001$ ). Additionally, higher levels of reputational PV were associated with a higher frequency of binge drinking, beyond contributions of overt PV ( $\beta = .12, p < .05$ ). However, contrary to hypotheses, relational PV was not uniquely associated with frequency of binge drinking ( $p > .10$ ). Furthermore, relational and reputational PV were not associated with frequency of drinking, beyond contributions of overt PV ( $p$ 's  $> .10$ ). Aim 1 hypotheses were partially supported. As expected, overt PV was positively related to all substance use behaviors. However, interpersonal subtypes of PV were not uniquely associated with substance use, with the exception of reputational PV, which was positively related to frequency of binge drinking.

### **Aim 2: Unique Contribution of Cyber Victimization to Substance Use**

Regression results for Aim 2 are presented in Table 8. Hierarchical regressions were identical to those in Aim 1, adding cyber victimization on step 4. As expected, controlling for demographic variables and traditional subtypes of PV, greater levels of cyber victimization were associated with a higher frequency of cigarette smoking ( $\beta = .14, p < .01$ ) and more cigarettes smoked ( $\beta = .10, p < .05$ ). Additionally, among the participants who endorsed having had a drink in their lifetime, greater cyber victimization was associated with a higher frequency of drinking ( $\beta = .23, p < .001$ ) and binge drinking ( $\beta = .24, p < .001$ ). After cyber victimization was entered in the analysis, reputational PV

was no longer significantly related to frequency of binge drinking ( $\beta = .03, p > .10$ ), but greater relational PV became related to a lower frequency of binge drinking ( $\beta = -.10, p < .05$ ). Findings supported Aim 2 hypotheses, as cyber victimization was positively related to all substance use behaviors.

### **Aim 3: The Moderating Role of Gender**

Hierarchical regressions were identical to Aim 2, with interactions between gender and each PV subtype entered independently on step 5 in separate regressions. A Bonferroni correction (alpha level of  $p < .01$ ) for interaction terms was applied. Again, a separate regression was conducted for each of the four outcomes. Regression results for Aim 3 are presented in Table 9.

When entered independently, the gender x overt PV interaction ( $\beta = -.13, p < .01$ ) was associated with frequency of cigarette smoking. A graph of this interaction is depicted in Figure 1. Simple slopes analysis revealed that greater overt PV was related to a greater frequency of cigarette smoking for boys ( $\beta = .24, t = 4.63, p < .001$ ), but not for girls ( $\beta = .05, t = .84, ns$ ). Regarding number of cigarettes smoked, when entered independently, the gender x overt PV interaction ( $\beta = -.14, p < .01$ ) was significant. A graph of this interaction is depicted in Figure 2. Simple slopes analysis revealed that greater overt PV was related to more cigarettes smoked for boys ( $\beta = .23, t = 4.41, p < .001$ ) but not for girls ( $\beta = .03, t = .51, ns$ ).

No gender x PV subtype interactions were found with regard to drinking outcomes,  $p$ 's  $> .10$ . In sum, gender moderated the relationship between overt PV and smoking behaviors, such that greater levels of overt PV were related to more cigarette use for boys, but not girls. Gender did not moderate the relationship between overt PV and

drinking behaviors; greater overt PV was associated with greater alcohol use for both boys and girls. The hypothesis that the relationship between interpersonal subtypes of PV and substance use would be stronger for girls than boys was not supported; gender did not moderate these relationships. Furthermore, gender was not a moderator of the relationship between cyber victimization and substance use.

#### **Aim 4: The Moderating Role of Peer Aggression**

Hierarchical regressions were identical to Aim 2, with peer aggression entered on step 5 and interactions between aggression and each PV subtype entered independently on step 6 in separate regressions. Once again, a Bonferroni correction (alpha level of  $p < .01$ ) for interaction terms was applied. Regression results for Aim 4 are presented in Table 10.

In step 5, aggression was associated with frequency of cigarette smoking ( $\beta = .12$ ,  $p < .01$ ). In step 6, when entered independently, the aggressor x overt PV interaction ( $\beta = .12$ ,  $p < .05$ ) and aggressor x relational PV ( $\beta = -.13$ ,  $p < .01$ ) were significantly related to frequency of cigarette smoking. When entered simultaneously, both the aggressor x overt PV interaction ( $\beta = .16$ ,  $p < .01$ ) and aggressor x relational PV interaction ( $\beta = -.16$ ,  $p < .01$ ) remained significant. These interactions are depicted in Figures 3 and 4, respectively. Simple slopes analysis revealed that greater overt PV was related to a higher frequency of cigarette smoking among aggressors ( $\beta = .23$ ,  $t = 4.24$ ,  $p < .001$ ), but not among non-aggressors ( $\beta = .01$ ,  $t = .21$ , *ns*). In contrast, lower relational PV was related to a higher frequency of cigarette smoking among aggressors ( $\beta = -.29$ ,  $t = -4.23$ ,  $p < .001$ ), but not among non-aggressors ( $\beta = -.02$ ,  $t = -.37$ , *ns*).

Regarding number of cigarettes smoked, in step 5, aggression was positively associated with number of cigarettes smoked ( $\beta = .11, p < .01$ ). In step 6, the aggressor x overt PV interaction ( $\beta = .14, p < .05$ ) and aggressor x relational PV interaction ( $\beta = -.12, p < .01$ ) were significantly related to number of cigarettes smoked. When entered simultaneously, both the aggressor x overt PV interaction ( $\beta = .18, p < .01$ ) and aggressor x relational PV interaction ( $\beta = -.15, p < .01$ ) remained significant. These interactions are depicted in Figures 5 and 6, respectively. Simple slopes analysis revealed that greater levels of overt PV were related to more cigarettes smoked among aggressors ( $\beta = .22, t = 4.14, p < .001$ ), but not among non-aggressors ( $\beta = -.01, t = -.16, ns$ ). In contrast, lower levels of relational PV were related to more cigarettes smoked among aggressors ( $\beta = -.27, t = -3.92, p < .001$ ), but not among non-aggressors ( $\beta = -.01, t = -.18, ns$ ).

Aggression was related to frequency of drinking ( $\beta = .18, p < .001$ ) and frequency of binge drinking ( $\beta = .13, p < .01$ ). However, no aggressor x PV subtype interactions were significant. In sum, Aim 4 hypotheses were partially supported. Consistent with hypotheses, greater overt PV was related to greater cigarette use among aggressors, but not non-aggressors. However, aggression did not moderate the relationship between overt PV and alcohol use; greater overt PV was related to a higher frequency of drinking and binge drinking among both aggressors and non-aggressors. Aggression moderated the association between relational PV and cigarette use, but this was in the unexpected direction. Specifically, lower relational PV was related to more cigarette use among aggressors, but not non-aggressors. Aggression did not moderate the relationship between cyber victimization and reputational PV and substance use.

### **Aim 5: Gender Differences in Peer Aggression Moderation**

Hierarchical regression analyses for smoking outcomes from Aim 4 were conducted separately in boys and girls to examine whether the observed relationships held for both genders. Regression results for boys are presented in Table 11. Among boys, in step 5, aggression was associated with frequency of cigarette smoking ( $\beta = .20, p < .01$ ). In step 6, the aggressor x overt PV interaction ( $\beta = .32, p < .01$ ) and aggressor x relational PV ( $\beta = -.26, p < .01$ ) were significantly related to frequency of cigarette smoking. These interactions are depicted in Figures 7 and 8, respectively. Simple slopes analysis revealed that for boys, greater overt PV was related to a higher frequency of cigarette smoking among aggressors ( $\beta = .34, t = 3.97, p < .001$ ), but not among non-aggressors ( $\beta = -.07, t = -.68, ns$ ). Lower relational PV was related to a higher frequency of cigarette smoking among aggressors ( $\beta = -.54, t = -4.79, p < .001$ ), but not among non-aggressors ( $\beta = -.11, t = -1.52, ns$ ).

Regarding number of cigarettes smoked, in step 5, aggression was positively associated with number of cigarettes smoked ( $\beta = .17, p < .01$ ). In step 6, the aggressor x overt PV interaction ( $\beta = .38, p < .001$ ) and aggressor x relational PV interaction ( $\beta = -.22, p < .01$ ) were significantly related to number of cigarettes smoked. These interactions are depicted in Figures 9 and 10, respectively. Simple slopes analysis revealed that for boys, greater overt PV was related to more cigarettes smoked among aggressors ( $\beta = .39, t = 4.49, p < .001$ ), but not among non-aggressors ( $\beta = -.10, t = -.99, ns$ ). Lower relational PV was related to more cigarettes smoked among aggressors ( $\beta = -.44, t = -3.84, p < .001$ ), but not among non-aggressors ( $\beta = -.07, t = -.99, ns$ ).

Regression results for girls are presented in Table 12. Among girls, in step 6, the aggressor x overt PV interaction ( $\beta = -.03, p = .69$ ) and aggressor x relational PV interaction ( $\beta = -.10, p = .09$ ) were not related to frequency of cigarette smoking. In this final step, aggression was not related to frequency of cigarette smoking ( $\beta = .09, p = .09$ ). Similarly, regarding number of cigarettes smoked, in step 6, the aggressor x overt PV interaction ( $\beta = -.05, p = .54$ ) and aggressor x relational PV interaction ( $\beta = -.12, p = .04$ ) were not related to the number of cigarettes smoked. In this final step, aggression was not related to number of cigarettes smoked ( $\beta = .10, p = .09$ ).

In sum, aggression moderated the relationships between overt and relational PV and smoking behaviors for boys, but not for girls. Among boys, greater overt PV was related to greater cigarette use for aggressors but not non-aggressors. Additionally, among boys, lower levels of relational PV were related to more cigarette use for aggressor but not non-aggressors.

## CHAPTER 4: DISCUSSION

Peer victimization has been consistently linked with a host of negative mental and physical health outcomes. However, less research has examined the relationship between PV and adolescent substance use, particularly among older youth. Substance use is an important outcome to study, as a significant proportion of high school students engage in cigarette and alcohol use (CDC, 2010). A better understanding of factors, such as PV, that may be associated with substance use, is critical to identifying youth at risk for using substances. Such knowledge holds important implications for prevention and intervention efforts aimed at reducing these health risk behaviors among youth.

The current study addressed several important gaps in the literature by examining unique associations of four PV subtypes (i.e., overt, relational, reputational, and cyber) with adolescent cigarette and alcohol use, and whether these associations were moderated by gender and peer aggression. Findings highlight peer and individual factors that may contribute to adolescent cigarette use and alcohol consumption. Aggressive boys who reported high levels of overt PV and aggressive boys who reported low levels of relational PV were the youth who were most likely to report greater cigarette use. Overtly victimized youth were more likely to drink and binge drink more often. Cyber victimization represented a risk factor for all health risk behaviors. These key findings are discussed in greater detail below.

### **Is Peer Victimization Associated with Adolescent Cigarette Use?**

This study demonstrated that adolescent boys who reported greater overt PV also reported higher levels of cigarette use. This was consistent with hypotheses and previous work on middle-school aged youth (Sullivan et al., 2006; Tharp-Taylor, 2009), which



demonstrated a link between overt PV and cigarette use. The current study extends this work in a sample of predominantly Hispanic older youth and suggests that prior findings with younger adolescents may generalize to older adolescents. Together, past and current research highlight the negative correlates of overt PV for boys.

To date, studying the potential link between cyber victimization and cigarette use has been largely neglected. The current study indicated that adolescent boys and girls who reported greater cyber victimization also reported more cigarette use, even after considering traditional PV subtypes. This finding was consistent with hypotheses and previous work that has demonstrated that online victimization is related to increased substance use among adolescents (Mitchell et al., 2007). To our knowledge, the present study is the first to specifically examine cyber victimization in relation to adolescent smoking, while simultaneously assessing traditional PV. The current data indicate that PV that occurs through electronic media, such as social networking sites and cell phones, uniquely contributes to adolescents' smoking behaviors, above and beyond experiences that occur in person. Findings add to the limited but growing body of literature suggesting that cyber victimization has unique associations with adolescents' adjustment.

Due to its public nature, cyber victimization may have especially far and broad reaching consequences. Because of its potentially anonymous nature, the aggressor may be difficult to detect and cyber victimization may be challenging to reduce and mitigate. Furthermore, cyber victimization is less constrained by time and place than traditional forms of PV and teachers and parents may be less aware of its occurrence (Mishna, Saini, & Solomon, 2009). Current study findings, along with other emerging research suggest that cyber victimization represents an aversive experience, associated with various

negative outcomes. As youth's use of electronic media is on the rise and youth increasingly rely on the Internet and mobile devices for social interactions and maintaining social relationships (Lenhart et al., 2010), victimization through electronic media, compared to traditional means, may be especially salient for youth. Cyber victimization certainly warrants further attention, as social media continue to play an important role in adolescents' lives.

Surprisingly, relational and reputational PV were not related to more reports of cigarette use, regardless of whether or not overt PV and cyber victimization were considered. This is in contrast to previous studies with younger adolescents which found that greater interpersonal PV was linked to more smoking behaviors (e.g., Sullivan et al., 2006; Tharp-Taylor et al., 2009) and a study with high school students which found that reputational PV was associated with cigarette use among girls (Chan & La Greca, 2011). The current data suggest that among older youth, higher levels of overt and cyber PV are more closely linked to cigarette use than are interpersonal subtypes of PV. Although interpersonal PV may represent a significant stressor, youth who are victimized in this way may display maladaptive behaviors or maladjustment in other areas, such as internalizing symptoms (La Greca & Harrison, 2005; Storch et al., 2005). Rather than using substances, it is possible that interpersonally victimized youth may use alternative coping strategies to manage their negative experiences. Additionally, peer crowd affiliation has been linked with health risk behaviors (La Greca et al., 2001). It is possible that associations between interpersonal PV and cigarette use might be observed only among particular peer crowds. Another potential explanation for the lack of observed relationship between interpersonal PV and cigarette use is that the rate of

smoking in the current sample was particularly low. Only 9% of these youth reported smoking in the last 30 days, compared to 17% in a previous study (Chan & La Greca, 2011) and 19.5% in the most recent YRBS (CDC, 2010). Thus, the low prevalence of smoking in this sample may have affected the ability to obtain significant findings for cigarette use outcome variables.

Furthermore, findings did not support the hypothesis that higher levels of interpersonal subtypes of PV would be more strongly associated with cigarette use for girls than boys. Although negative peer experiences of a relational or reputational nature may be perceived as more hurtful and distressing to girls than boys (Galen & Underwood, 1997; Paquette & Underwood, 1999), girls may express their distress in other ways, such as by internalizing symptoms rather than externalizing problems (i.e., engagement in health risk behaviors). It is also possible that adolescent girls may possess the necessary coping skills to deal with these aversive interpersonal experiences, such as confiding in a friend or adult. For example, in one yet unpublished study, it was shown that adolescent girls were more likely to disclose their PV experiences to a parent or teacher than were boys (La Greca, Herge, & Bailey, 2012). Alternatively, limited findings for cigarette use may again be a result of the low rate of smoking in the current sample.

It is of interest to note that, although relational and reputational PV were not uniquely related to substance use, some aspects of these interpersonal PV subtypes were captured in the cyber victimization measure. For example, items such as “I found out that I was excluded from a party or social event via electronic media (item 17)” and “A peer posted pictures of me that made me look bad via electronic media (item 8)” appear to

reflect relational and reputational PV, respectively. Therefore, these types of interpersonal experiences may represent a risk factor for substance use, but may be more salient and relevant to engagement in health risk behaviors when experienced through electronic media.

Among aggressive boys, higher levels of overt PV were linked with more smoking. This was not the case among non-aggressive boys. As a follow-up analysis, aggressive boys ( $n = 92$ ) reported higher levels of overt PV than non-aggressive boys ( $n = 225$ ),  $p < .001$ . These findings are consistent with literature suggesting that youth who are both bullies and victims are at increased risk for cigarette use, compared to their peers who are only bullies, only victims, or neither (e.g., Stein et al., 2007; Weiss et al., 2011). Overall, bully-victims have the most maladaptive outcomes (Kaltiala-Heino et al., 1999; Kaltiala-Heino et al., 2000; Nansel et al., 2001). Aggression, particularly of a reactive nature, is associated with psychosocial maladjustment including internalizing problems, delinquent behavior, PV, and substance use (Card & Little, 2006; Fite, Colder, Lochman, & Wells, 2008). Thus, youth who are considered aggressive may be more likely to respond to a negative peer experience or stressful event, such as overt PV, with a behavior such as substance use. In contrast, boys who are not aggressive may deal with overt PV in alternative ways.

It was not possible to determine whether cigarette use was a result or a cause of overt PV. That is, it remains unclear whether overt PV led to more smoking behaviors or whether boys who used cigarettes (and possibly displayed other deviant or non-normative behaviors) were more likely to be a target of overt PV. It is also possible that overt PV and cigarette use influence each other in a reciprocal manner. Longitudinal studies will be

required to examine these possibilities. Nonetheless, current findings indicate that adolescent boys who are overtly victimized by their peers also demonstrate more cigarette use.

Counter to expectations, girls who reported high levels of overt PV did not report corresponding greater cigarette use. This contrasts prior research on younger adolescents which demonstrated that overt PV was associated with greater cigarette use for both boys and girls (Sullivan et al., 2006; Tharp-Taylor et al., 2009). It is possible that such gender differences do not emerge until later adolescence, when different peer processes and social norms are at play. Given that overt PV tends to decrease with age and is less common among girls than boys (De Los Reyes & Prinstein, 2004; La Greca & Harrison, 2005; Prinstein et al., 2001; Sullivan et al., 2006), current findings may be explained in part by the low rates of overt PV experienced by older adolescent girls, as observed in other studies and in the present sample. As youth age, overt PV may become less of a relevant risk factor for cigarette use among girls.

It is also possible that for youth who do experience overt PV, adolescent girls possess different or more effective coping skills than boys. For example, overt PV is more likely to be disclosed to parents than other subtypes of PV, and girls are more likely to disclose (any type of) PV events to parents than are boys (La Greca et al., 2012). Another noteworthy finding was that girls' aggression did not have an impact on the relationship between their reports of overt PV and cigarette use. Prior work has shown that girls are less likely than boys to engage in aggression and to be bully-victims (e.g., Kumpulainen et al., 1998) and therefore, the role of aggression in substance use may be more limited for girls. Further research in this area is warranted.

Another key and unexpected finding was that less relational PV was related to more smoking among boys, when aggression was considered. More specifically, aggressive boys who reported low levels of relational PV also reported more cigarette use, but this association was not observed for non-aggressive boys. One potential explanation for this unexpected finding is that relational PV reflects experiences of social exclusion and friendship withdrawal (e.g., “Some teens left me out of an activity or conversation that I really wanted to be included in,” “A teen did not invite me to a party or social event even though they knew that I wanted to go,” and “A teen left me out of what they were doing”). As cigarette smoking is often a social activity and connectedness to friends is related to youth’s smoking behaviors (Karcher & Finn, 2005), youth who are not often left out of social activities (i.e., experience low levels of relational PV) may have greater opportunities to engage in this health risk behavior.

A second explanation is that low levels of relational PV may reflect high popularity. Some aggressive adolescents are viewed by their peers as being popular (Cillessen & Mayeux, 2004; Rose, Swenson, & Waller, 2004). High levels of popularity have been linked with aggressive behavior (Prinstein & Cillessen, 2003) as well as substance use (Mayeux, Sandstrom, & Cillessen, 2008). Additionally, a recent study demonstrated that among adolescent boys at average levels of popularity, popularity was positively associated with increases in cigarette use over time (Prinstein et al., 2011). Thus, aggressive adolescent boys who experience low levels of relational PV may represent a popular subgroup of youth more likely to use cigarettes. Findings from the current study offer a more complex and nuanced view of peer processes and smoking behaviors, particularly among boys. The relationships between relational PV, aggression,

and cigarette use warrant attention in future research. Research that seeks to elucidate gender differences in these relationships will also be important.

### **Implications for Cigarette Smoking Prevention and Intervention**

Existing youth smoking prevention programs typically focus on education about the consequences of smoking, building social/affective competence (e.g., clarifying values, building self-esteem, developing life skills), and/or developing resistance skills to social influences (Hwang, Yeagley, & Petosa, 2004; Lantz et al., 2000; Tingle, DeSimone, & Covington, 2003; Wiehe, Garrison, Christakis, Ebel, & Rivara, 2005). While school-based smoking prevention programs have been shown to produce decreases in smoking prevalence in the short-term, overall, results regarding the effectiveness of such programs have been mixed (Bruvold, 1993; Murnaghan, Sihvonen, Leatherdale, & Kekki, 2007; Rooney & Murray, 1996; Rundall, Bruvold, 1988). Findings from the current study support the inclusion of a focus on PV experiences and providing youth with appropriate coping skills for managing overt and cyber PV experiences. The incorporation of strategies for reducing aggression may also be fruitful among boys who experience high levels of overt PV. Intervention efforts might specifically target aggressive boys who are overtly victimized, aggressive boys who are not relationally victimized, and any adolescent who is cyber victimized, as the current data point to these youth as being at higher risk for engaging in smoking behaviors. Smoking prevention programs often target elementary and middle school students (Lantz et al., 2000; Tingle et al., 2003) and unfortunately, there is little evidence that indicates that existing interventions demonstrate long-term effects (Wiehe et al., 2005). The current study

suggests that high school students might also benefit from intervention and continual education and support.

### **Is Peer Victimization Associated with Adolescent Alcohol Use?**

This study demonstrated that youth who reported greater overt PV also reported higher levels of alcohol use. These findings are consistent with hypotheses and generally in line with previous work on middle school students (Sullivan et al., 2006; Tharp-Taylor, 2009), importantly extending this work to an older adolescent sample. Again, it is not possible to determine whether experiences of overt PV led to a higher frequency of drinking and binge drinking, or whether adolescents who drink more often are more likely to be targets of overt PV. Nevertheless, overt PV appears to be associated with greater alcohol use.

Youth who reported greater cyber victimization also reported higher levels of alcohol use. This finding is consistent with previous work, adding to the very limited existing research on cyber victimization and adolescent drinking (Ybarra et al., 2007). As with smoking outcomes, gender and aggression did not affect the association between cyber victimization and alcohol use. This highlights the pervasive potential impact of cyber victimization; it appears to represent a risk factor for engagement in substance use, for boys and girls alike, and for aggressors and non-aggressors alike. Findings suggest that cyber victimization should be an important target for intervention.

In contrast to findings for cigarette use, greater overt PV was associated with a higher frequency of drinking and of binge drinking, regardless of gender and peer aggressor status. Such findings suggest that different risk factors may be involved in adolescents' use of different substances. Among high school students, drinking is more



normative than smoking (CDC, 2010), and thus individual characteristics (e.g., gender) and behaviors (e.g., peer aggression) may play a less important role in alcohol use. Many prevention efforts have been developed to reduce tobacco use, including government-funded media campaigns (e.g., Farrelly, Davis, Haviland, Messeri, & Healton, 2005; Wakefield, Flay, Nichter, & Giovino, 2003) and changes in public policy (Lantz et al., 2000). Given the large push to decrease tobacco use, adolescent smoking might be viewed as a relatively more externalizing and deviant behavior than drinking. As such, it may be the case that overt PV is associated with smoking only among a particular subgroup of youth (e.g., male, aggressive), whereas this association is less constrained regarding drinking. Findings emphasize the importance of studying and conceptualizing risk factors and processes for different health risk behaviors differently. Rather than considering substance use as one global outcome as has been done in previous research (e.g., Luk et al., 2010), current results suggest that PV may be differentially related to different health risk behaviors, depending on youth's other characteristics.

Of note, analyses for drinking outcomes were conducted on a subsample restricted to participants who endorsed having at least one drink in their lifetime. This subsample reported higher levels of all PV subtypes, all substance use behaviors, and were more likely to be boys and aggressors, compared to the entire sample. Thus, this subsample may have represented a more high-risk group than the larger population from which it was drawn. It is possible that gender and aggression do not moderate relationships between PV subtypes and drinking behaviors among youth who already endorse lifetime alcohol use. It is also possible that the lack of observed significant interactions may be due to reduced power due to fewer participants analyzed, although the subsample was

still sizable. Alternatively, the current data may suggest that risk factors for drinking behaviors are relatively simple, whereas more complex patterns emerge for smoking outcomes, where multiple factors are at play and interact with each other.

Overall, as with cigarette use, current data do not suggest that interpersonal PV plays an important role in youth's alcohol use. Although youth who reported higher levels of reputational PV also reported increased alcohol use, this pattern was no longer observed once cyber victimization was taken into account. It appears that while interpersonal PV appears to be related to internalizing problems, such as social anxiety and depressive symptoms (e.g., La Greca & Harrison, 2005), it may be a less relevant risk factor for engaging in health risk behaviors among older adolescents.

### **Implications for Alcohol Use Prevention and Intervention**

Study findings have important implications for reducing alcohol use among youth. Most substance use prevention programs focus on social influences, competence enhancement, or a combination of both (Botvin, 2000). For example, the Life Skills Training program (Botvin, Baker, Dusenbury, Botvin, & Diaz, 1995; Botvin, Baker, Dusenbury, Tortu, & Botvin, 1990), emphasizes education about drugs, and fostering skills related to drug-resistance, self-management, as well as social skills. The incorporation of strategies to cope specifically with negative peer interactions of a physical nature or those experienced via electronic media would be important in reducing rates of alcohol use. Findings suggest that overtly and cyber victimized youth, regardless of gender and their levels of aggression, may benefit from prevention efforts.

## **Limitations and Future Directions**

Despite the important contributions of the current study, findings should be interpreted with caution due to several study limitations. First, the data analyzed were cross-sectional, thus precluding any inferences with regards to directionality or causality. Although associations between certain PV subtypes and substance use outcomes were found, without a longitudinal design, it is not possible to determine whether PV experiences contribute to changes in health risk behaviors over time or whether adolescents' engagement in substance use may lead to further PV experiences. Future studies employing a longitudinal design will be important and necessary to answer questions regarding potential prospective and bidirectional relationships between PV and adolescent substance use.

Second, data from the current study were obtained solely via self-report measures, which have known limitations. Reports may have been influenced by social desirability or individual differences in accuracy of reporting. Although self-report measures of peer experiences are widely used among youth (e.g., Siegel et al., 2009; Storch et al., 2005) and youth are considered to be the most accurate reporters of their own health risk behaviors (e.g., La Greca & Lemanek, 1996), the use of multiple informants (especially peers) and/or additional measures of substance use (e.g., physiological measures), could be valuable and informative. Additionally, single items were used as outcomes. Although these YRBS items are widely used, future research that employs multiple item measures might improve assessment of youth's substance use.

Third, the current study did not assess and control for other important variables that have been related to adolescents' health risk behaviors. For example, peers'

substance use, peer crowd affiliation, and popularity are important predictors of youth's substance use (La Greca et al., 2001; Prinstein et al., 2011). Furthermore, measures of generalized stress or other stressors that could be contributing to substance use were not included. Future research might examine these issues more comprehensively.

A fourth limitation relates to the sample of youth analyzed. Participants without complete data were dropped from regression analyses. As these participants reported higher levels of reputational and overt PV, greater number of cigarettes smoked, and higher frequency of drinking and binge drinking than those with complete data, results should be interpreted with caution. Biases in missingness suggest that the sample analyzed may not be representative of the broader community of adolescents.

Additionally, the sample was composed of adolescents from diverse ethnic backgrounds, with the majority of participants self-identifying as Hispanic. This may limit the generalizability of findings; it would be important to replicate findings in other samples and examine potential ethnic differences that may exist. However, the ethnic composition of the current sample also represents a unique strength of this study. Most studies on PV and adolescent substance use have examined ethnically diverse but predominantly White samples (Luk et al., 2010; Mitchell et al., 2007; Tharp-Taylor et al., 2009; Ybarra et al., 2007). Ethnic minority youth merit greater attention as the relationship between PV and substance use may differ across ethnic groups. Hispanic and Black youth report less cigarette smoking than their White peers (CDC, 2010). Furthermore, some research suggests that ethnic minority youth report lower levels of PV than White youth (Juvonen, Graham, & Schuster, 2003; Nansel et al., 2001). Future research should examine cultural factors that may explain the association between PV

and substance use as well as cultural factors that may either exacerbate or mitigate potential effects of PV on substance use.

Another limitation is that the current study did not employ a screener item for cigarette use; therefore, analyses for smoking outcomes could not be restricted to youth who have tried cigarette smoking at least once in their lifetime. The *CVS-A* is not a previously validated measure, although preliminary data suggest that this is a valid and reliable measure of youth's online PV experiences. Future research might also examine peer aggression as a continuous rather than a dichotomous variable in order to more precisely understand how peer aggression moderates the relationship between PV and substance use.

An additional important avenue for future research includes longitudinal designs that assess changes over time, potential reciprocal relationships, as well as potential mediating variables, to help elucidate causal mechanisms at play. Current study findings were consistent with theoretical models of stress and substance use (Khantzian, 1985; Hussong & Chassin, 1994). These models would suggest that youth who experience greater PV, an interpersonal stressor associated with negative affect, would be more likely to use substances as a maladaptive way to reduce distress. However, future research that more directly tests these models by examining potential mediators, such as depressive symptoms and anxiety symptoms, will be important. PV has been associated with depressive symptoms (Fredstrom et al., 2011; Perren et al., 2010) and social anxiety (Dempsey et al., 2009; Siegel et al., 2009; Storch et al., 2005). Depressive symptoms and anxiety symptoms, in turn, have also been associated with increased substance use among youth (Frojd, Ranta, Kaltiala-Heino, & Marttunen, 2011; McCarty, Rhew, Murowchick,

McCauley, & Stoep, 2011; Torikka, Kaltiala-Heino, Rimpela, Rimpela, & Rantanen, 2001). Therefore, these mental health indicators represent candidate mediators worth further investigation. One study demonstrated that the relationship between general PV and substance use was mediated by depressive symptoms among girls but not boys (Luk et al., 2010), a finding that requires replication. Future research that also specifically examines the role of various coping strategies used to manage negative affect associated with PV is important and desirable.

### **Conclusions**

Despite its noted limitations, the current study has notable strengths, and makes significant contributions to the limited existing literature on PV adolescent substance use. It addressed important gaps in the current literature, by examining subtypes of PV, including cyber victimization, in a sample of older youth, and examining gender and peer aggression as moderating variables. Results point to a complex picture and nuanced relationships between PV experiences and substance use among youth. Overt PV and cyber victimization appear to be particularly relevant experiences associated with substance use. Furthermore, boys who are aggressive and experience high levels of overt PV and/or low levels of relational PV appear to be most at risk for engaging in cigarette use.

Findings highlight the need to distinguish between subtypes of PV and different types of substances. While interpersonal forms of PV appear to be related to internalizing outcomes (La Greca & Harrison, 2005; Siegel et al., 2009; Storch et al., 2005), overt PV and cyber victimization appear to be more closely related to substance use, which may be viewed as a more externalizing outcome. Patterns for smoking

outcomes differed from those observed for drinking outcomes. Additionally, the current study underscores the importance of considering moderating variables, such as gender and aggression, in order to gain a more complete picture of the relationships at play.

Findings have important implications for efforts to reduce adolescent substance use. While some existing adolescent substance use prevention programs address peer-related issues, such as fostering appropriate social skills to resist peer pressure (Botvin et al., 1990; Botvin et al., 1995; Wiehe et al., 2005), they do not seem to specifically address issues of PV. As PV represents a common and negative experience linked with substance use, it merits attention in intervention programs. Moreover, from a public health perspective, interventions to reduce PV may be important to improve not just mental health, but also physical health and health risk behaviors among youth. In sum, the current study provides a more precise understanding of the risk factors associated with adolescent substance use, may allow for better identification of youth at risk for engaging in substance use, and suggests relevant issues to incorporate in substance use prevention and intervention programs.

*Table 1.* Significant Differences between Adolescents With and Without Complete Data on Key Study Variables

	<b>Mean (SD) for Adolescents with Complete Data (<i>n</i> = 811)</b>	<b>Mean (SD) for Adolescents with Missing Data (<i>n</i> = 262)</b>
Reputational PV	1.48(.69)	1.58(.72)
Overt PV	1.29(.48)	1.43(.58)
Overt aggression	1.25(.52)	1.36(.58)
Number of cigarettes smoked	.15(.59)	.35(1.03)
Frequency of drinking	.71(1.08)	.92(1.34)
Frequency of binge drinking	.35(.88)	.56(1.16)
Gender	.61(.49)	.49(.50)
School	.24(.43)	.15(.36)



*Table 2.* Significant Differences between Adolescents Who Endorsed and did not Endorse Lifetime Drinking on Key Study Variables

	<b>Mean (SD) for Non-Drinkers (n = 247)</b>	<b>Mean (SD) for Drinkers (n = 564)</b>
Relational PV	1.57(.61)	1.67(.62)
Reputational PV	1.39(.64)	1.52(.70)
Overt PV	1.22(.40)	1.32(.51)
Cyber victimization	1.18(.23)	1.26(.31)
Relational aggression	1.39(.47)	1.61(.58)
Reputational aggression	1.14(.36)	1.22(.44)
Overt aggression	1.14(.37)	1.30(.56)
Cyber aggression	.07(.25)	.18(.39)
Aggressor (0 = non-aggressor)	.15(.35)	.31(.46)
Frequency of smoking	.02(.24)	.26(.86)
Number of cigarettes smoked	.03(.31)	.20(.67)
Frequency of drinking	.03(.20)	1.00(1.17)
Frequency of binge drinking	0.00(0.00)	.50(1.01)
Gender (0 = boys)	.66(.47)	.59(.49)

Table 3. Means and Standard Deviations of Study Variables

<b>Variable</b>	<b>Mean (SD) for Total Sample <i>n</i> = 811</b>	<b>Mean (SD) for Drinker Subsample <i>n</i> = 564</b>	<b>Range for Total Sample</b>
Age	15.79 (1.21)	15.82(1.21)	13-19
Overt PV	1.29 (.48)	1.32(.51)	1-4.33
Relational PV	1.64 (.62)	1.67(.62)	1-4.67
Reputational PV	1.48 (.69)	1.52(.70)	1-5
Cyber PV	1.23 (.29)	1.26(.31)	1-5
Overt aggression	1.25 (.52)	1.30(.56)	1-5
Relational aggression	1.55 (.56)	1.61(.58)	1-4.33
Reputational aggression	1.19 (.41)	1.22(.44)	1-.433
Cyber aggression	.16 (.15)	.18(.15)	0-1
Frequency of smoking	.19 (.73)	.26(.86)	0-6
Number of cigarettes	.15 (.59)	.20(.67)	0-5
Frequency of drinking	.71 (1.08)	1.00(1.17)	0-6
Frequency of binge drinking	.35 (.88)	.50(1.01)	0-6
Lifetime alcohol use	2.14 (2.14)	3.08(1.93)	0-7
Frequency of smoking (log)	.04 (.14)	.06(.16)	0-.85
Number of cigarettes (log)	.03 (.12)	.05(.14)	0-.78

Table 4. Frequencies and Amount of Cigarette and Alcohol Use

<b>Substance Use in Past 30 Days</b>	<b>% Endorsed</b>
Frequency of smoking	
None in the past 30 days	90.9
1-2 days	4.7
3-5 days	1.5
6-9 days	1.5
10-19 days	.9
20-29 days	.2
All 30 days	.4
Number of cigarettes smoked per day	
None	92.0
< 1	3.9
1	1.7
2-5	1.8
6-10	.4
11-20	.1
> 20	0.0
Frequency of drinking	
None in the past 30 days	58.9
1-2 days	23.9
3-5 days	9.1
6-9 days	4.7
10-19 days	2.6
20-29 days	.4
All 30 days	.4
Frequency of binge drinking	
None in the past 30 days	81.4
1-2 days	10.4
3-5 days	3.0
6-9 days	3.8
10-19 days	.9
20-29 days	.4
All 30 days	.2

Table 5. Bivariate Correlations Among Key Study Variables ( $n = 811$ )

	1	2	3	4	5	6	7	8	9
1. Overt PV	1								
2. Relational PV	.27***	1							
3. Reputational PV	.47***	.37***	1						
4. Cyber PV	.41***	.43***	.53***	1					
5. Aggressor status	.42***	.25***	.34***	.40***	1				
6. Frequency of smoking <sup>1</sup>	.18***	-.01	.07	.14***	.16***	1			
7. Number of cigarettes <sup>1</sup>	.14***	-.02	.04	.09	.13***	.88***	1		
8. Frequency of drinking	.16***	.07	.13***	.24***	.26***	.38***	.34***	1	
9. Frequency of binge drinking	.19***	.07	.17***	.27***	.24***	.48***	.44***	.78***	1

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

<sup>1</sup>log transformed variable

Table 6. Summary of Regression Analyses Examining Aim # 1: Associations between Traditional Subtypes of Peer Victimization and Cigarette Use

	Frequency of smoking			Number of cigarettes		
	$\Delta R^2$	$\beta$	Final $\beta$	$\Delta R^2$	$\beta$	Final $\beta$
<i>Step 1</i>	.02*			.02*		
Age		.06	.07		.08*	.09**
Gender (boys = 0)		-.08*	-.06		-.06	-.04
Black		-.03	-.04		-.04	-.05
Asian		.03	.01		.02	.01
White		.03	.02		.00	-.00
School		-.05	-.05		-.05	-.04
<i>Step 2</i>	.03***			.02***		
Overt PV		.18***	.18***		.14***	.16**
<i>Step 3</i>	.00			.00		
Relational PV		-.05	-.05		-.05	-.05
Reputational PV		.03	.03		.00	-.00

Note: \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Table 7. Summary of Regression Analyses Examining Aim # 1: Associations between Traditional Subtypes of Peer Victimization and Alcohol Use

	Frequency of drinking			Frequency of binge drinking		
	$\Delta R^2$	$\beta$	Final $\beta$	$\Delta R^2$	$\beta$	Final $\beta$
<i>Step 1</i>	.03*			.03*		
Age		.04	.07		.05	.07
Gender (boys = 0)		.00	.01		-.02	-.02
Black		-.05	-.06		-.08	-.11*
Asian		-.02	-.03		.01	-.00
White		.02	-.01		.07	.05
School		.16**	.15**		.09	.10*
<i>Step 2</i>	.03***			.04***		
Overt PV		.17***	.11*		.21***	.16***
<i>Step 3</i>	.00			.01		
Relational PV		-.03	-.08		-.05	-.05
Reputational PV		.05	-.04		.12*	.12*

Note: \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Table 8. Summary of Regression Analyses Examining Aim # 2: Associations between Cyber Victimization and Substance Use

	Frequency of smoking		Number of cigarettes		Frequency of drinking		Frequency of binge drinking	
	$\Delta R^2$	Final $\beta$	$\Delta R^2$	Final $\beta$	$\Delta R^2$	Final $\beta$	$\Delta R^2$	Final $\beta$
<i>Step 1</i>								
Age		.07*		.10**		.07		.08
Gender (boys = 0)		-.06		-.03		.01		-.02
Black		-.04		-.05		-.06		-.09*
Asian		.01		.01		-.03		-.01
White		.02		-.01		-.01		.04
School		-.06		-.05		.15**		.08
<i>Step 2</i>								
Overt PV		.15***		.14**		.11*		.12*
<i>Step 3</i>								
Relational PV		-.09		-.08		-.08		-.10*
Reputational PV		-.02		-.03		-.04		.03
<i>Step 4</i>								
Cyber victimization	.01**	.14**	.01*	.10*	.03***	.23***	.03***	.24***

Note: \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Table 9. Summary of Regression Analyses Examining Aim # 3: Associations between Subtypes of Peer Victimization, Gender x Peer Victimization Interactions, and Substance Use

	Frequency of smoking		Number of cigarettes		Frequency of drinking		Frequency of binge drinking	
	$\Delta R^2$	Final $\beta$	$\Delta R^2$	Final $\beta$	$\Delta R^2$	Final $\beta$	$\Delta R^2$	Final $\beta$
<i>Step 5</i>	.01**		.01**		.00		.00	
Gender x Overt PV		-.13**		-.14**		-.07		-.09
<i>Step 5</i>	.00		.00		.00		.00	
Gender x Relational PV		.06		.03		.10		.05
<i>Step 5</i>	.01		.01		.01		.00	
Gender x Reputational PV		-.17		-.14		.14		.02
<i>Step 5</i>	.01		.00		.00		.00	
Gender x Cyber victimization		-.10		-.05		.07		.01

Note: \*\*  $p < .01$ . \*\*\*  $p < .001$ .



Table 10. Summary of Regression Analyses Examining Aim # 4: Associations between Subtypes of Peer Victimization, Aggression x Peer Victimization Interactions, and Substance Use

	Frequency of smoking		Number of cigarettes		Frequency of drinking		Frequency of binge drinking	
	$\Delta R^2$	Step $\beta$	$\Delta R^2$	Step $\beta$	$\Delta R^2$	Step $\beta$	$\Delta R^2$	Step $\beta$
<i>Step 5</i>	.01**		.01**		.02***		.01**	
Aggressor (non-aggressor = 0)		.12**		.11**		.18***		.13**
<i>Step 6</i>	.01*		.01*		.00		.00	
Aggressor x Overt PV		.12*		.14*		.03		.02
<i>Step 6</i>	.01**		.01**		.01		.00	
Aggressor x Relational PV		-.13**		-.12**		-.10		-.08
<i>Step 6</i>	.00		.00		.00		.00	
Aggressor x Reputational PV		-.04		-.06		-.08		-.04
<i>Step 6</i>	.00		.00		.00		.00	
Aggressor x Cyber victimization		-.02		-.10		-.02		.01
<i>Step 6</i>	.02***		.02***					
Aggressor x Overt PV		.16**		.18**				
Aggressor x Relational PV		-.16**		-.15**				

Note: \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Table 11. Summary of Regression Analyses Examining Aim # 5: Associations between Subtypes of Peer Victimization, Aggression x Peer Victimization Interactions, and Cigarette Use Among Boys ( $n = 317$ )

	Frequency of smoking			Number of cigarettes		
	$\Delta R^2$	$\beta$	Final $\beta$	$\Delta R^2$	$\beta$	Final $\beta$
<i>Step 1</i>	.01			.02		
Age		.05	.08		.08	.12*
Black		.00	-.02		-.03	-.04
Asian		.04	-.01		.05	.01
White		.09	.09		.07	.07
School		-.04	-.06		-.04	-.06
<i>Step 2</i>	.06***			.05***		
Overt PV		.25***	-.07		.24***	-.10
<i>Step 3</i>	.02*			.01		
Relational PV		-.16*	-.11		-.14*	-.07
Reputational PV		.16*	.10		.10	.08
<i>Step 4</i>	.02*			.01		
Cyber victimization		.18*	.18*		.09	.08
<i>Step 5</i>	.03**			.02**		
Aggressor (non-aggressor = 0)		.20**	.20**		.17**	.17**
<i>Step 6</i>	.05***			.05***		
Aggressor x Overt PV		.32**	.32**		.38***	.38***
Aggressor x Relational PV		-.26**	-.26**		-.22**	-.22**

Note: \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Table 12. Summary of Regression Analyses Examining Aim # 5: Associations between Subtypes of Peer Victimization, Aggression x Peer Victimization Interactions, and Cigarette Use Among Girls ( $n = 494$ )

	Frequency of smoking			Number of cigarettes		
	$\Delta R^2$	$\beta$	Final $\beta$	$\Delta R^2$	$\beta$	Final $\beta$
<i>Step 1</i>	.02			.02		
Age		.06	.08		.08	.09
Black		-.05	-.06		-.04	-.04
Asian		.01	.02		-.02	-.01
White		-.03	-.03		-.05	-.05
School		-.08	-.09		-.06	-.08
<i>Step 2</i>	.01			.00		
Overt PV		.08	.08		.04	.05
<i>Step 3</i>	.00			.00		
Relational PV		-.01	.03		-.02	.03
Reputational PV		-.01	-.04		-.01	-.05
<i>Step 4</i>	.00			.00		
Cyber victimization		.08	.05		.08	.05
<i>Step 5</i>	.00			.00		
Aggressor (non-aggressor = 0)		.07	.09		.07	.10
<i>Step 6</i>	.01			.01		
Aggressor x Overt PV		-.03	-.03		-.05	-.05
Aggressor x Relational PV		-.10	-.10		-.12	-.12

Figure 1. Gender x Overt PV Interaction for Frequency of Cigarette Smoking.

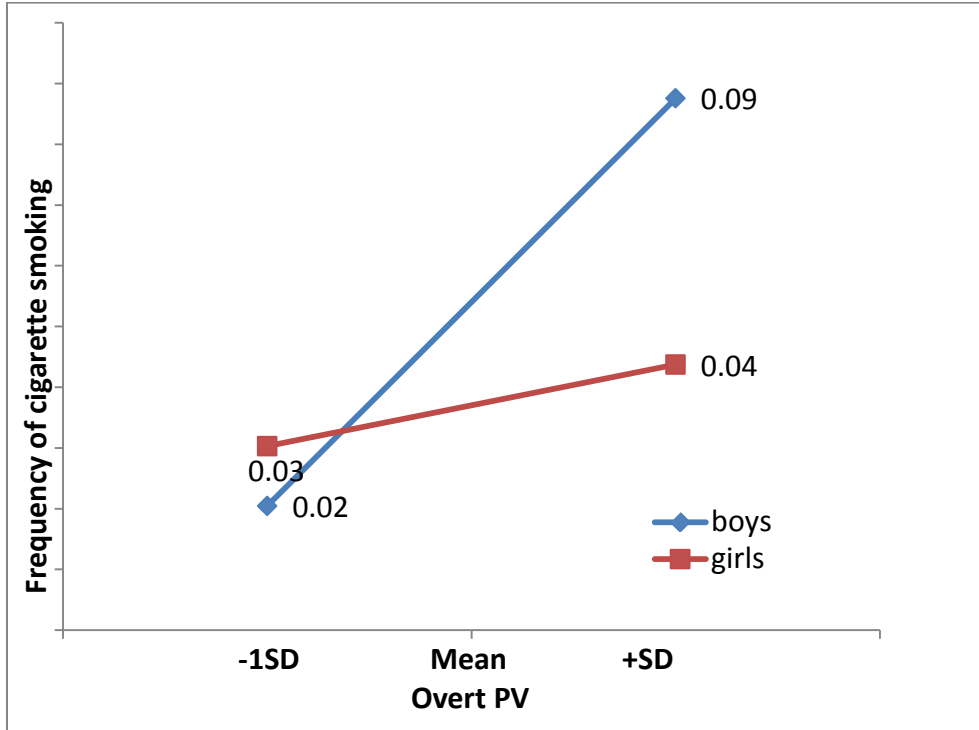


Figure 2. Gender x Overt PV Interaction for Number of Cigarettes Smoked.

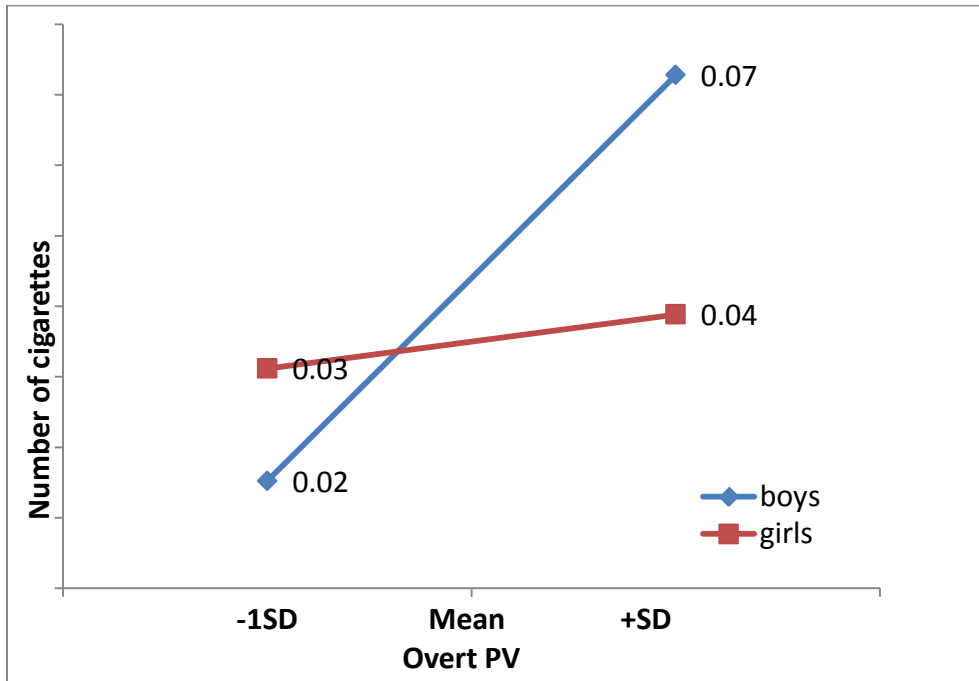


Figure 3. Aggressor x Overt PV Interaction for Frequency of Cigarette Smoking.

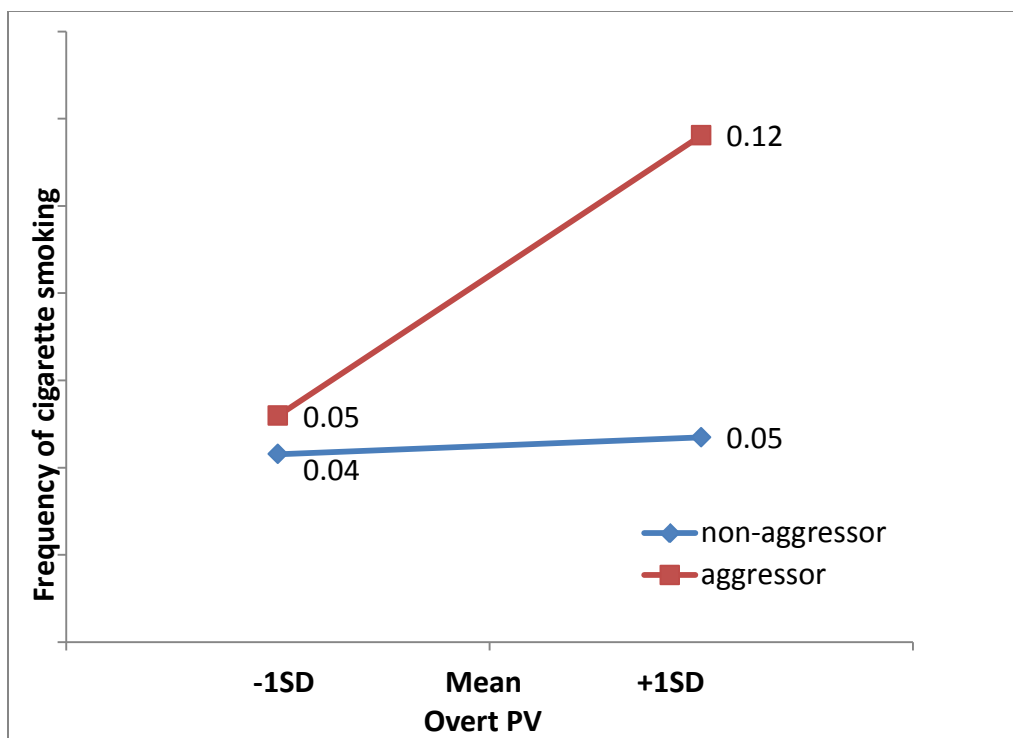


Figure 4. Aggressor x Relational PV Interaction for Frequency of Cigarette Smoking.

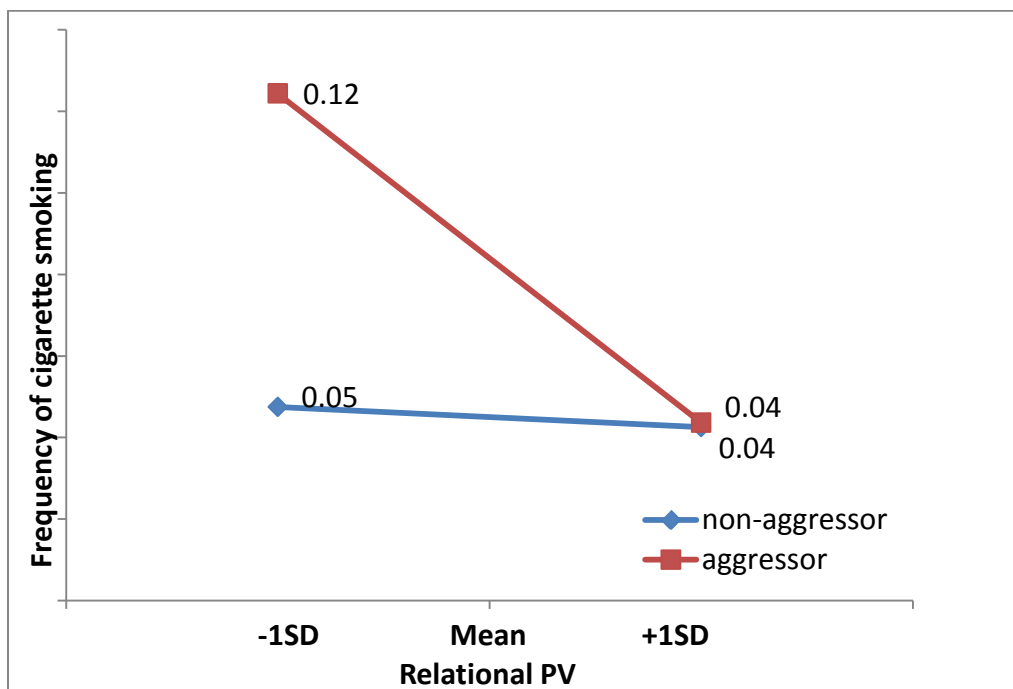


Figure 5. Aggressor x Overt PV Interaction for Number of Cigarettes Smoked.

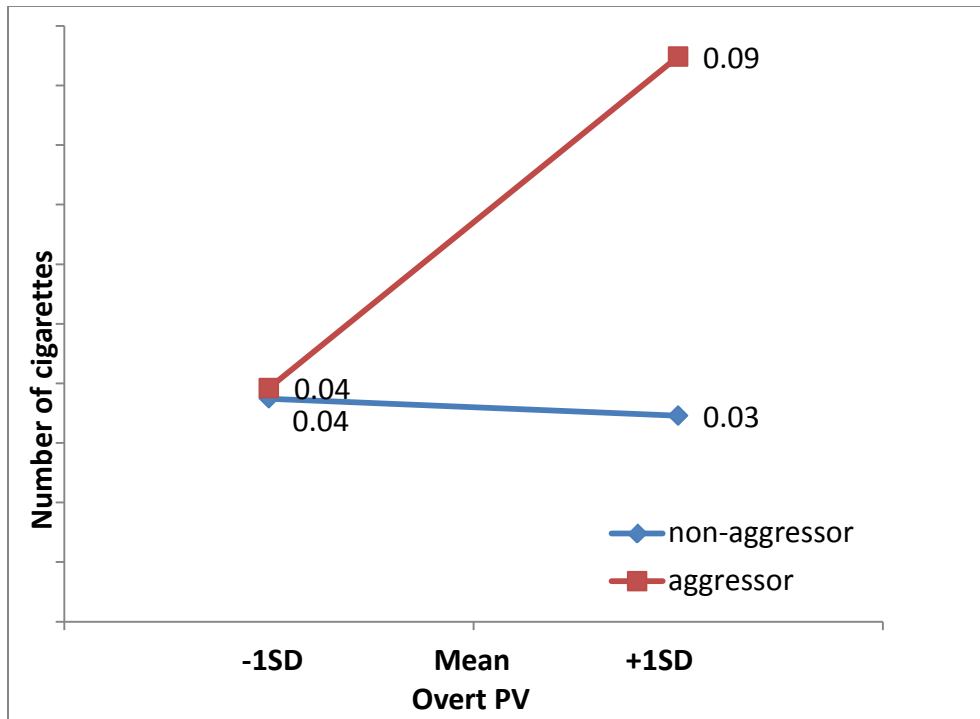


Figure 6. Aggressor x Relational PV Interaction for Number of Cigarettes Smoked.

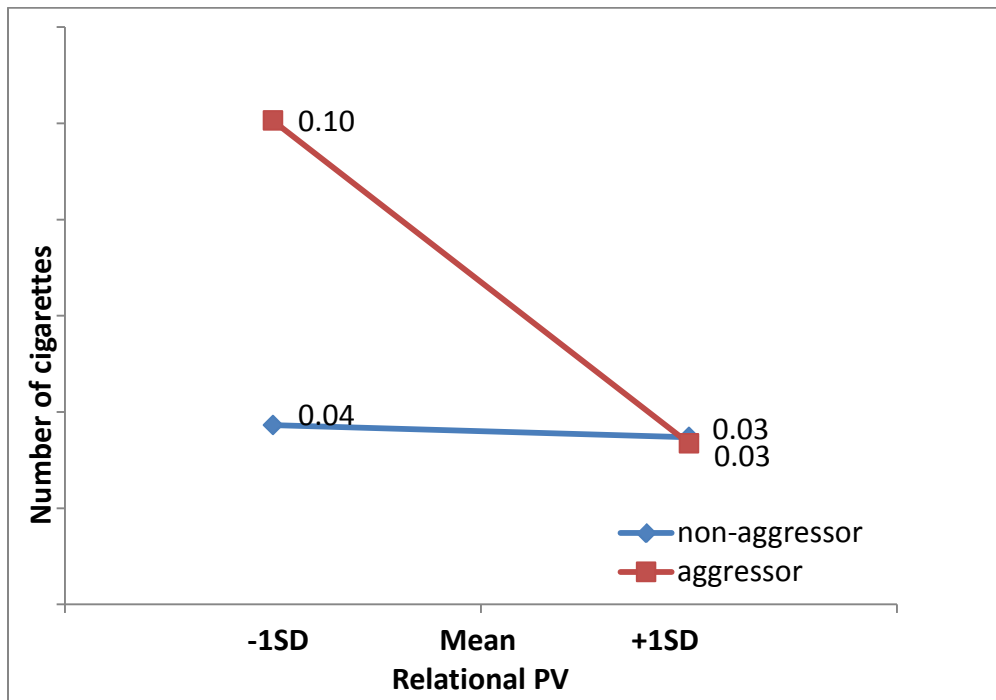


Figure 7. Aggressor x Overt PV Interaction for Frequency of Cigarette Smoking Among Boys.

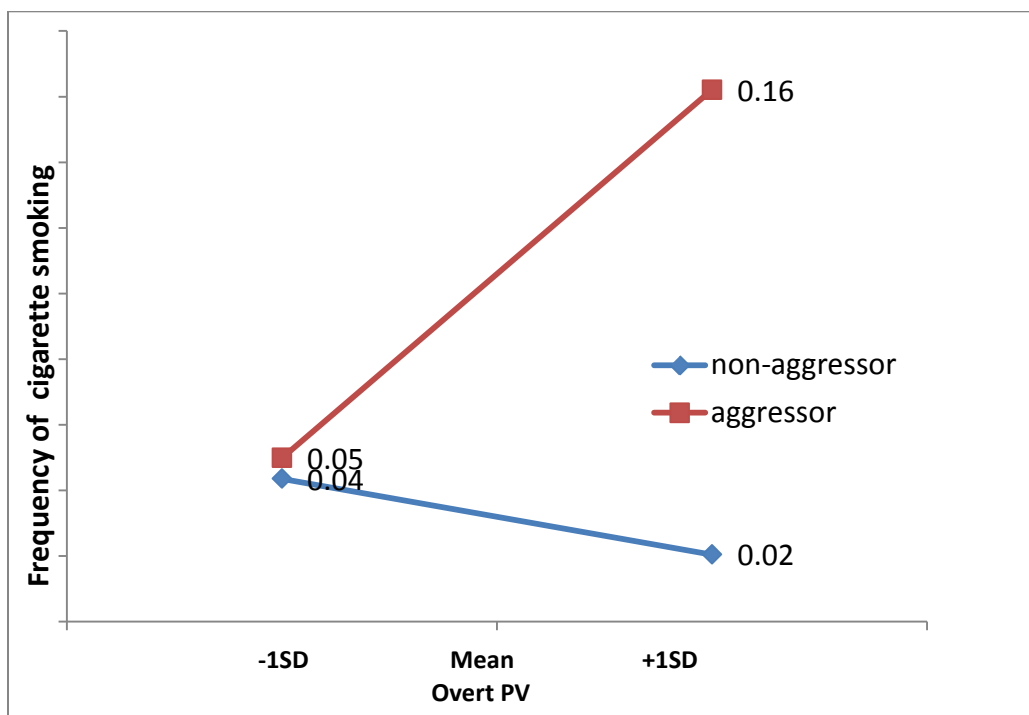


Figure 8. Aggressor x Relational PV Interaction for Frequency of Cigarette Smoking Among Boys.

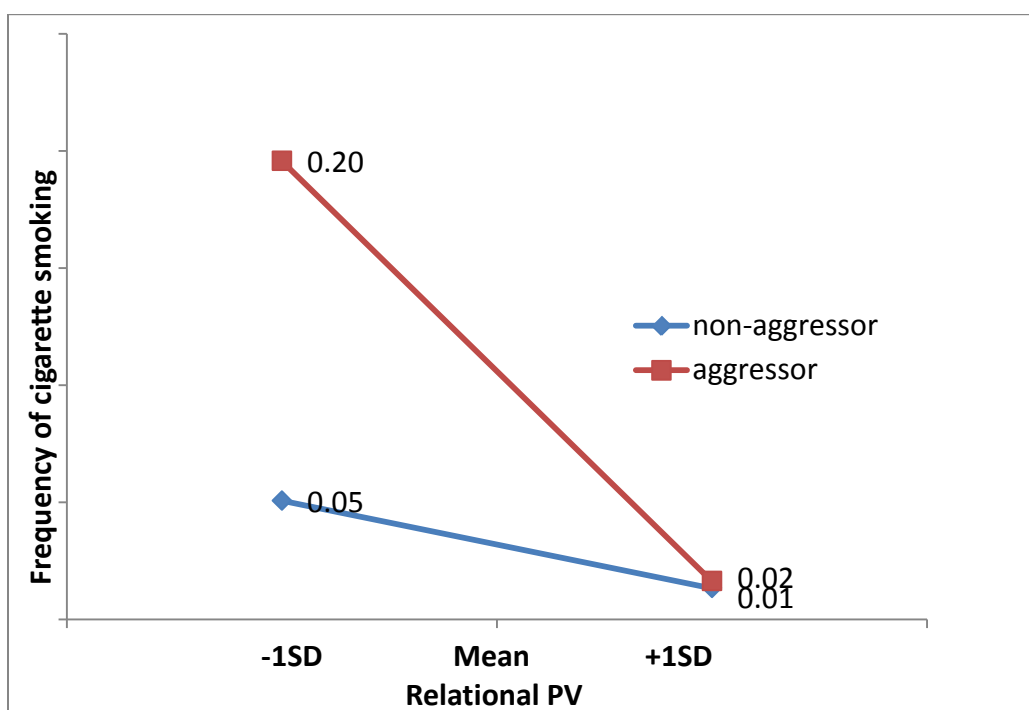


Figure 9. Aggressor x Overt PV Interaction for Number of Cigarettes Smoked Among Boys.

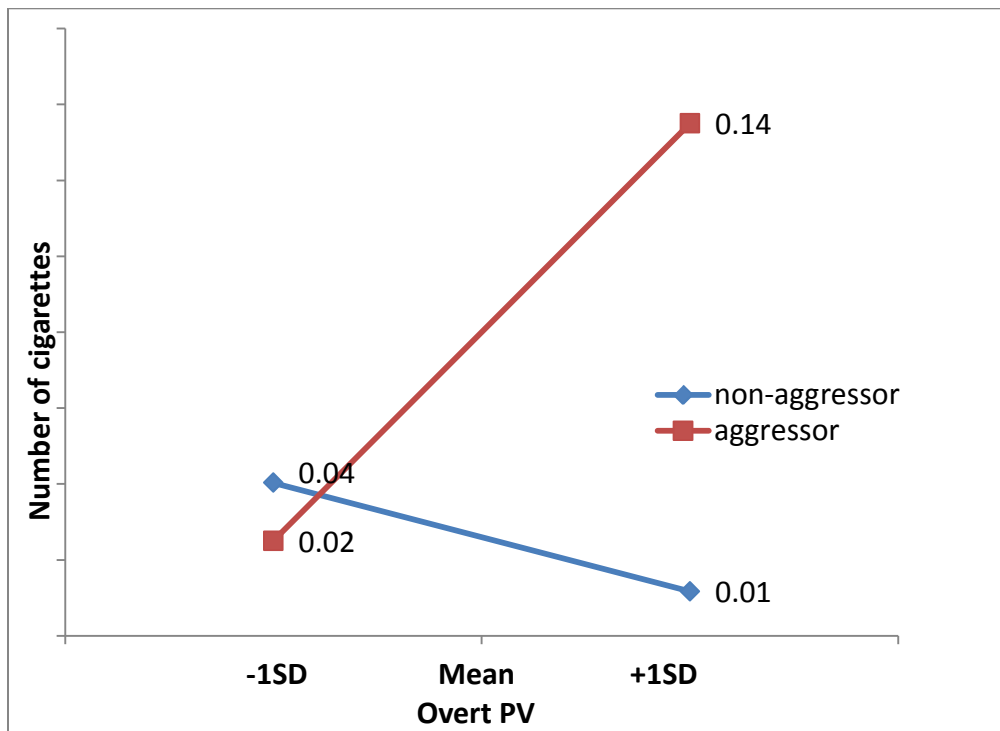
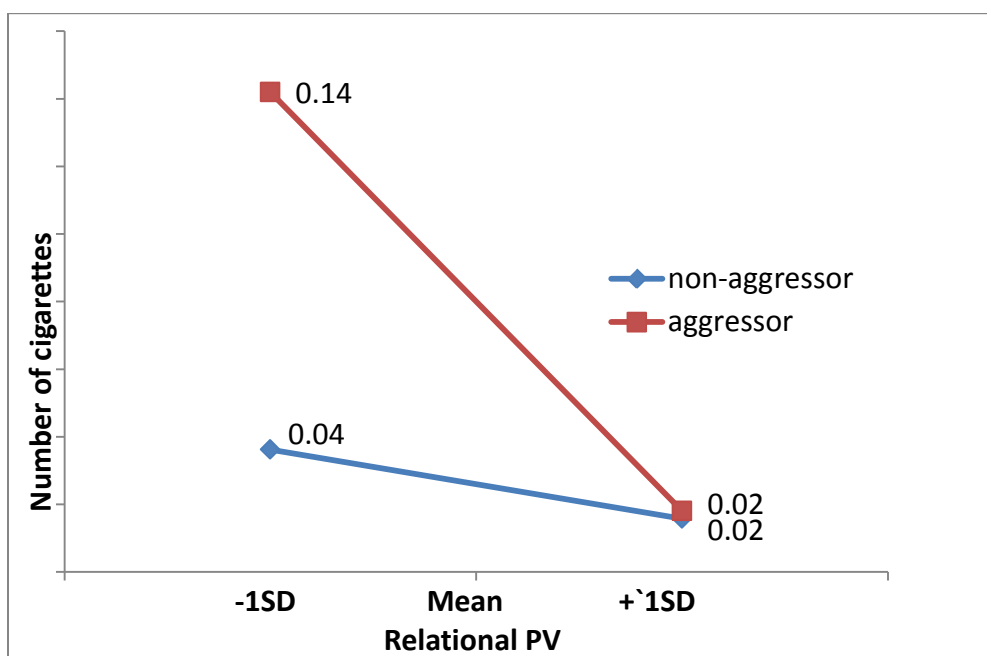


Figure 10. Aggressor x Relational PV Interaction for Number of Cigarettes Smoked Among Boys.





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**Appendix A: Background Information**

1. Sex                     Boy (Male)         Girl (Female)
2. Grade                 9                     10                     11                     12
3. Date of Birth (Month/Day/Year) \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_ Age: \_\_\_\_\_
- 4a. Are you of Hispanic/Latino descent?     Yes  No
- 4b. Are you of Caribbean descent?             Yes  No
- 4c. What is your racial background? Check the one that BEST fits your background.  
 White     Black     Asian
5. From the above descriptions (questions 4a-4c), which race/ethnicity do you identify with the most?  
\_\_\_\_\_
6. What language did you FIRST speak as a child? (circle)  
 English                     Spanish                     Other (explain)  
\_\_\_\_\_
7. Who do you currently live with?  
 Mom only  
 Dad only  
 Both parents  
 Mom and her significant other (e.g. step-parent)  
 Dad and his significant other (e.g. step-parent)  
 Other relatives  
 Other (explain) \_\_\_\_\_
8. How many brothers and sisters do you live with at home? \_\_\_\_\_

## Appendix B: R-PEQ

**These questions ask about some things that often happen between teens. Please rate how often you have done these things to others and how often these things have happened to you in the past two months.**

**How often has this happened to you?**

**How often have you done this to another teen?**

1. Some teens left me out of an activity or conversation conversation that I really wanted to be included in.

- a. Never
- b. Once or twice
- c. A few times
- d. About once a week
- e. A few times a week

I left another teen out of an activity or that they really wanted to be included in.

- a. Never
- b. Once or twice
- c. A few times
- d. About once a week
- e. A few times a week

2. A teen chased me like he or she was really trying hurt to hurt me.

- a. Never
- b. Once or twice
- c. A few times
- d. About once a week
- e. A few times a week

I chased a teen like I was really trying to hurt him or her.

- a. Never
- b. Once or twice
- c. A few times
- d. About once a week
- e. A few times a week

3. A teen helped me when I was having a problem.

- a. Never
- b. Once or twice
- c. A few times
- d. About once a week
- e. A few times a week

I helped a teen when they were having a problem.

- a. Never
- b. Once or twice
- c. A few times
- d. About once a week
- e. A few times a week

4. A teen I wanted to be with would not sit near me at lunch or in class.

- a. Never
- b. Once or twice
- c. A few times
- d. About once a week
- e. A few times a week

I would not sit near another teen who be with me at lunch or in class.

- a. Never
- b. Once or twice
- c. A few times
- d. About once a week
- e. A few times a week

5. A teen tried to damage my social reputation by spreading rumors about me.

- a. Never
- b. Once or twice
- c. A few times
- d. About once a week
- e. A few times a week

I tried to damage another teen's social spreading rumors about them.

- a. Never
- b. Once or twice
- c. A few times
- d. About once a week
- e. A few times a week

6. A teen was nice and friendly to me when I needed needed

I was nice and friendly to a teen when they

help.

- a. Never
- b. Once or twice
- c. A few times
- d. About once a week
- e. A few times a week

7. A teen did not invite me to a party or social event even though they knew that I wanted to go.

- a. Never
- b. Once or twice
- c. A few times
- d. About once a week
- e. A few times a week

8. A teen left me out of what they were doing.

- a. Never
- b. Once or twice
- c. A few times
- d. About once a week
- e. A few times a week

9. To get back at me, a teen told me that s/he would not be friends with me anymore.

- a. Never
- b. Once or twice
- c. A few times
- d. About once a week
- e. A few times a week

10. A teen stuck up for me when I was being on picked on or excluded.

- a. Never
- b. Once or twice
- c. A few times
- d. About once a week
- e. A few times a week

11. A teen gossiped about me so others would not like me.

- a. Never
- b. Once or twice
- c. A few times
- d. About once a week
- e. A few times a week

12. A teen threatened to hurt or beat me up.

- a. Never
- b. Once or twice

help.

- a. Never
- b. Once or twice
- c. A few times
- d. About once a week
- e. A few times a week

I did not invite a teen to a party or other though I knew the teen wanted to go.

- a. Never
- b. Once or twice
- c. A few times
- d. About once a week
- e. A few times a week

I left another teen out of what I was doing.

- a. Never
- b. Once or twice
- c. A few times
- d. About once a week
- e. A few times a week

I told a teen that I would not be friends with them anymore to get back at them.

- a. Never
- b. Once or twice
- c. A few times
- d. About once a week
- e. A few times a week

I stuck up for a teen who was being picked or excluded.

- a. Never
- b. Once or twice
- c. A few times
- d. About once a week
- e. A few times a week

I gossiped about a teen so others would not like him/her.

- a. Never
- b. Once or twice
- c. A few times
- d. About once a week
- e. A few times a week

I threatened to hurt or beat up a teen.

- a. Never
- b. Once or twice

- c. A few times  
d. About once a week  
e. A few times a week
13. A teen gave me the silent treatment (did not talk to me on purpose).  
a. Never  
b. Once or twice  
c. A few times  
d. About once a week  
e. A few times a week
14. A teen said mean things about me so that people would  
people would think I was a loser.  
a. Never  
b. Once or twice  
c. A few times  
d. About once a week  
e. A few times a week
15. A teen helped me join into a group or conversation.  
conversation.  
a. Never  
b. Once or twice  
c. A few times  
d. About once a week  
e. A few times a week
16. A teen hit, kicked, or pushed me in a mean way.  
way.  
a. Never  
b. Once or twice  
c. A few times  
d. About once a week  
e. A few times a week
17. A teen teased me in a mean way, by saying rude  
things or calling me bad names.  
a. Never  
b. Once or twice  
c. A few times  
d. About once a week  
e. A few times a week
18. A teen spent time with me when I had no one else to  
hang out with.  
a. Never  
b. Once or twice  
c. A few times  
d. About once a week  
e. A few times a week
- c. A few times  
d. About once a week  
e. A few times a week
- I gave a teen the silent treatment (did not talk to the teen on purpose).  
a. Never  
b. Once or twice  
c. A few times  
d. About once a week  
e. A few times a week
- I said mean things about a teen so that  
would think s/he was a loser.  
a. Never  
b. Once or twice  
c. A few times  
d. About once a week  
e. A few times a week
- I helped a teen join into a group or  
a. Never  
b. Once or twice  
c. A few times  
d. About once a week  
e. A few times a week
- I hit, kicked, or pushed a teen in a mean  
a. Never  
b. Once or twice  
c. A few times  
d. About once a week  
e. A few times a week
- I teased a teen in a mean way, by saying  
rude  
things or calling him or her bad names.  
a. Never  
b. Once or twice  
c. A few times  
d. About once a week  
e. A few times a week
- I spent time with a teen when they had no  
to hang out with.  
a. Never  
b. Once or twice  
c. A few times  
d. About once a week  
e. A few times a week

## Appendix C: CVS-A

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.**

<b>In the past month...</b>	<b>Never</b>	<b>Once or twice</b>	<b>A few times</b>	<b>About once a week</b>	<b>A few times a week</b>		<b>Did <u>you</u> do this to another peer?</b>	
							<b>Yes</b>	<b>No</b>
1. A peer I wanted to be friends with via electronic media ignored my friend request.*	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		<b>Yes</b>	<b>No</b>
2. A peer removed me from his/her list of friends via electronic media.*	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		<b>Yes</b>	<b>No</b>
3. A peer made me feel bad by not listing me in his/her “Top 8” or “Top Friends” list.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		<b>Yes</b>	<b>No</b>
4. A peer that I liked became my “friend” via electronic media.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		<b>Yes</b>	<b>No</b>
5. A peer posted mean things about me publicly via electronic media.*	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		<b>Yes</b>	<b>No</b>
6. A peer posted mean things about me anonymously via electronic media.*	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		<b>Yes</b>	<b>No</b>
7. A peer posted pictures of me that made me look bad via electronic media.*	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		<b>Yes</b>	<b>No</b>
8. A peer sent embarrassing pictures or videos of me to others via electronic media.*	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		<b>Yes</b>	<b>No</b>
9. A peer tried to get me in trouble with parents, teachers or others by posting pictures or comments about me via electronic media.*	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		<b>Yes</b>	<b>No</b>
10. A peer sent me a nice message via electronic media.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		<b>Yes</b>	<b>No</b>
11. A peer publicly spread rumors about me or revealed secrets I had told them via electronic media.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		<b>Yes</b>	<b>No</b>

12. A peer sent me a mean message via electronic media.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		<b>Yes</b>	<b>No</b>
13. A peer pretended to be me via electronic media and did things to make me look bad/damage my friendships.*	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		<b>Yes</b>	<b>No</b>
14. A peer prevented me from joining a group via electronic media that I really wanted to join.*	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		<b>Yes</b>	<b>No</b>
15. A peer posted pictures of me having fun and spending time with them via electronic media.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		<b>Yes</b>	<b>No</b>
16. A peer created a group via electronic media to be mean and hurt my feelings.*	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		<b>Yes</b>	<b>No</b>
17. I found out that I was excluded from a party or social event via electronic media.*	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		<b>Yes</b>	<b>No</b>
18. A peer I was dating broke up with me using electronic media.*	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		<b>Yes</b>	<b>No</b>
19. A peer made me feel jealous by “messing” with my girlfriend/boyfriend via electronic media.*	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		<b>Yes</b>	<b>No</b>
20. A peer complimented me publicly via electronic media.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		<b>Yes</b>	<b>No</b>

Note: items 4, 6, 8, 9, 10, 15, 16, and 20 were not included in the *CVS*

\*items included in the current study analyses

## Appendix D: 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 <b>past 12 months</b> , how many times have you:	0	1	2 or 3	4 or 5	6 or 7	8 or 9	10 or 11	12 or more
1. Gone on a diet to lose weight?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Been in a physical fight?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

During the <b>past 30 days</b> , 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
3. <b>Smoke cigarettes?</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. <b>Have at least one drink of alcohol?</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. <b>Have 5 or more drinks of alcohol in a row</b> , that is, within a couple of hours?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

During the <b>past 30 days</b> , 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
6. <b>How many cigarettes</b> did you smoke per day?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Have you ever:	Yes	No
7. <b>Smoked cigarettes daily</b> , that is, <b>at least one cigarette every day for 30 days?</b>	<input type="checkbox"/>	<input type="checkbox"/>

During <b>your life</b> , 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
8. <b>Have you had at least one drink of alcohol?</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>