EXPLORING ASSOCIATIONS BETWEEN SUBSTANCE USE AND ADOLESCENT DELINQUENCY:

AN ECOLOGICAL PERSPECTIVE

by

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ABSTRACT

Adolescent delinquency and substance use are significant concerns that influence youth development and overall well-being in the United States. This study focuses on adolescent substance use and delinquent behaviors. Particularly, it investigates relationships between three forms of adolescent substance use (social, hard, and non-medical prescription drugs) and delinquent behaviors. Although many recent studies have investigated the relationship between substance abuse and adolescent delinquency, few have explored moderating effects from an eco-systems perspective. To contribute to the existing knowledge, the present study investigates three potential moderating effects representing different layers of the ecological system in order to advance understanding of more complicated and multifaceted relationships between substance use and adolescent delinquency.

The sample of the present study was extracted from the National Survey on Drug Use and Health (NSDUH), 2017 (McCance-Katz, 2019). The survey involved a nationally representative sample of adolescents (*N=13,722*). The three previously mentioned forms of substance use were positively associated with both violent and theft delinquent behaviors. In addition, several factors were found to moderate the relationship between adolescent substance use and involvement with delinquent behaviors. Most importantly, positive drug prevention communication significantly moderated relationships between substance use and delinquency. Adolescent substance users who had ever received any positive drug prevention communication via mass media were less likely than those who had not received such messages to engage in both violent and theft behavior

The findings are highly relevant to social work practice, research, and policy related to substance use and adolescent delinquency. Whereas many interventions to reduce adolescent delinquency or to mitigate negative effects of substance use focus on the individual and the family, the study results illustrate that larger social systems, including systems delivering mass communication, such as social media, may also have potential to mitigate negative effects of adolescent substance use. Moreover, the findings suggest a number of future directions for further investigation of the role of family relationships and positive drug prevention communication in reducing adolescent substance use and delinquent behaviors in the United States.

LIST OF ABBREVIATIONS AND SYMBOLS

a Cronbach's index of internal consistency

df Degrees of freedom: number of values free to vary after certain restrictions have been placed on the data

F Fisher's F ratio: A ration of two variances

M Mean: the sum of a set of measurements divided by the number of measurements in the set

SD Standard deviation: a measure of the extent of variation for a group as a whole, calculated as the square root of variance

SE Standard Error: A measure of the statistical accuracy of an estimate, equal to the standard deviation of the theoretical distribution of a large population of such estimate

p Probability associated with the occurrence under the null hypothesis of a value as extreme as or more extreme than the observed value

r Pearson product-moment correlation

t Computed value of t test

< Less than

= Equal

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CHAPTER 1

INTRODUCTION

Adolescent delinquency is one of the most critical concerns influencing youth development and public health in the United States. Adolescent delinquency has been capturing attention from adolescent care providers, policymakers, many among the helping professions, including social work, and even the entire society due to its high prevalence rate and severe adverse effects on adolescent development and health. Theft and violent delinquent behaviors are both of great concern (Noyori-Corbett & Moon, 2010). An additional concern relates to connections between substance use and adolescent delinquency. It will be useful to better understand associations between substance-related risk factors and adolescent delinquency so that effective prevention and treatment programs can be developed. Prevention and treatment of adolescent substance use as a way to prevent serious behavioral problems and delinquency among adolescents has been heightened on the policy agenda in the United States (Asscher et al., 2014).

Over the past decades, scientific research experienced a significant paradigm shift that attempted to explore the relevant risk factors of delinquent behaviors to establish therapeutic intervention and prevention treatments among children and adolescents (Horstkötter et al., 2014). This dissertation first focuses on adolescent substance use and delinquent behaviors. Particularly, the dissertation investigates relationships between three forms of adolescent substance use (social, hard, and non-medical prescription drug use) and delinquent behaviors. Second, the study identifies factors from multiple levels of the adolescent ecosystem (i.e., family relationships and

positive drug prevention communication) to assess moderating effects on the relationship between substance use and adolescent delinquency in the United States.

Definition of Risk Factors

In social sciences, researchers seek to predict certain future outcomes as probabilities. Experiences, behaviors, or demographic characteristics can increase or decrease the probability of certain positive or negative outcomes, and combinations of factors can draw conclusions that children are at high risks of certain behaviors or at low risks of certain outcomes (Fraser et al., 2004; Williams et al., 2003). In other words, when the adolescents are exposed to factors associated with a higher likelihood of exhibiting adverse outcomes, the factors are labeled "risk" factors (Fraser et al., 2004). Risk factors can be contrasted with experiences, behaviors, and demographic characteristics associated with positive outcomes. Such positive factors are labeled "protective" factors. The understanding of risk factors associated with adolescent delinquent behaviors has been refined and rapidly developed. Although gender, age, and race/ethnicity were the prominent findings associated with adolescent delinquency, adolescents live in families located in communities, interact with peers in school, and communicate with broader society daily, including the use of social networks. Therefore, adolescent delinquency has both common and unique risk structures that vary with different individual characteristics, family conditions and structures, peers, schools, neighborhoods, communities, and contextual social conditions.

Overall, there are two common conditions researchers and scholars use to address behaviors among adolescents. First, when specific delinquent behaviors occur, researchers and scholars aim to identify which risk factors contributed to the delinquent behaviors. They then use the risk factors to try to predict future behaviors. Ideally, social work researchers and practitioners can establish and develop early interventions before negative behaviors happen, based on risk factors

they have observed. Second, social work researchers cannot discuss and ignore the risks of adolescent delinquency without considering environmental and social contexts. Parent, family, peer, school, neighborhood, and community environments place adolescents at greater risk of some behavioral issues (Fraser et al., 2004). Furthermore, there is no single risk factor that merely causes adverse behavioral outcomes; it is the cumulative and reciprocal effects of various risk factors that have a strong influence on adolescents (Fraser et al., 2004).

Hence, to achieve a comprehensive understanding of adolescent delinquent behaviors, all known risk factors should be considered in a comprehensive framework that incorporates both individual characters and contextual social conditions affecting behaviors among U.S. adolescents.

Prevalence of Delinquency among Adolescents

According to a national report based on a nationally-representative sample of adolescents from age 10 to 17 years, there were approximately 1,100 delinquency cases being processed in the juvenile court daily in the 1960s, and in 2015 there were almost 2,400 cases per day (Justice, 2015). Hence, the number of juvenile delinquency cases doubled in the last five decades. Still, the prevalence of juvenile arrests has been on a strong downward trend since the late 1990s. In 1996, the arrest rate for youth age 10-17 was about 8.5%, but by 2017, the arrest rate had fallen to about 2.4% (OJJDP, 2019). The overall rate of juvenile arrests can be broken down to look at participation in specific delinquent behaviors. For the most serious offenses in 2016, all of the adolescents who were arrested, approximately 7%, were arrested for murder, an increase since 2012. Of juveniles arrested, 20% of them were involved in robbery, motor vehicle crimes, or vandalism (Puzzanchera, 2018). Puzzanchera noted that, according to a national report of juvenile justice statistics, among all adolescents arrested, 12% of them were arrested for using a

weapon and nearly 22% of them engaged in a drug abuse or liquor law violation. On a positive note, violent crimes such as robbery and aggravated assault, presented a linearly decreasing trend from 2011 to 2016. Although the juvenile arrest rate of drug law violations in 2016 was the lowest level since the early 1990s (Puzzanchera, 2018), it is still of concern that 22% of arrested juveniles engaged in a drug or liquor law violation. This statistic suggests that it is worthwhile to identify factors that could moderate a relationship between adolescent substance use and juvenile delinquency.

As for substance use, 9.5% of adolescents reported they first tried cigarette smoking before they were 13 years old, and 8.8% of adolescents in the United States had smoked a cigarette at least once during the 30 days before the survey (Kann et al., 2017). Moreover, 2.6% of adolescents reported had smoked cigarettes more than 20 days during the 30 days before the survey. Nationwide, 29.8% of adolescents reported current alcohol use and 19.8% reported recent marijuana use (Kann et al., 2017). In 2017, approximately 2.0 million (7.9%) of adolescents aged between 12 and 17 years used illicit drugs in the United States, while 6.5% used marijuana (Bose et al., 2018). This means that 1.6 million adolescents used marijuana in high school in the United States, which is similar in 2015 and 2016 (Bose et al., 2018). In addition, nearly 19% of high school adolescents have used prescription pain relievers without a doctor's prescription or more often than with a doctor's prescription in the United States (Kann et al., 2017). Among use of non-medical prescription pain relievers in adolescents, 3.1% of the population reported non-medical prescription opioid use in the past year (Bose et al., 2018).

CHAPTER 2

CONCEPTUAL FREAMEWORK

Ecological Systems Theory in Social Work

The Person in Environment (PIE).

Social work has long and proud traditions of understanding human behavior and complexities in the human environment (Gitterman & Heller, 2011). The person-in-environment is the subject of attention in both social work practice and research (Meyer, 1983). Meyer (1983) also indicated that the living environment is embedded in the individual's total ecological and physical environment. The person in environment (PIE) perspective helps social work practitioners and scholars to be aware of the importance of understanding behaviors in light of the environmental contexts where a person lives (Kondrat, 2008). PIE considers different life and environmental stressors, such as, social, economic, political, historical, religious, cultural, and familial, that are related to individual behavior and the reciprocal relationships between individual behaviors and the environment (Kondrat, 2008). Therefore, PIE perspectives provide a broad framework for ecological system theory.

Ecological Systems Theory.

Ecology is the means by which science focuses on the adaptive fit of organisms and their environments to achieve dynamic balance and interrelationships (Germain, 1973). The ecological systems theory provides a dynamic view for understanding how humans interact with a diverse environment (Miley et al., 2016; Shulman, 2012). Germain (1973) believed that the purpose of ecological systems theory is to improve environments to support human well-being. Therefore,

ecological systems theory contributes substantially to social work by considering the delicate and reciprocal relationships of human beings to the rapidly changing physical and social environment. An ecosystems approach helps social work scholars and practitioners view adolescent behaviors from an interactional, structural, biopsychosocial, and cultural perspective. A systems approach reveals entry points for social work practitioners, researchers, and adolescents themselves to initiate changes in delinquent behaviors (Miley et al., 2016). Additionally, the ecological perspectives enable social work researchers to achieve complementarity between scientific and humanistic concerns regarding cause and functions (Germain, 1973).

In summary, ecological systems theory not only provides a contextual perspective on human behavior, but also directs focus to the reciprocal relationship between an individual and the environment (Antakly, 2005). Therefore, a central task of social work professionals is to change dysfunctional relationships between individuals and the environment.

The founder of ecological systems theory, Urie Bronfenbrenner, believed that children's development was profoundly shaped by family, school, peer, neighborhood, and community context (Bronfenbrenner, 1986, 1992). Children's development is nested in and interacts with different social systems. For instance, a child usually grows up in a family located in a neighborhood. A neighborhood often resides in the broader community. Also, children live in a family; attend school, socializing with teachers and peers; and, later, will work in a community. Therefore, each system will exert influences on children. Children's behaviors are also shaped by each system. The ecological perspective focuses on these linkages and how a change in a system could affect adolescent behaviors in the system (Meyer, 1983). In sum, the bundling of risks from diverse systems can exert a cumulative effect on children's behaviors.

Microsystem.

The first level of systems in ecological systems theory is the microsystem. The microsystem refers to adolescents' biological conditions, such as brain development, delinquent beliefs, attitudes, and, most relevant to the present study, the parent-child relationship.

The parent-child relationship plays a crucial role in violent behaviors among children. Children who receive better monitoring from their parents tend to do better emotionally, physically, and psychologically in pro-social behaviors than those who lack monitoring from their parents (Masten & Coatsworth, 1998). A study showed that a high level of monitoring from parents could help moderate the effects of bullying on internalizing problems among adolescents (Ledwell & King, 2015). Strong parental monitoring can protect students from bullying in physical, verbal, relational, and cyber environments. In other words, better parental monitoring is negatively associated with bullying behaviors among school-aged adolescents (Wang et al., 2009). A strong parent-child relationship is another protective factor against delinquent behaviors (Fulkerson et al., 2008; Li et al., 2000; Singer et al., 1999), including even carrying a weapon to school (Vaughn et al., 2016). Another study indicated that students from two-parent households had a lower likelihood of exhibiting violent behaviors than those who did not have a two-parent household (Bailey et al., 1997; May, 1999), perhaps reflecting the effects of parental monitoring.

Mezzosystem.

Mezzosystem, the second level in the ecological systems theory, focuses on interactions between settings (Bronfenbrenner, 1977). Farineau (2016) discussed Bronfenbrenner's (1979) mezzosystem as the system considered to be the interaction between microsystems, but also hav-

ing independent influences on adolescent development (Farineau, 2016). Negative peer relationships can be a significant risk factor for delinquent behaviors among children and adolescents. Children who experience bullying from their peer group have a higher likelihood of delinquent behaviors (Begue et al., 2016). Children who reported higher levels of delinquent behaviors had a higher risk of exposure to violence and violence victimization, especially for physical bullying, which was positively significant associated with delinquent and violent behaviors (Farrell & Flannery, 2006). Moreover, children affiliated with more delinquent peers had a higher likelihood of exhibiting violent behaviors (Brennan & Moore, 2009). Also, recent research reveals that children who reported less violent behaviors had less deviant peer affiliations (Bernat et al., 2012). Studies demonstrated that children who had more pro-delinquent beliefs or delinquent peers tend to have more physical, violent behaviors (Begue et al., 2016; Shetgiri et al., 2016).

Exosystem.

Exosystem, the third level of ecological system theory, is the developmental settings in contexts, and compromises two or more settings in the system (Bronfenbrenner, 1977; Bronfenbrenner, 1994). Adolescents may not be directly involved in the exosystem, but it projects great influences on adolescents' development and functioning (Farineau, 2016), and includes factors such as social services, mass media, and social networking. Mass media contributes to public fears of youth crime through new coverage (Ruigrok et al., 2017). For instance, the mainstream news media loop reported the Parkland, Florida, school shooting thematically (Sanchez, 2018). The over-reporting of youth crime in the mass media may shape and harden public opinion about adolescents. News coverage might also provide a way for those adolescents who have delinquent beliefs and attitudes to mimic delinquent or violent behaviors. Hence, the

exosystem, even if adolescents may not be involved in it directly, can exert significant influences on adolescent behaviors.

Macrosystem.

The macrosystem is considered the highest level in ecological systems theory. It refers to the expansive environment related to social structures, power, and the cultural milieu people live in (Farineau, 2016; Weng et al., 2016). For instance, racial/ethnic stereotypes and social labeling are always held by American culture. The public tends to be more tolerant of Caucasian-White adolescents than African American adolescents for certain types of crimes. This might be one of the plausible explanations of why African American adolescents are overrepresented in the criminal justice system (Martin et al., 2011).

Therefore, social settings in the macrosystem focus on the consequences of community-concentrated disadvantages, racial isolation, and community disorganization (Martin et al., 2011). Furthermore, exposure to a disorganized community is significantly associated with delinquent behaviors among adolescents. For example, a study of adolescents from two different communities revealed that children living in a highly aggressive or violent community were more likely to exhibit delinquent behaviors (Duran-Bonavila et al., 2017). Similar results indicated that an adverse community had a disadvantageous impact on adolescent's delinquent and criminal behaviors (Intravia et al., 2017).

The Vital Role and Implications of Ecological Framework in Social Work Research.

The ecological systems theory has long been applied in social work practice to eliminate life stressors for clients and groups and to mobilize and draw on personal and environmental resources for effective coping, as well as to promote physical environmental forces in response to clients' needs (Antakly, 2005). The ecological systems theory is not only a framework

contributing to social work practice, but it also makes important contributions to social work research.

Bronfenbrenner indicated that ecological systems theory provides social work scholars with empirical evidence of systematical divergence and of the total pattern of reciprocal relationships in adolescents' development in the environment they live in (Bronfenbrenner, 1977). In the general ecological framework, Bronfenbrenner (1994) believed that, in the early phase of human development, adolescents are involved in progressively complex reciprocal interactions among the biopsychological human organism, social group and settings, and the environment. The reciprocal interactions of adolescents are enduring. The form, content, and direction of the proximal process are three important forces which affect reciprocal interactions in different and nested systems in an environment of adolescents' functioning and development (Bronfenbrenner, 1994).

Ecological systems theory inspires the present study to investigate the empirical relationships between the person and context, and to explore the effects of multiple risk factors on adolescent delinquent behaviors. The present study focused on micro-level risk factors, mezzo-level risk factors, and risk factors in the exosystem, as possible moderators of the associations between substance abuse/misuse and adolescent delinquency in the United States. Risk and/or protective factors in the micro-level, mezzo-level, and exosystem project more direct influences on adolescent development than risk factors in the macro system, including economics, political system, and legal system. Macro system factors are certainly critical, but they are not investigated in the present study.

CHAPTER 3

LITERATURE REVIEW

Environmental Resilience and Risk Perspectives of Adolescent Delinquency

Ecological systems theory predicts adolescent's delinquent behaviors by considering the influences of risk and protective factors in multiple ecological systems (Traube et al., 2012b). Protective and risk factors can be drawn from different domains in life and from multiple ecological systems, including community, social media, school, family relationship, peer relationship, and the individual condtions (Oesterle et al., 2012). Perspecitves of person-in-environment reflect the timing of life events that are influenced by changes of economics, politics, historical events, and even social structures, and adolescents have to meet these social stressors to be resilient in their behaviors (Greene, 2013). After expounding on the indiviual-environmental interactions and exchanges above, the enviromental factors should be the starting point of investigating adolescent delinquency, rather than the focus being on adolecent genetic risks (Rutter, 2006).

Rutter (2006) pointed out that resilience was a new dimension of the risk and protective factors of adolescent delinquency that combines the childhood risk experiences and relatively later positive psychological and behavioral outcomes in spite of the adversities. In addition, Rutter explained that the mechanism of resilience of delinquency, first, may come from exposure to environmental risks in a controlled condition, not the rejection of risks, and second, protection may originate from either neutral or risky behavior in the absence of key environmental hazards (Rutter, 2006).

Regarding resilience factors of adolescent delinquency, previous studies addressed the impacts of social influence or social relationships on adolescent delinquent behaviors, rather than on individual characteristics. For example, Walters (2018) indicated that positve social influences had a higher likelihood of less subsequent delinquent behaviors, while the negative social influences were associated with higher involvement of delinquent behaviors. Walters (2018) also explained that juvenile delinquents may experience more negative social influences and fewer positive social influences, with a rapid increase of criminal behaviors in early adolescence, compared to those who were not engageing in delinquent behaviors. Moreover, according to the earlier study, Rutter (1987) indicated that if the interactions of risk and protective factors facilitated the outcomes when stressors were low, then the protective factors showed less impacts on adolescents' behaviors (Rutter, 1987). Therefore, mediation or moderation effects should be investigated in a future study to better understand positive social influences and adolescent delinquency (Walters, 2018).

In sum, the growing awareness of resilience and risk perspectives shows an increase in evidence-based practice in social work, particularly focsing on violence prevention among adolescents (Greene, 2013). Understanding resilience and risk factors plays a significant role in adolescents health development and behavioral problems, and identifying those factors facilitates the development of adolescent violence prevention strategies (Williams, 2008). Adolescent violence prevention programs should strengthen and promote the resilience factors in different ecological systems, while reducing the risk factors associated with adolescent delinquency.

Major Risk Factors of Adolescent Delinquency

The development of adolescent delinquency can be approached from different and informative perspectives, such as biological, psychological, and contextual. In historical perspectives, the biological character is an essential factor that can influence adolescents' delinquent behaviors. Biological character as a primary contributing factor in adolescent delinquency has been studies for over a hundred years. Researchers tried to build the relationship between certain somatotypes and delinquent behaviors. Further investigations were conducted by Glueck (1953) indicating that adolescent delinquency was caused by the internal mechanism that interacted with adolescents' living environment. In other words, delinquent behaviors among adolescents were caused by the interactions of biological and psychological factors within the living environment (Shoemaker, 2010). In sum, in a historical perspective, adolescent delinquency is inborn. However, historical theories failed to provide a comprehensive explanation of the causal relationship between delinquent behaviors and somatotype, as well as the specific connections between somatotype and delinquency among adolescents.

By historical perspectives, modern theories provide comprehensive and interdisciplinary explanations of adolescent delinquency. Instead of focusing on adolescents' somatotype or genetic sources, modern perspectives address the impact of the contextual influences, social structural, social relationship, and the accessibility of social services on them (Cheng & Lo, 2015; Cheng & Li, 2017; Li & Cheng, 2017). Adolescent delinquency today is the product of multiple and complex causes in the different living environments. Risk factors related to delinquency vary from individual factors (i.e., beliefs supportive of violence, history of early aggression) to relational factors (i.e., delinquent peer affiliation, weak parental monitoring) and environmental factors (i.e., diminished economic opportunity) (Asscher et al., 2014).

Individual Factors

Adolescence is a critical development period for all human beings that has been attributed to significant biological, psychological, cognitive, and socio-emotional changes (Steinberg, 2008). Compared to children and adults, adolescents appear to be more sensitive to rewards and seem to need higher levels of simulation and novelty gained from risk behaviors to please themselves (Huang et al., 2012). Therefore, a wealth of studies has investigated the relationships between biological and psychological characteristics and adolescent delinquency.

Gender Gap and Race/Ethnicity Differences. Research indicates that gender is the most discriminating factor related to crimes among children and adolescents (Tracy et al., 2009). Adolescent delinquency is regarded as a predominantly male phenomenon in the United States (Howard & Jenson, 1999), but some recent studies have emphasized the gender differences in adolescent delinquency. However, the "gender gap" associated with adolescent delinquency is still existing in the current literature. Tracy et al. traced back historical criminology issues and literature combined with contemporary empirical evidence to explore and understand the differences and similarities in crime-relationship among boys and girls. Tracy and his colleagues found that the delinquent behaviors of female adolescents cannot be discarded as less frequent or less severe than their male counterparts (Tracy et al., 2009). On the other hand, Weerman et al. (2016) indicated that, in light of the gender gap in adolescent delinquency, boys are involved in delinquent behaviors three times more than girls (Weerman et al., 2016). Another study focused on the gender gap in delinquency found that the gender gap decreased with the reduction of national levels of patriarchy (Savolainen et al., 2017). Savolainen et al. also pointed out that this gender-gap narrowing was followed by increased delinquent behaviors among girls and by decreased in delinquency among boys. Therefore, the gender gap remains an issue in the current literature.

Historically, studies revealed that the relatively high rates of juvenile delinquency among African American youths and the differential between African American and Caucasian-White youths tends to be smaller in self-reported violence than official records (Elliott, 1994). Plenty of studies have shown the existence of in the juvenile justice system which prevents juvenile justice from achieving its goals (Wong et al., 2016). Thirty-six percent of all the juvenile delinquents included African American, Asian, Native Indian, American Pacific Islander, which was 21% of the youth population in the United States (Donnelly, 2017). A longitudinal study presented evidence of the general trend toward more punitive than rehabilitative punishments for juvenile delinquents in ethnic/racial groups (Fix et al., 2017). African American juvenile delinquents, especially, were positively associated with the racial disparity of placement rate compared to juvenile delinquents in other racial groups and White delinquents. Ethnic juvenile delinquents showed lower violence risks than White delinquents, but were disproportionately represented among the juvenile facilities population relative to their proportions in the general population (Desai et al., 2012).

The Onset of Delinquency and Age. One of the significant concerns about adolescent delinquency is the age of onset. This is one of the best predictors of the future delinquent behaviors and prevention implications (Farrington et al., 1990; Tolan & Thomas, 1995). Historically, the age of onset of adolescent delinquency has been decreasing in recent decades (Fraser et al., 2004). Farrington et al. (1990) found that, among 411 males in London, the peak age of onset for the first conviction was age 14. Tremblay et al. (1995) indicated that the primary pathway to the early onset of delinquency was from disruptive behaviors to aggressive behaviors occurring between 10 to 12 years, to delinquent behaviors from 11 to 13 years.

Hence, age is a significant factor predicting adolescent delinquency; delinquent behaviors vary with increasing age (Mason et al., 2010). Cheng and Li (2017) found in their recent studies that age was positively associated with delinquent behaviors. In other words, older adolescents were more likely to be involved in delinquent behaviors than those who were younger (Cheng & Li, 2017a; Li & Cheng, 2017). A classic narrative review also revealed that age was positively associated with delinquent behaviors among adolescents (Hawkins et al., 1998).

Socioeconomic Status. The relationship between socioeconomic status (SES) and adolescents varies with circumstances (Tittle & Meier, 1990). Tittle and Meier indicated in their traditional research that, most of the time, SES does not predict delinquent behaviors among adolescents. In other words, the relationship between SES and delinquency is nonlinear (Agnew & Welcher, 2008). This finding challenged the general and pervasive assumption of low SES predicting delinquent behaviors among adolescents (Tittle & Meier, 1990). A recent study showed the SES about adolescent delinquency was still impartially limited (Agnew & Welcher, 2008; Gault-Sherman, 2013). Gault-Sherman indicated that SES showed no significant relationships with delinquency in both gender groups. Agnew and Welcher found that most adolescents from low SES were able to overcome multiple economic problems that contribute to delinquency. These problems also occurred in a great percentage of adolescents from high SES (Agnew & Welcher, 2008). Considering these findings, researchers revealed SES was a weak factor in predicting delinquency.

On the other hand, some studies also find positive relationships between SES and delinquency. A recent longitudinal study showed low SES was positively associated with delinquent behaviors among adolescents involved in the child welfare system (Cheng & Li, 2017a). Another longitudinal study revealed that adolescents from low SES families, even with higher levels of

parental monitoring, were more likely to exhibit delinquent behaviors (Rekker et al., 2017). Similarly, Rekker et al. found that adolescents showed a higher likelihood of involving in delinquent behaviors in low SES families than those from high SES families. In sum, adolescents with low SES had low attachment to their social bond, which led to delinquency (Defoe et al., 2013).

Substance Use and Adolescent Delinquency

Brain Development and Substance Misuse

Adolescent engagement in problematic behaviors is biological, social, and emotional, which relates to the networks elementary coding for effective and motivation process in the brain development of adolescence (Steinberg, 2008). Steinberg aimed to provide an overview of the most critical findings in adolescent brain development associated with risk-taking behaviors, mapping out the fundamental framework on shaping risk-taking behaviors in developmental neuroscience. He believed that the risk-taking or problematic behaviors between childhood and adolescence grew with the increasing sensation-seeking related to different patterns of dopaminergic activities around pubertal maturation, but not completely induced by the rising gonadal hormones. Another study was proposed to examine the neural process of decision-making of severely delinquent behaviors among juvenile delinquents by analyzing MRI, fMRI, and ROI data (Van den Bos et al., 2013). Researchers asked antisocial adolescents to play a two-choice Ultimatum Game with three conditions, depending on the alternative offer, pitted against a fixed unfair 8/2 offer: (i) 5/5 offer (fair alternative), (ii) 8/2 offer (no alternative), and (iii) 2/8 offer (hyperfair alternative). The prominent finding of this research indicated that there were disorders of decision-making processes related to rTPJ (right temporal partial junction) and rIFG (right inferior frontal gyrus) brain activities underlying severely antisocial behaviors in adolescent delinquents. Van den Bos et al. also found that severely antisocial adolescents failed to show the

inclination of considering social contexts in the decision-making process in imaging results. In summary, the development of biochemical, neuropsychological, and brain imaging data indicated areas of the frontal cortex and hypothalamus that regulate a range of aggressive behaviors among adolescents (Bartholow, 2018).

It is well-established in current literature that substance misuse results in brain abnormalities among adolescents, such as poor neurocognitive performance, white matter integrity, brain volume changes, and abnormal neurocognitive activities (Doran et al., 2012; Squeglia et al., 2009). Doran et al.'s review concluded that the cumulative risks of substance misuse in adolescence are associated with brain functions, structures, and consequent changes in neurocognitive abilities that impact the further risk of substance abuse and delinquent behaviors. Substance misuse and delinquency are each impacted by the brain functions that affect the adolescent transition from youth to adulthood; the effect of substance misuse could impair adolescents' neurocognitive function in the brain, with increased risks for delinquency and substance use in the future.

Adverse Childhood Events (ACEs) with Substance Use. A large body of research indicated that adolescent substance use and violent and other problematic behaviors were highly related to adverse childhood events (ACEs), such as exposure to family violence, child abuse, maltreatment, and neglect (Douglas et al., 2010; Levenson & Grady, 2016; Mersky et al., 2013; Woodson et al., 2010). Mallett (2015) suggested that social work professionals should develop effective intervention programs for juvenile delinquents with substance abuse disorders that target individualized childhood and adolescence factors, including school-level difficulties, family problems, mental health problems, and distressed communities.

Scientific studies have shown that ACEs are associated with violent behavior in later adolescence and even adulthood. Douglas et al. (2010) compared 2,061 individuals who had lifetime

substance dependence, including alcohol, cocaine, and opioid use, with 449 controls, and found that individuals who experienced physical abuse, sexual abuse, and exposure to violence in childhood had increased odds of substance use in later life. However, they were not able to explore the environmental factors which could be associated with ACEs and substance dependence. Another study explored the relationships between ACEs and substance abuse among 180 adult offenders (Levenson & Grady, 2016). Levenson and Grady indicated in their study that higher ACEs were significantly associated with the higher likelihood of exhibiting substance use and violent behaviors. They also revealed that violent offenders showed higher scores on ACEs and substance abuse than those theft adult offenders. Therefore, it is meaningful for future studies to investigate the early onset of violent behaviors among adolescents who have ACEs. The findings of investigations of adverse childhood events will improve social workers' understanding of the developing mechanisms of substance abuse and violent behaviors among adolescents.

Social Substance Use (Sussman et al., 2012; Traube et al., 2012b). Alcohol and tobacco play significant roles in adolescent delinquency and substance abuse (Helstrom et al., 2004a). Multiple studies have examined the association between alcohol and tobacco use and adolescent delinquency. A recent study showed consistent results with the previous study, in that the increasing adolescent delinquent behaviors were significantly associated with increased odds of using tobacco, alcohol, and marijuana (Shpiegel et al., 2016a). Curcio and Mak (2016) found that adolescents who showed alcohol drinking problems were more likely to involve in all areas of delinquency without gender differences. But Noffsinger et al. (2012), who aimed to investigate the relationship between substance abuse/misuse and youth violence, indicated that alcohol use was significantly associated with physical fighting among male adolescents. Cheng and Li (2017) in-

dicated that heavy alcohol use was strongly associated with delinquent behaviors among adolescents who were involved in the child welfare system in the United States. Another recent study revealed that an increased accessibility to alcohol raised the risk of engaging in delinquent behaviors among adolescents (Miller et al., 2016).

Furthermore, alcohol use and tobacco use were regarded as mediators in current studies investigating the relationships between adolescent delinquency and illicit drug use. Helstrom et al. (2004a) suggested that to examine the externalizing problems among adolescents, substance abuse/misuse could be conceptualized as indirect effects, with alcohol use and tobacco use as mediators. Helstrom et al. found that adolescent externalizing of problems was significantly associated with hard substance abuse mediating with alcohol use and tobacco use (Helstrom et al., 2004b).

Hard Substance Use (Sussman et al., 2012; Traube et al., 2012b). On the whole, the association between adolescent violence and substance misuse is extensive (Delisi et al., 2015; Murphy et al., 2014). Substance abuse confers risks for adolescent delinquency (Doran et al., 2012) and criminal offense, as well as criminal justice system involvement (Delisi et al., 2015). Watts and Wright (1990) indicated that the frequent use of illicit drugs was the best predictor of adolescent delinquency.

According to a classic study conducted by Elliot (1994), adolescent delinquency is the threshold for substance abuse. Elliot found that most adolescents in his study who exhibited externalizing behaviors began with delinquency and consequently facilitated to co-occurring delinquent behaviors and substance abuse. Although ample research has revealed a significant relationship between substance abuse and adolescent delinquent behaviors, the relationship is more

complex and dynamic, which has been indicated by the currently available literature. In sum, research results on the relationship between adolescent delinquency and substance abuse have been inconsistent.

A recent study that aimed to examine both general delinquent and specific offenses (i.e., minor theft and the felony assault) surveyed a sample of female adolescents involved in the child welfare system (Lalayants & Prince, 2014). They found that the bi-directional relationship among female adolescents in the child-welfare system who exhibited delinquent behaviors increased the risk of misusing substance; the opposite direction is also true. Noffsinger et al. (2012) presented that, compared to male adolescents, females who reported marijuana and methamphetamine use were significantly associated with violent behaviors. Wu and Howard (2007) revealed that among white female adolescent drug users, injection and drug use were significantly linked to delinquent behaviors. By contrast, Monahan et al.(2014) found different results, in that that male adolescents who were engaged in either delinquent behaviors or substance abuse at one period reported constraining in later periods, but female adolescents showed a lower likelihood of constraining in delinquency or substance abuse. Ford (2005) indicated in his research that substance abuse was significantly predictive of future delinquent behaviors, nonetheless, adolescent delinquency did not show a direct effect on future substance abuse/misuse. Furthermore, a nationally representative sample of adolescents involved in the child welfare system suggested that adolescent delinquency increased the risk for both social substance use and hard substance use (Traube et al., 2012a).

On the other hand, multiple studies have shown that hard substance abuse was not preceding the adolescent delinquency. A recent study that proposed to examine the longitudinal associations between substance abuse and adolescent delinquency presented opposite results.

Among adolescents in foster care, delinquency at age 17 revealed a positively significant correlation with substance abuse at age 18, controlling for baseline of usage substances. However, substance use at age 17 was not a significant predictor of delinquency after controlling the baseline delinquency (Shpiegel et al., 2016b). Nakawaki and Crano (2015) proposed to investigate the patterns of inhalant users and delinquency applying latent class analysis. They found that high substance users were more likely to involve in physical fights, but not involve in adolescent delinquency. Therefore, Shpiegel et al. suggested that adolescent delinquency could increase the vulnerability of future substance abuse among youths in the foster care system.

Regarding the relationship between adolescent violent behavior and substance abuse, a classic study revealed two common ways by which substance abuse/misuse associated with adolescent violence (Johnson & Belfer, 1995). First, violence can be triggered by substance abuse/misuse and, second, substance abuse/misuse associated with violent behaviors that originated from drug trade. However, research results on the relationship between substance abuse/misuse and violent behaviors are not consistent. Melotti and Passini (2018) suggested that adolescents who use drugs more frequently were more likely to involve in violent behaviors, as well as that more adolescents use drugs and more of them are engaging in violent behaviors. Delisi et al. (2015), in their research on criminal careers, indicated that juvenile substance misuse was the only onset offense type which was significantly associated with all criminal careers. By contrast, another study presented that the level of adolescents' recent drug use was not significantly associated with violent behaviors (Tarter et al., 2002). Therefore, it is timely and important for the present to investigate the relationship between hard substance abuse and violent behaviors among adolescents.

Non-Medical Prescription Drug Use (NMPDU). A large increase of non-medical prescription drug use has occurred in recent years, and it has been a great concern due to its high addiction potential, cognitive impairment effects, and other negative consequences among adolescents in the United States (Catalano et al., 2011). In addition, adolescents who were NMPDU users were also polynomial substance users. According to the National Survey on Drug Use and Health, non-medical prescription drug use refers to misuse of at least one prescription-type psychotherapeutic without a prescription to the respondents, or use of a non-medical drug for the experience and the feeling the drug caused without specific controlling for (Murphy et al., 2014; Substance Abuse and Mental Health Services Administration, 2017; Young et al., 2012). Catalano and colleagues also indicated that adolescents who more frequently used NMPDU were more likely to use other illicit drugs, such as cocaine and ecstasy. Among NMPDU users, they were five times more likely to drink alcohol, seven times more likely to smoke cigarettes, and eight times more likely to use different illicit drugs (Catalano et al., 2011). More importantly, Catalano et al. found that adolescent violence was the only outcome yielded by NMPUD users.

A recent systematic review summarized non-medical prescription drug use, particularly pain relievers, stimulants, sedatives, and tranquilizers, among U.S. adolescents, and found that NMPDU was significantly associated with older age, illicit drug use, and delinquency (Young et al., 2012). Specifically, Murphy et al. (2014) found that non-medical prescription opioid use was a strong predictor for adolescents' violent behaviors. They re-proofed the research results of Catalano et al. (2011) showing that non-medical prescription opioid misuse was positively related to adolescent violence. Additionally, Murphy et al. (2014) cited Boles and Miotto's (2003) literature review to explain that the substance abusers find themselves in a violent situation while they

are suffering from withdrawal symptoms and trying to acquire more drugs or committing crimes to get more drugs.

Family Relationships

Parenting behaviors is a salient influence associated with delinquent behaviors and substance misuse among US adolescents (Deutsch et al., 2012). Research has indicated that, according to social control theory, poor family management and parental attitudes regarding substance abuse and adolescent delinquency varied by individuals (Fagan et al., 2013). Fagan et al. pointed out in their study that, particularly for adolescents who were experiencing different risk factors, the independence and freedom from parents may limit parents' rules and expectations. Also, in late adolescence, parents usually reduce monitoring and controls on adolescents and leave them to a more vulnerable situation in exhibiting externalizing problems.

Parental Criminality and Pro-Violence Attitudes. The influences of parental behaviors on their children's delinquent behaviors need to be noticed and acknowledged (Palmer & Hollin, 2001). A recent study using a national-representative sample in Sweden divided family types into three subtypes: the intact family; the 'not-lived-with family,' where biological parents never lived with their children; and the 'stepfamily' (Kendler et al., 2015). This research revealed that children in all three types of families with parental criminal behaviors exhibited early delinquent behaviors in early childhood. Noticeably, adolescents reported lower rates of delinquent behaviors in the intact family, and the risk of delinquency increased from intact family to 'stepfamily' respectively. Kendler et al.'s research successfully demonstrated the delinquency rates in three different types of families, but failed to indicate the influences and relationships of parental criminal behaviors vertically or by cross-generational transmission.

A myriad of studies has shown that parental criminal behaviors have a significant impact on children's delinquent and violent behaviors (Connolly et al., 2018; Kendler et al., 2015; Latvala et al., 2015; Laurens et al., 2017). Additionally, the influences of parental criminal behaviors on children's delinquent behaviors are pervasive, and it is cross-generationally transmitted (Laurens et al., 2017). This research indicated that, with 66,477 children and their parents in Australia, both boys and girls whose exposure to parental criminal offending were at higher odds of delinquent behaviors when mothers and both parents offended than for offending by fathers. More importantly, cross-generational transmission of convictions indicated that the most robust relationship between parental criminal offending and adolescence delinquency is the same-sex intergenerational pairs, such as fathers and sons (Auty et al., 2017).

However, the findings of Latvala et al.'s study supported the previous results yielded by Auty et al. Having antisocial fathers was correlated with the delinquency of their sons and included underlying genetic factors (Latvala et al., 2015). Maternal offending was strongly associated with delinquent behaviors among offspring, revealed by recent research that applied latent class analysis (Connolly et al., 2018). Connolly et al. (2018) had two prominent findings: (1) maternal offending was strongly associated with a starting level at age 10 and rates of decline of delinquent behaviors at age 11 to 17 among both male and female genders; and (2) as for life-course-persistent (LCP) delinquency and adolescence-limited (AL) delinquency, maternal offending was more highly associated with both LCP and AL male trajectories of adolescent delinquency than their counterparts. Generally speaking, parents with criminal convictions have a higher likelihood of experiencing strain in their social context and living environment, so that a chain reaction exists to their children that can cause psychosocial risk factors of adolescent delin-

quency (Auty et al., 2017). Recent research provided another plausible explanation, that adolescents with antisocial parents experienced family hardships that compromised adolescents' cognitive development (Latvala et al., 2015).

Parental Monitoring. Consistent discipline, parental monitoring, and warmth and nurturance in parent-children interaction are the most important three aspects of parenting styles associated with delinquent behaviors among adolescents (Palmer & Hollin, 2001). It is a common sense and a simple linear relationship that stronger parental control or monitoring is related to lower delinquent behaviors in adolescents. Dishion et al. (1991) indicated that parental monitoring was found to be significantly associated with affiliation with delinquent peers in early adolescence. However, the relationship between parental monitoring and child behaviors is complex, dynamic, and interactional. There is no fixed agreement with the dose of parental monitoring shaping delinquent behaviors among adolescents. A dearth of studies revealed different results in the relationship between parental monitoring and adolescenct delinquency (Cheng & Li, 2017a; Currie et al., 2002; Dahlberg, 1998; Tsui, 2014; Li & Cheng, 2017; Nixon, 2014; Steinberg, 2008; Sullivan et al., 2006; Wall & Kohl, 2007; Zaborskis et al., 2016).

McCauley et al. (2010) indicated that lack of parental monitoring might increase the possibility of adolescent substance abuse/misuse, including NMPUD. Research regarding parental monitoring as the primary pathway to substance abuse and delinquent behaviors among African American urban adolescents indicated that strong parental monitoring significantly mitigated the risk of adolescent substance abuse and delinquent behaviors (Marotta & Voisin, 2017). Marotta and Voisin also suggested that improving parental monitoring in low-resourced communities is challenging but crucial because of the great environmental risks that contribute to adolescent delinquency.

On the one hand, strong parental monitoring or supervision has a significant influence on children's responsible conformity and self-control (Llorca et al., 2017), but on the other, weak parental monitoring was positively associated with delinquent acts in adolescents (Augenstein et al., 2016; Cheng & Li, 2017a; Gamez-Guadix et al., 2010; Leslie et al., 2010; Li & Cheng, 2017). Augenstein et al. investigated 74 pairs of adolescents and their parental caregivers and revealed that adolescents who exhibited delinquent behaviors reported weak parental monitoring and lower level of knowledge of their parental caregiver compared to those without exhibiting delinquent behaviors. They believed that adolescents' delinquent acts associated with measure patterns of parental monitoring and parenting knowledge. In other words, the links between adolescent delinquency and parental monitoring may vary according to different measure patterns (Augenstein et al., 2016). However, there are different voices on parental monitoring regarding adolescence delinquency. Parental monitoring was found to be strongly associated with adolescent delinquency in most cross-sectional studies, but few longitudinal studies explored the long-term relationship between parental monitoring and delinquent acts in adolescents. A longitudinal study using structural equation modeling has shown that efforts in parental monitoring or parental control did not predict the changes in adolescence delinquency over time (Kerr et al., 2010a). Nonetheless, effortful maternal control also plays a vital role in predicting aggressive and delinquent behavior genetically unrelated adolescents, and maternal sensitivity is also associated with the development of adolescent delinquency (van der Voort et al., 2013).

Moreover, another longitudinal study aimed to examine the consistency of mother-child reported discrepancies in parental monitoring and whether the discrepancies can predict the adolescents' delinquent behaviors two years later (De Los Reyes et al., 2010). De Los Reyes et al. found that the high-level of discrepancies reported by mothers in parental monitoring at research

baseline can effectively predict adolescence delinquency two years later. Similarly, research showed that father departures in early childhood would result in analogous consequences as mother discrepancies (Markowitz & Ryan, 2016). Markowitz and Ryan found that father departures were associated with increasing delinquent behaviors and depressive symptoms in adolescence for both male and female genders.

On the other hand, according to Nye's social control theory (1958), the relationship between parental monitoring and adolescence delinquency seems to be a U-shape in that either too strong or too weak parental monitoring was associated with a higher likelihood of exhibiting delinquent behaviors (Nye et al., 1958). Harris-McKoy (2016) applied negative binomial logistic regression with Add Health public use data, proving that the relationship between parental monitoring and adolescents' delinquent behaviors is curvilinear, not simply linear (Harris-McKoy, 2016). Harris-McKoy also believed that either higher or lower parental monitoring was positively associated with a higher level of delinquent behaviors among U.S. adolescents. Based on Nye's social control theory, only moderate parental monitoring appears to be a protective factor in preventing delinquent behaviors among adolescents, which is supported by Harris-McKoy's study.

Low attachment to parents/caregivers. Traditional research suggested that parental monitoring and parental attachment are two important dimensions to examine adolescent delinquency (Rankin & Wells, 1990). They hypothesized that adolescents who exhibited delinquent behaviors had weak parental attachment and did not value the parents' opinions, and found that low parental attachment was strongly associated with various delinquent behaviors, such as fighting at school, hitting teachers and parents, theft-vandalism, using a weapon, and having trouble with the police. The later study of Rankin and Kern (1994) indicated that adolescents who were

weakly attached to their parents showed a higher likelihood of involving in delinquent acts than those who had a strong parental attachment.

Additionally, adolescents from single-parent homes, even with a strong attachment with a custodial parent, were more likely to exhibit self-reported delinquency than those who were from an intact family (Rankin & Kern, 1994). Another classic research applying the National Longitudinal Study of Adolescent Health (Add Health) revealed that lying to parents showed a robust correlation of delinquent acts (Warr, 2007). Warr believed that lying to parents had a progressively negative influence on attachment to their parents, which means adolescent might be angry at least one of their parents. On the other hand, a recent study presented that a secure parental attachment was negatively associated with delinquent behaviors among Chinese adolescents with moral disengagement (Bao et al., 2015). In other words, a secure parental attachment reduces delinquent acts among adolescents.

Nonetheless, Thaxton and Agnew (2004) indicated that the relationship between parental attachment and adolescent delinquency is non-linear. They also found that adolescents who lacked positive attachment to others did not worry that their delinquent behaviors would harm others or damage their relationship with others. Thaxton and Agnew classified parental attachment into three levels: positive attachment, neutral attachment, and negative attachment. Adolescents who were negatively attached to their parents had a higher likelihood of exhibiting delinquent acts than adolescents who had a neutral or positive attachment to their parents. Moreover, the differences between neutral and positive parental attachment in adolescent delinquency were not significant.

Family violence. Mapping the relationship with parents and family characteristics can help researchers to expand the knowledge of interactions between delinquency and family predictors.

To my best knowledge, adolescents exposed to family violence regarding adolescent delinquency was less sufficiently studied than the relationship between child maltreatment or abuse and delinquency (Jonson-Reid, 1998). More surprisingly, there are very few studies exploring the relationship between family violence and adolescent delinquency in the recent decade. The existing literature studying the relationship between family violence and adolescent delinquency is surprisingly not enough. Jonson-Reid reviewed Widom's 1989 study that showed that, in the 1970s and 1980s, up to 79% of adolescents who exhibited violent behaviors were from abusive families.

Additionally, Jonson-Reid discussed the research findings from Hotaling, Straus, and Lincoln (1989) and Suh and Abel (1990) who had similar results with adolescents who were exposed to family violence (Jonson-Reid, 1998). A cross-sectional study that applied path analysis among Korean adolescents showed that adolescents who exhibited delinquent behaviors were more likely to show higher levels of dysfunctional parental partner dynamics and higher levels of exposure to family violence, compared to those adolescents who did not report delinquent behaviors (Kim & Kim, 2008). Specifically, there are no significant gender differences in family characteristics regarding adolescent delinquency. Boy and girls share similar familial risk factors associated with delinquent behaviors (Herrera & McCloskey, 2001). Herrera and McCloskey indicated that though there were no gender differences in overall referral rates according to juvenile court records, girls were more vulnerable for domestic violence, child physical abuse, and marital violence, which were associated with delinquency, than boys. Therefore, future studies might further explore how family violence affects adolescents' problematic behaviors.

Drug-Related Prevention and Adolescent Delinquency

After reviewing the available literature, a large body of current studies have suggested that it could be helpful for establishing evidence-based intervention to mitigate the delinquency

and substance abuse/misuse in early adolescence (Cheng & Li, 2017a; Cox et al., 2016; Jabar et al., 2016; Li & Cheng, 2017; Shpiegel et al., 2016a). Even though the association between adolescent delinquency and substance abuse has become a growing public health concern in the United States, studies are still lacking that investigate how particular drug-related prevention programs would impact adolescent delinquency, specifically in recent years (Jabar et al., 2016). Moreover, Cox et al. (2016) indicated in their latest systematic review that there is as yet no single research focusing on drug-related prevention targeted on reducing adolescent violence.

In 2002, Friedman et al. conducted a drug prevention/early intervention program aiming to reduce violent behaviors among male delinquent adolescents. According to the study, the experimental group had two treatments, the Botvin Life Skill Training (LST) and the Prothrow/Stith Anti-Violence (A.V.) model, to investigate how the drug-related prevention mitigated adolescent violent behaviors. Friedman et al. found that LST treatment showed a significant effect in reducing substance abuse disorders, and that A.V. treatment presented effectiveness in reducing violent behaviors among male adolescents. Another study in the same year applied community-based intervention providing counseling services, and indicated a significant reduction in alcohol and marijuana use at a one-year follow-up, as well as decreased delinquent behaviors among neighborhood delinquent adolescents in Baltimore (Hanlon et al., 2002). However, both Friedman et al. and Hanlon et al. failed to point out associations between substance abuse/misuse and adolescent delinquency yielded by the interventions. In other words, it remains unknown how specific drug-related interventions or how reduced substance abuse disorders would impact on adolescent delinquency particularly. Hence, it is urgent and crucial for this study to examine how drug-related intervention programs would reduce adolescent delinquency in the United States.

Mass Media Influences. The association between exposure to violent media and adolescent delinquency has been well-documented in the current literature. Violent contents in the mass media are acknowledged as contextual risk factors related to adolescent delinquency (Boxer et al., 2009; Ybarra et al., 2008). Boxer et al. found that violent contents in the mass media significantly predicted delinquent acts among adolescents. Copycat effect is one of the major concerns that could be caused by mass media due to its role of informing and educating the public about complex social issues (Helfgott, 2015; Lambie et al., 2014). The term copycat effects has been commonly used in academic literature to refer to imitative crime impacted by mass media (Helfgott, 2015). Helfgott noted that adolescents rely on the symbolic reality they draw from social media, and they tend more to be more influenced by media and to weave information from media coverages than older people. Lambie and colleagues indicated that exposure to violent media increased the copycat effects and increased the likelihood of involving in delinquent behaviors among adolescents. Helfgott concluded in his study that media uniquely shaped the choices and delinquent behaviors among adolescents, from antisocial decisions to types and efforts of delinquent behaviors, to provide ready-made scripts for rationalizing technology and delinquency.

Cyberbullying is a growing concern about adolescents' behavioral development in recent decades. National statistics showed that in 2017, 14.9% of school-aged adolescents were cyberbullied, with female adolescents (19.7%) presented a significantly higher percentage than their male counterparts (9.9%). Additionally, non-Latino white (17.3%) adolescents demonstrated a significantly higher percentage of being cyberbullied than African American (10.9%) and Hispanic adolescents (12.3%) (Prevention, 2018). Therefore, adolescents' problematic online behaviors should be monitored and supervised by their guardians. A recent study that

aimed to investigate the role of media use in adolescents' cyberbullying behaviors applied structural equation modeling and found that exposure to antisocial media was positively associated with cyberbullying behaviors among adolescents, especially among adolescents who experienced traditional bullying with anger and frustration (den Hamer et al., 2014). Analogously, a longitudinal study aimed to examine the long-term relationship between antisocial media exposure and cyberbullying behaviors presented that both male and female adolescents who had higher exposure to antisocial media contents showed a greater likelihood of exhibiting cyberbullying perpetration (den Hamer & Konijn, 2015). Studies have indicated that exposure to antisocial media contents played the role of amplifier in a cyclical process of being traditional bully victims and cyberbullying perpetrators (den Hamer & Konijn, 2015; den Hamer et al., 2014; Lee et al., 2016).

Playing video or computer games is a common and popular activity among adolescents. Multiple studies have revealed that violent or delinquency-reinforcing video games had a significant association with adolescent delinquent behaviors. Fischer et al. (2012) demonstrated that reinforcement of delinquency video games was positively associated with tolerance of actual delinquent behaviors, and significantly increased the likelihood of exhibiting delinquent acts in daily life. Violent video games were related to increasing the likelihood of exhibiting delinquent behaviors, such as physical fighting and weapon carrying (Li & Cheng, 2017a; Olson, 2004).

Table 1 shows a summary of major risk factors for adolescent delinquency in the presently available literature. The list of commonly studied risk factors generates some observations about current knowledge. First, a significant number of the studies focused on risk factors for adolescent delinquency were concentrated on individual-level factors and social relationships. Second, most of the studies solely investigated risk factors at the micro-level, mezzo-level, or

macro-level. Very few studies explored the interactions between or across different ecological systems. It remains unknown how well the interactive relationships across multiple ecological systems impact adolescent delinquent behaviors. Moreover, research has shown significant associations between substance use and adolescent delinquency. However, due to the rapid development of the Internet and electronic mobile devices, the roles of social relationships and mass media are understudied. It remains unknown how social relationships and mass media will influence the association between substance use and adolescent delinquency.

In sum, there is no single cause of delinquent behaviors in children and adolescents. The roots of delinquent behaviors are multi-faceted, multidimensional, and inter-correlated with different risk factors. In other words, delinquent behaviors are shaped and formed by the environment and social systems surrounding children and adolescents. Therefore, multi-dimensional causes of delinquent behaviors among children and adolescents require social work practitioners to consider the environmental system (Bay, 2015; Gitterman & Germain, 2008). Delinquent behaviors are the end product of the reciprocal interplay between the individual and the environmental and ecological systems they are nested in (Henggeler et al., 1996). Identifying this fact provides crucial insights for interventions meant to reduce delinquency and anti-social behaviors among children and adolescents in the United States.

Table 1

Summary of Key Ecological Risk Factors for Adolescent Delinquency

Micro-Level Risk Factors
Gender gap and race/ethnicity differences
The onset of delinquency and age
Socioeconomic status
Substance Abuse and Adolescent Delinquency
Brain Development and Substance Misuse
Adverse Childhood Events (ACEs) with Substance Use
Social Substance Use

Hard Substance Use
Non-Medical Prescription Drug Use (NMPDU).
Mezzo-Level Risk Factors
Family Factors
Parental criminality and pro-violence attitudes
Low attachment to parents/caregivers
Parental monitoring
Family violence
Peer/School Factors
Delinquent peer affiliation
Academic performance
School climate
Peer victimization
Exosystem Risk Factor
Drug-related Prevention and Adolescent Delinquency
Mass Media influences

Gaps in the Literature, Unanswered Questions, and Need for this Study

Although many recent studies investigated the relationship between substance abuse and adolescent delinquency, most of the available studies discussed the relationship between substance use and adolescent delinquency either without consideration of moderation effects or by investigating a single moderating effect. Very few studies investigated moderating effects from multiple layers of the adolescent eco-system. Therefore, the present dissertation study contributes to current knowledge by investigating three potentially moderating factors across multiple layers of the ecological system to explore more complicated and multifaceted relationships between substance use and adolescent delinquency. It is hoped that findings from this study will help social workers, policy makers, and interdisciplinary professionals establish coordinated services addressing multiple aspects of the ecological system to mitigate and prevent adolescent delinquency.

Potential moderators of the relationship between substance use and delinquent behaviors that warrant further investigation include the quality of the family relationship, the teacher-student relationship, and exposure to mass media, such as positive drug prevention communication. For example, studies into predictors of parental monitoring and substance abuse have explored influences on adolescent delinquency in parallel. However, to my knowledge, no recent studies have examined the moderating effect of parental monitoring on the relationship between substance abuse and delinquent behaviors. Similarly, parental support, parent-child conflict, the teacher-student relationship, and mass media have been found to have a significant relationship either with substance abuse or adolescent delinquency in prior studies. Nonetheless, the moderating effects of parental support, parent-child conflicts, and mass media on the relationship between substance abuse and adolescent delinquency warrants further investigation.

Social work research and behavioral sciences cannot miss an opportunity to identify moderating effects on the relationship between substance abuse and delinquent behaviors in order to improve adolescent behavioral health in micro-level, mezzo-level, and the Exosystem. It is imperative to explore how family relationships and the mass media moderate the relationship between substance abuse and adolescent delinquency. Findings of the present dissertation study can inform specific violence and substance use intervention programs about whether to target certain types of adolescents with specific risk factors. The findings also help social workers and other social service professionals develop more comprehensive interventions or treatments, combing different factors across multiple layers of the ecological systems to mitigate adolescent delinquency and improve adolescent behavioral health.

Figure 2.1

Conceptual Framework: Family Relationships as Moderators on the Relationship between Substance Use and Adolescent Delinquency

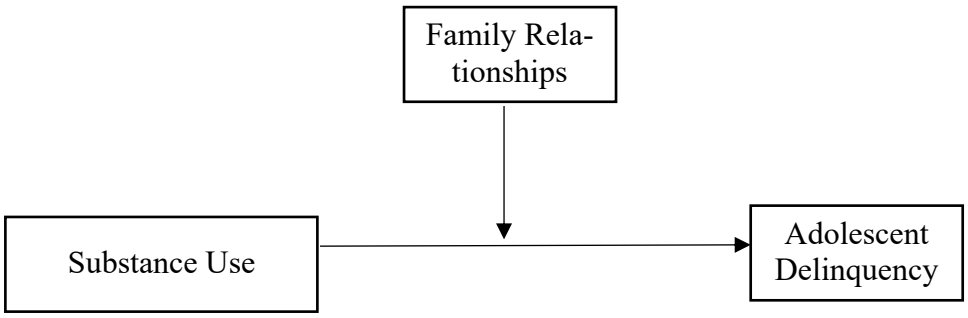


Figure 2.2

Conceptual Framework: Positive Drug Prevention Communication as a Moderator on the Relationship between Substance Use and Adolescent Delinquency

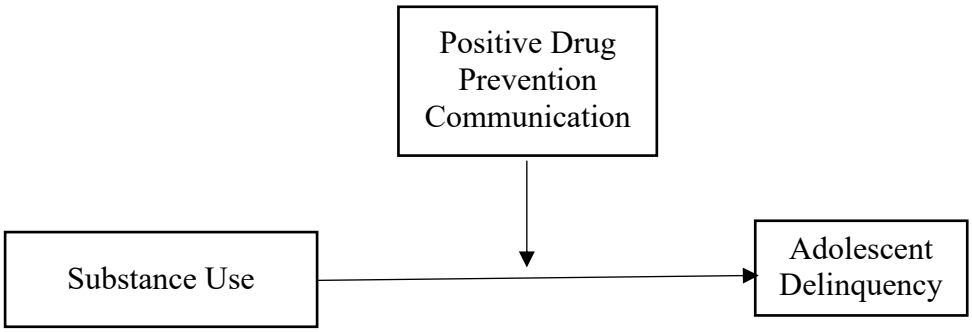
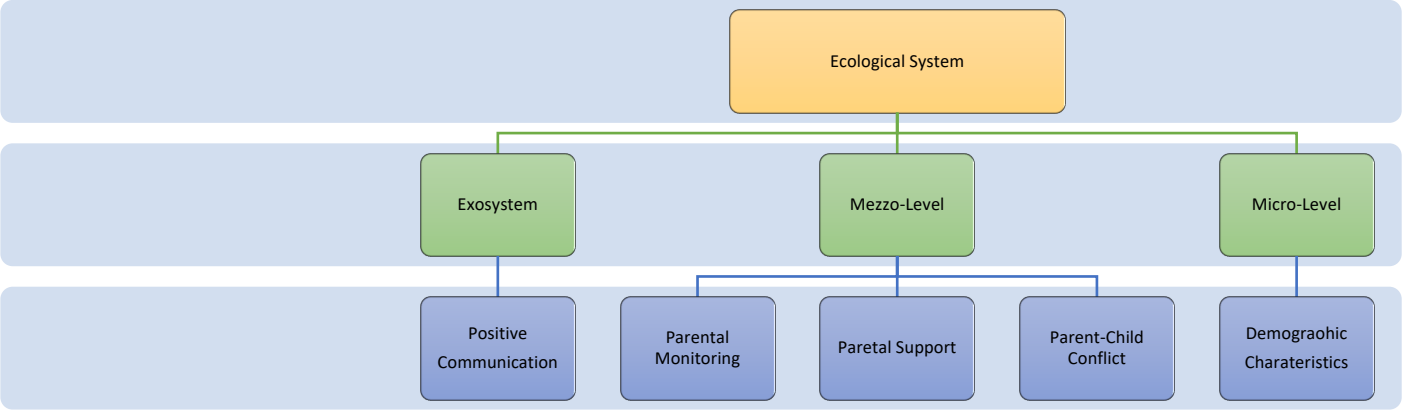


Figure 2.3

The Ecological System Theory: Moderators across Different Eco-Systems on the Relationship between Substance Use and Adolescent Delinquency



Statement of the Problem

The goal of the present study is to examine the relationship between adolescent substance abuse (i.e., alcohol, tobacco, social substance misuse, hard substance misuse, and non-medical prescription drug use) and adolescent delinquency, and to assess how the relationship is moderated by aspects of family relationships (i.e., parental monitoring, parental support, and parent-child conflicts). Specifically, the study aims to answer the following research questions and test the respective hypotheses:

1. Is adolescent substance abuse/misuse associated with delinquent behaviors (violent and theft)? If so, which types of substance use are most strongly associated with delinquent behaviors (violent or theft)? And which delinquent behaviors (violent or theft) are most strongly associated with substance use/misuse?

H_1: The greater the level of substance use/misuse, the greater the number of delinquent behaviors (violent and theft).

2. Does parental monitoring moderate the relationship between adolescent substance abuse/misuse and delinquent behaviors (violent and theft)?

H_2: Parental monitoring has significant moderating effects between substance use and delinquent behaviors (violent and theft). As parental monitoring is stronger, the association between substance use and delinquent behaviors will be weaker.

3. Does parental support moderate the relationship between adolescent substance use/misuse and delinquent behaviors (violent and theft)?

H_3: Parental support has significant moderating effects between substance use and delinquent behaviors (violent and theft). As parental support is stronger, the association between substance use and delinquent behaviors will be weaker.

4. Do parent-child conflicts moderate the relationship between adolescent substance use/misuse and delinquent behaviors (violent and theft)?

H_4: Parent-Child conflict has significant moderating effects between substance use and delinquent behaviors (violent and theft). With more parent-child conflict, the association between substance use and delinquent behaviors will be stronger.

5. Does positive drug prevention communication moderate the relationship between adolescent substance use/misuse and delinquent behaviors (violent and theft)?

H_5: Positive drug prevention communication has significant moderating effects between substance use and delinquent behaviors (theft and violent). The more exposure to positive drug prevention communication, the weaker the association between substance use and delinquent behaviors.

The research questions and research hypotheses originate from the previously described conceptual framework that accounts for the various risk factors from different ecological systems which may influence the relationships between ecological systems and behavioral health outcomes among adolescents.

The Significance of the Present Study

Adolescent delinquency has been capturing attention from parents, school teachers, and administrators, helping professions including social work, and even the entire society due to its severe adverse effects to youths' development and health. The present study provides valuable knowledge on the relationship between adolescent delinquency and substance use, assessing alcohol use, tobacco use, illicit and prescription drug use, family relationships, and exposure to mass media in the United States. The findings from the present study provide beneficial insights to social workers and other interdisciplinary professionals to develop effective interventions that address the unique needs of the individual adolescent who is most at-risk for delinquent behaviors among United States adolescents. The greater demands for drug-related violence prevention programs justify the need for more effective and efficient interventions. Thus, school teachers and social workers might employ the recommended approaches derived by the findings of the present study to mitigate the delinquent behaviors by drug-related preventions. Policy makers and government administrators would be guided on which specific drug and drug-related intervention should be addressed to reduce the adolescent delinquency in the United States.

Finally, to my best knowledge, the present study is the first study to examine the associations between adolescent delinquency and substance abuse/misuse while assessing the potentially moderating effects of family relationships and drug-prevention communication exposure with a national representative sample in the United States. Therefore, the present study helps researchers uncover a critical area in adolescent delinquency that many other researchers were not able to explore. Thus, the present study is both essential and timely.

Chapter Summary

This chapter starts with the introduction of the prevalence of adolescent delinquency in recent decades in the United States, and the existing evidence of risk factors from different ecological systems associated with adolescent delinquency. This chapter also demonstrates the conception of the multiple disadvantages model and the ecological systems theory, which provides the legitimacy for five timely research questions.

CHAPTER 4

METHODS

The study involves secondary analysis of a nationally representative cross-sectional survey to assess the association of a particularly disadvantageous risk factor with adolescent delinquency. Focusing on adolescent delinquency and substance use, the study assesses a micro-level risk factor, and mezzo-level and macro-level moderating factors.

Sample

The study sample was extracted from a cross-sectional public-use dataset, the National Survey on Drug Use and Health (NSDUH) (2017), the 36th series in the NSDUH surveys since 1971. The main purpose of the survey is to measure the prevalence and correlates of drug use in the United States. The survey described a nationally representative sample of adults (*N=56,276*) and adolescents (*N=13,722*). This survey provides information about adolescents' well-being, social functioning, caregivers' behaviors, academic performance, utilization of social services, and community environment among the U.S civilian and noninstitutionalized population in 48 states. The NSDUH 2017 was administered with American Standard Code for Information Interchange (ASCII) which was designed to promote the respondents with a highly private and confidential mode for responding to questions to increase the honest level of reporting delinquent behaviors, illicit drug use, and other negative experiences.

Sampling Procedures

In the 2017 NSDUH, there were five phases in the sampling procedure. The sample for the survey was selected employing a multistage, rigorous stratified sample design in 48 states. In

each state, based on composite size measures, a state sampling regions (SSRs) approach was formed which ensured that states were partitioned geographically into restrictively equally sized regions (Administration, 2017). In other words, as researchers expected, each area with a state yielded restrictively the same number of interviews during each data collection period in the regions that were formed to collect data. The partitioning divided the 48 states in the United States into a total of 750 SSRs, with 36 SSRs in California; 30 SSRs each in Florida, New York, and Texas; 24 SSRs each in Illinois, Michigan, Ohio, and Pennsylvania; 15 SSRs each in Georgia, New Jersey, North Carolina, and Virginia; and 12 SSRs each in the rest of 38 states including the District of Columbia.

The first phase of sampling named census tracts which began with the construction of an area sample frame that contained one record for each census tract in the United States. Census tracts were aggregated within SSRs to meet the minimum dwelling unit (DU) requirement, if necessary, in the data collection procedure. The census tracts were the primary sampling units (PSUs) in NSDUH. In the second phase, adjacent census block groups were collapsed as needed within selected census tracts. The block groups were sorted in the order in which they were formed, and sampled per selected census tract with probability proportionate to a composite size measure. The smaller geographic area was sampled within each selected census block group. In the third phase of sampling, each selected census block group was divided into small geographic areas composed of adjacent census blocks. These small geographic areas of blocks, named segments, are referred to as tertiary sampling units (TSUs). The fourth stage of sampling is to sample DUs in each segment, after determining census tracts, census block group, and segments. The DU sampling rate depends on the state to which the segment belongs and the computation

eligibility, screener, and interview response rates. The last phase of the sampling procedure is to select individual respondents within screened DUs based on age groups.

Study Sample

The present study applied a public-use national representative dataset, the National Survey on Drug Use and Health (NSDUH), 2017. In the present study, I extracted a sub-sample of 13,722 adolescents' aged from 12 to 17 years from the total sample of 56,276.

Measures and Variables

The Principal Outcome

The outcome variable is a frequency of delinquent acts. The outcome measures using a modified version of the 30-item Self-Reported Delinquency Scale that NSDUH researchers used (Administration, 2017). To achieve a score, the scale totaled adolescent responses' of delinquent behaviors committed during the 12 months that preceded the interview; scoring involves six delinquency subscales, one each for a serious fight at school/work, being involved in a group fight, carrying a handgun, minor theft, and seriously hurting someone. The outcomes in this study were operationalized as violent behaviors (Cronbach's α=.999) (i.e., serious fight at school, involved in group fight, carried a handgun, attack someone intentionally) and theft (i.e., minor theft) among U.S. adolescents.

Independent Variables

Key Independent Variables

The study involves three primary categories of independent variables: substance abuse, moderating factors, and demographic control. The first set of explanatory variables reflect substance use and are divided into three different categories. The first category of substance use variables includes the social substance use variables, which are computed by the researcher from

the following three binary variables: ever used cigarettes (yes/no) describes that an adolescent had smoked at least once; ever used alcohol (yes/no) describes that an adolescent had used alchohol at least once; and ever used marijuana (yes/no) describes that an adolescent had used marijuana at least once.

The second category of substance use variables include the hard substance use variables, which will be computed by the researcher from the following binary variables: ever used cocaine (yes/no) demonstrates that an adolescent had or had not used cocaine at least once; ever used crack (yes/no) demonstrates that an adolescent had or had not used crack at least once; ever used heroin (yes/no) demonstrates that an adolescent had or had not used heroin at least once; ever used LSD (yes/no) demonstrates that an adolescent had or had not used LSD at least once; and ever used methamphetamine (yes/no) demonstrates that an adolescent had or had not used methamphetamine at least once.

The third category of substance use variables includes the non-medical prescription drug use variables, which will be computed by the researcher from the following binary variables: ever used non-medical use prescription (NMUP) pain reliever (yes/no) demonstrates that an adolescent had or had not used NMUP pain reliever at least once; ever used non-medical use prescription (NMUP) tranquilizers (yes/no) demonstrates that an adolescent had or had not used NMUP tranquilizer at least once; ever used non-medical drug use prescription (NMDUP) stimulant (yes/no) demonstrates that an adolescent had or had not used NMDUP stimulant at least once.

Moderating Variables

The first set of moderating variables reflect family relationships. Family-relationship factors describing adolescents' relationships with their parents, such as low parental monitoring, low parental support, and parent-child conflicts, are conceptulized as moderating factors.

Low parental monitoring (Cronbach's α=.993) measures inadequate monitoring of adolescents' behaviors or activities from their parents and reflects adolescents' self-report. In the present study, low parental monitoring (Brown et al., 1993; Zaborskis et al., 2016) is a total score of four items: "During the past 12 months, how often did your parent check if you have done homework?"; "During the past 12 months, how often did your parent make you do chores at home?"; "During the past 12 months, how often did your parent limit the amount of time you watched TV?"; and "During the past 12 months, how often did your parent limit the amount of time you went out with friends on school nights?". Each item describes the frequency of parental monitoring on adolescents' daily activities or behaviors, ranging from 1 (always), 2 (sometimes), 3 (seldom), and 4 (never). The higher scores in parental monitoring show that parents have a lower level of monitoring on their children's daily life.

Low parental support (Cronbach's α=.993) is also a total score of three items: "During the past 12 months, how often did your parents provide help with your homework when you needed it?"; "During the past 12 months, how often did your parents tell you you'd done a good job?"; and "During the past 12 months, how often did your parents tell you they were proud of you of something you had done?", ranging from 1 (always), 2 (sometimes), 3 (seldom), and 4 (never). The higher scores in parental support show that parents have a lower level of support in their children's daily life.

The last variable related to family relationship is parent-child conflicts, measuring how often adolescents had fights or arguments with at least one of their parents during last 12 months, ranging from 1 (0 times), 2 (1 to 2 times), 3 (3 to 5 times), 4 (6 to 9 times), 5 (10 or more times). The higher scores in fights or arguments with parents show a higher level of parent-child conflicts.

Another important moderating variable in this study is positive drug prevention communication (Cronbach's α=.994) related to substance use. Three questions are provided by 2017 NSDUH to measure exposure to positive drug-prevention communication: "During the past 12 months have you had films, lectures, discussions, or printed information about drugs or alcohol in one of your regular school classes?" (yes/no); "During the past 12 months have you had films, lectures, discussions, or printed information about drugs or alcohol outside of one of your regular school classes?" (yes/no); and "During the past 12 months have you seen or heard any alcohol or drug prevention messages from sources outside school such as posters, pamphlets, radio, or TV?" (yes/no). These three questions describe whether adolescents have received information about drug or alcohol from positive drug-prevention communication, which will be created as a binary variable.

Control Variables

Control variables in the present study include adolescents' gender (male versus female), and racial/ethnic background, and annual household income. Adolescents' racial/ethnic background was demonstrated as five dummy variables that include White (reference group), African American, Asian, Hispanic, and other racial/ethnic groups. Family income, describing the total amount of money sustaining annual household income, using seven levels provided by the data: 1 (less than $10,000 including loss), 2 ($10,000-$19,999), 3 ($20,000-$29,999), 4

($30,000-$39,999), 5 ($40,000-$49,999), 6 ($50,000-$74,999), and 7 ($75,000 and more). The higher scores mean a higher amount of family income.

Table 2

Delinquent Behaviors Measures

Variables	Measures	Computed Outcome Variable	Scales
Outcome	*1.Get a serious fight at school or work* *2.Take part in a fight where a group of your friends fights against another group* *3.Carry a handgun* *4.Attacked someone w/intent to hurt them seriously*	Violent Behaviors (Range: 1 to 20)	1= 0 times 2=1 or 2 times 3=3 to 5 times 4=6 to 9 times 5=10 or more times
	Stolen anything worth>$50	Theft (Range: 1 to 5)	1= 0 times 2=1 or 2 times 3=3 to 5 times 4=6 to 9 times 5=10 or more times

Table 3

Measures of Independent Variables and Control Variable

Variables		Measures	Scales
Control Variables		*Gender*	1=male 0=female
		Race: Non-Latino White	1=yes 0=no
		Race: African American	1=yes 0=no
		Race: Hispanic	1=yes 0=no
		Race: Asian	1=yes 0=no
		Race: other race or ethnicity	1=yes 0=no
		Household income	1= less than $10,000 2=$10,000-$19,999 3=$20,000-$29,999 4=$30,000-$39,999 5=$40,000-$49,999 6=$50,000-$74,999 7=$75,000 and more
Key Independent Variable	Social Substance Use (Yes/No)	*Cigarettes smoking*	1=yes 0=no
		Alcohol use	1=yes 0=no
		Marijuana use	1=yes 0=no
	Hard Substance Use (Yes/No)	*Cocaine use*	1=yes 0=no
		Crack use	1=yes 0=no
		Heroin use	1=yes 0=no
		LSD use	1=yes 0=no
		Methamphetamine use	1=yes 0=no
	Non-Medical Prescription Drug Use (Yes/No)	*NMUP pain reliever*	1=yes 0=no
		NMUP tranquilizer	1=yes 0=no
		NMUP stimulant	1=yes 0=no
Moderating Variable		*Low parental monitoring (a total score of four items: 1 to 16)*	1=always 2=sometimes 3=seldom 4=never

	Low parental support *(a total score of three items: 1 to 12)*	1=always 2=sometimes 3=seldom 4=never
	Parent-child conflicts	1=Never 2=Low 3=Medium 4=High
	Positive Drug Prevention Communication	1=yes 0=no

Data Analysis Strategy

Descriptive

First, descriptive analysis of all variables was conducted to assess distributions and central tendencies. As described above, NSDUH 2017 employed a complex sampling procedure and included sampling weights to make it possible to generate estimates of the total population. The weighted data must be applied to obtain unbiased estimates for survey outcomes in the population (Substance Abuse and Mental Health Services Administration, 2017). Descriptive analysis was conducted with weighted data.

Addressing Missing Data

Three primarily algorithmic methods to address and estimate missing data were conducted in the present study: a) the number of cases missing per variable: b) the number of variables missing per case: and c) the pattern of correlations among variables created to represent missing and valid data. These three algorithmic approaches helped the researcher to determine the missing data mechanisms, whether missing at random (MAR) or not missing at random (NMAR), in the data set. After assessing and determining the missing data mechanism, a multiple imputations (MI) approach was conducted to fill in values for missing data. MI is a widely used method to fill in values in the incomplete data which lie in the ability to withhold the statis-

tical analysis that would have been applied had there been no missing values, specifically the estimates and variances (Fitzmaurice & Kenward, 2014, p.235). The desired analysis of the present study required all values of primary variables of interest to be available, so I included in the analysis only those units without missing values (Fitzmaurice & Kenward, 2014, p.240). When finished filling in values for the missing data, the present study was a complete case analysis, which is the most attractive option.

Of 13,722 adolescents in the total sample, 14.5% (*n=1921*) had some missing vales for an independent variable. Demographic characteristics including gender, race/ethnicity, and annual household income had no missing values in the dataset.

Regarding adolescent delinquent behaviors, 1.6% (*n=225*) had missing values in adolescent violent behaviors and 0.6% (*n=94*) were missing in terms of theft (see Table 4). Only 0.1% (*n=14*) and 0.6% (*n=91*) of social substance use and hard substance use were missing, while there were approximately 5% (*n=667*) of missing values in non-medical prescription drug use in the NSDUH 2017 dataset (see Table 5). However, there were no missing values in control variables. Nearly 7% (*n=960*) of low parental monitoring was missing, and 6% (*n=786*) of low parental support was missing, while only 2.1% (*n=285*) of parent-child conflicts were missing in the dataset (see Table 6).

Table 4

Missing Values in Adolescent Delinquent Behaviors

Violent Behaviors		Theft Behaviors		Total	
n	*%*	*n*	*%*	*n*	*%*
225	1.6%	94	0.6%	1921	14.5

Table 5

Missing Values in Substance Use

Substance Use					
Social Substance Use		Hard Substance Use		Non-Medical Prescription Drug Use	
n	*%*	*n*	*%*	*n*	*%*
14	0.1%	91	0.6%	667	4.8%

Table 6

Missing Values in Moderation Variables

Moderation Variables							
Low Parental Monitoring		Low Parental Support		Parent-child conflicts		Positive Drug Prevention Communication	
n	*%*	*n*	*%*	*N*	*%*	*n*	*%*
960	6.9%	786	5.7%	285	2.1%	1081	7.9%

As explained in chapter 3, the method for addressing missing values was multiple imputations via chain equations using sample weights. Because the ultimate data analytic strategy was multivariate linear regression, the best way of imputing missing values was to match the methodology of data analysis. Before applying multiple imputations (see Table 7), Lambda values stood for the proportion of total variance that is attributable to the missing data (Buuren & Groothuis-Oudshoorn, 2011). Among three key substance use variables, social substance use attributed 1.7% of total variance to the missing data, while hard substance use and non-medical prescription drug use attributed 4.5% and 4.0% respectively of total variables to the missing data. Moreover, each moderating variable varied differently in terms of attributable to missing data. Parental monitoring attributed approximately 22% of the total variance, while parental support only attributed nearly 13% of total variance to the missing data. Parent-child conflicts attributed 8.9% of the total variance to the missing data. Positive drug prevention communication was another total score in the present study, which attributed nearly 17% of total variance to the missing data.

The complete-case analysis of interest in the study is a multivariate linear regression of substance use on adolescent delinquent behaviors with tests of different moderation effects. For this purpose, the function "*imp*" in R, which is a list object containing *m* imputed datasets, was employed in the complete model to each of imputed datasets in the present study (Buuren & Groothuis-Oudshoorn, 2011). The present study employed five synthetic imputed datasets (*m=5*) which developed five complete datasets using predictive mean matching approach to each variable with missing values and no imputation for the variables without any missing values *(*Kabacoff, 2015, p. 429). Among five complete synthetic datasets created by Multiple Imputation via Chain Equation (MICE) process, the present study employed the third dataset for further data analysis. After multiple imputation process (see Table 7), Lambda values showed the present study had a complete dataset without any missing values.

Table 7

Statistics Before Applying Multiple Imputation via Chain Equations

Factors	Estimate	S.E.	Statistics	df	*p*-Value	Lambda (λ)	*fmi*
Social Substance Use	0.139	0.012	11.318	6882.658	0.000***	0.017	0.017
Hard Substance Use	0.524	0.050	10.442	1749.646	0.000***	0.045	0.046
Non-Medical Prescription Drug Use	0.142	0.024	5.891	2079.067	0.000***	0.040	0.041
Low Parental Monitoring	0.008	0.005	1.718	81.228	0.090	0.221	0.240
Low Parental Support	0.017	0.006	2.991	235.455	0.003**	0.129	0.136
Parent-Child Conflicts	0.099	0.008	11.884	554.676	0.000***	0.083	0.086
Positive Drug Prevention Communication	-0.008	0.009	-0.948	131.759	0.345	0.173	0.185

Note. *$p < .05$; **$p < .01$; ***$p < .001$

Table 8

Statistics After Applying Multiple Imputation via Chain Equations

Factors	Estimate	S.E.	Statistics	df	*p*-Value	Lambda (λ)	*fmi*
Social Substance Use	0.057	0.017	3.340	13,702.16	0.000***	0	0.000
Hard Substance Use	0.034	0.021	1.605	13,702.16	0.000***	0	0.000
Non-Medical Prescription Drug Use	0.040	0.008	4.900	13,702.16	0.000***	0	0.000

Low Parental Monitoring	0.010	0.004	2.102	13,702.16	0.04*	0	0.000
Low Parental Support	-0.016	0.006	-2.573	13,702.16	0.000***	0	0.000
Parent-Child Conflicts	0.290	0.008	35.501	13,702.16	0.000***	0	0.000
Positive Drug Prevention Communication	0.044	0.006	6.797	13,702.16	0.23	0	0.000

Note. *$p < .05$; **$p < .01$; ***$p < .001$

Univariate and Bivariate Analyses

In the present study, two outcomes (violent delinquent behaviors and theft behavior) are both continuous variables and substance use variables including both binary and continuous variables. First, the researcher conducted frequency tables for all the categorical variables and conducted descriptive statistics for all the continuous variables. Second, an independent-sample T-Test and Pearson's production-moment correlation tests were conducted to assess associations between binary variables (i.e., hard substance use, non-medical prescription drug use, and drug prevention program) and the two outcomes, independently. One-way ANOVA was applied to examine the relationships between child-parent conflicts and two continuous outcomes. Pearson correlations were conducted to assess bivariate associations between continuous variables and the two outcomes.

Multivariate Analysis

Linear regression with maximum likelihood-based parameter estimation was employed as the primary type of data analysis, using R. In the present study, delinquent acts among adolescents are continuous variables. Therefore, linear regression was a good fit for the present study. The researcher employed linear regression for cross-sectional data analysis to evaluate associations between substance use and adolescent delinquency.

Before applying linear regression, assumptions were checked to guarantee that the data met the criteria to run the regression models. First, Durbin-Watson statistic for independent errors was utilized to test for serial correlation among the residuals. In general, if the value of Durbin-

Watson is close to 2 it indicates that there were no serial correlations among explanatory variables, and the data meets this assumption for independent errors. Second, Leverage (h) and Cook's D: Criteria were applied to test for outliers in the data. Values were considered to be outliers when $h>3(k+1)/n$ since the present study involves a large sample size (n=sample size, k= the number of independent variables). Third, multi-collinearity was addressed and examined before running the regression. It was concluded that there were no multi-collinearity problems when the Tolerance values were greater than .705. In addition, because 15 interaction terms were involved in the data analyses, the potential multi-collinearity problems were considered. To avoid potential multi-collinearity problems, all the interaction terms were grand-mean centered before adding them to the final data analysis. Finally, normality and homoscedasticity assumptions needed to be met. The histogram and normal probability plots of the standardized residuals are almost symmetrical and lying on the diagonal line respectively, which suggested that the normality assumption was not violated. Residual plots of regression standardized residual versus regression standardized predicted value were generated to show the constant variance assumption related to homoscedasticity. The scatter plot showed that the dots are tightly close to each other, so there was no evidence of heteroscedasticity. Hence, the data were violating no assumptions and the researcher ran the linear regression models using the R Project for Statistical Computing.

Regression Assumptions

As previously discussed in chapter 3, it was necessary and important to test regression assumptions before employing linear regression. In this dissertation, two outcomes--adolescent violent acts and theft acts-- were both continuous variables; among independent variables, annual household income, parental monitoring, and parental support were also continuous variables.

Other independent variables, including gender, race/ethnicity, three types of substance use, family conflicts, and positive drug prevention communication were dichotomous variables. Therefore, the normality assumptions of continuous variables needed to be examined. As shown in Figure 4.1, among three continuous independent variables, only parental monitoring was normally distributed. Thus, the annual household income and parental support needed to be transformed as "*powerTransform*" analysis suggested (Table 9) to meet normality assumption before applying OLS.

Table 9

Box-Cox Power Transformation to Normality of Continuous Independent Variables

Factor	Est.Power	Wald Lower Bound	Wald Upper Bound	LRT	df	*p*-Value
Annual Household Income	-0.8	-0.847	-0.749	1085.742	1	0.000***
Parental Support	1.52	1.477	1.563	6510.653	1	0.000***

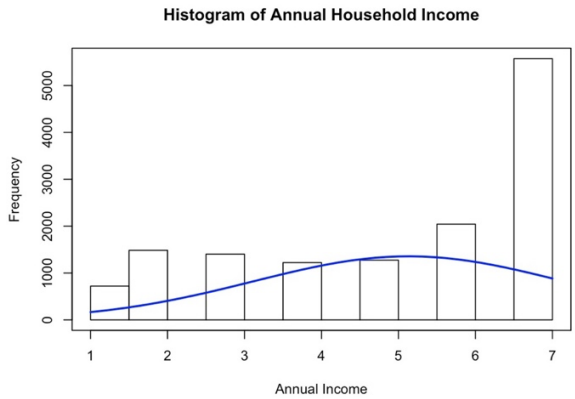
Note. *$p < .05$; **$p < .01$; ***$p < .001$

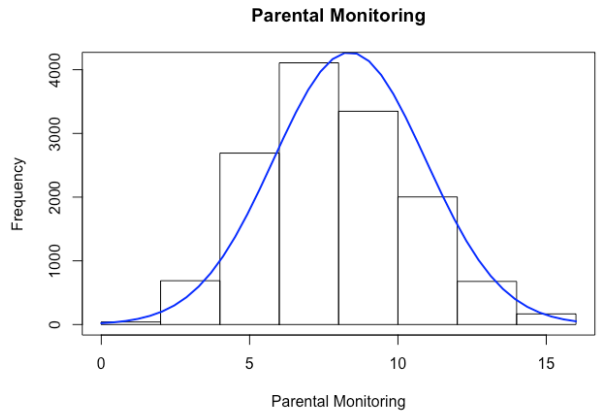
Data Transformation.

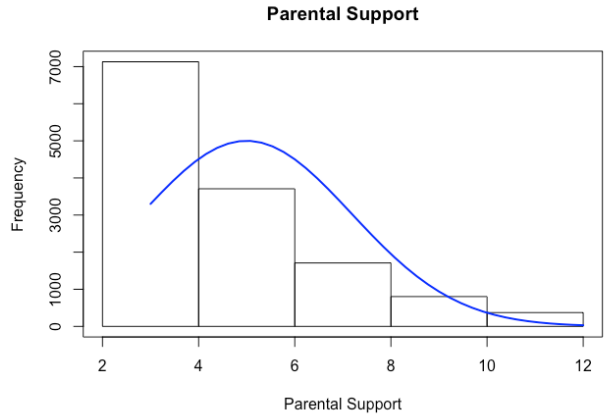
To solve the non-normality problem, data transformation was necessary and crucial to the assumptions of regression analysis. Data transformation for the individual variables was different and based on the particular distribution. Compiling from distributions established by Howell (pp.318-324, 2007) and Tabachnick and Fidell (pp. 86-89, 2007), the present study applied Box-Cox power transformation to normality approach which involved replacing a variables Y with Y^{λ} in R (see Table 9). Based on the results yielded by Box-Cox transformation to normality, annual household income and parental support were transferred to $Y^{-0.80}$ and $Y^{1.52}$ respectively to meet the normality distribution.

Figure 3.1.

Distributions of Moderators before Transformed







In sum, a global test of linear regression assumption tests revealed that Cook's Distance of each variable showed less than 1, which met the assumptions. A Durbin-Watson Test yielded a non-significant result of autocorrelations among independent variables, and there were no auto-correlations among independent variables. The multi-collinearity test identified no multi-collinearity among independent variables. The global tests of linear model assumptions in R (see Tables 10 & 11) revealed that the current data did not meet assumptions for conducting linear regression. Therefore, to satisfy the regression assumptions, independent variables were transformed

Table 10

Global Test of Linear Model Assumptions

	Value	p-Value	Decision
Auto-Correlation (Durbin-Watson Test)	1.986	0.438	Assumptions satisfied.
Cook's Distance			Assumptions satisfied.
Multi-collinearity (See Table 16.)	N/A	N/A	Assumptions satisfied.

Note. $*p < .05$; $**p < .01$; $***p < .001$

Table 11

Multi-collinearity Test for All Explanatory Variables

Factor	VIF	Tolerance	Decision
Gender	1.025	0.976	False
Annual Household Income	1.218	0.821	False
Black	1.259	0.794	False
Latinx	1.234	0.810	False
Asian	1.045	0.957	False
Other Race/Ethnicity	1.067	0.937	False
Social Substance Use	1.267	0.789	False
Hard Substance Use	1.344	0.744	False
Non-Medical Prescription Drug Use	1.419	0.705	False
Parental Monitoring	1.167	0.857	False
Parental Support	1.311	0.763	False
Parental-Child Conflicts	1.126	0.888	False
Positive Drug Prevention Communication	1.029	0.972	False

Regression steps to test hypotheses

Five sets of regression models were tested separately and repeatedly for the two outcomes of delinquent behaviors. In Model 1, only key independent variables of interest (i.e., social substance use, hard substance use, and non-medical prescription drug use) were added to the model. Demographic characteristics as control variables were added to Model 2. Next, Model 3 and Model 4 were run including the various moderating variables (i.e., low parental monitoring, low parental support, parent-child conflicts, and positive drug prevention communication) and, finally, Model 4 included interaction terms to test each hypothesis addressing the moderating effects. In Model 4, according to the purpose of this study, each moderating effect was multiplied with the three forms of substance use variables as interaction terms. Additionally, all the interaction terms were treated as independent variables which were entered together in one model.

Model 1

Key Independent Variables	Outcomes
Social Substance Use	Violent Behaviors
	Theft Behaviors
Hard Substance Use	Violent Behaviors
	Theft Behaviors
Non-Prescription Drug Use	Violent Behaviors
	Theft Behaviors

Model 2

Key Independent Variables	Control Variable	Outcome
1.Social Substance Use	1.Gender	Violent Behaviors
	2.Age	Theft Behaviors
2.Hard Substance Use	3.Race	Violent Behaviors
	4.Family Income	Theft Behaviors
3.Non-Medical Substance Use		Violent Behaviors
		Theft Behaviors

Model 3

Key Independent Variables	Control Variable	Moderate Variable	Outcome
1.Social Substance Use 2.Hard Substance Use 3.Non-Medical Substance Use	1.Gender 2.Age 3.Race 4.Family Income	1.Parental monitoring 2.Parental Support 3.Parent-child conflicts 4.Teacher-Student Relationships 5. Positive drug prevention communication	Violent Behaviors Theft Behaviors Violent Behaviors Theft Behaviors Violent Behaviors Theft Behaviors

Model 4

Key Independent Variables	Control Variable	Moderate Variable	Outcome
1.Social Substance Use 2.Hard Substance Use 3.Non-Medical Prescription Drug Use (NMPDU)	1.Gender 2.Age 3.Race 4.Family Income	1.Parental monitoring 2.Parental Support 3.Parent-child conflicts 4.Teacher-Student Relationships 5. Positive drug prevention communication	Violent Behaviors Theft Behaviors Violent Behaviors Theft Behaviors Violent Behaviors Theft Behaviors
With Interactions			
Social Substance Use*Parental Monitoring Social Substance Use*Parental Support Social Substance Use*Parent-child conflicts Social Substance Use*Teacher-Student Relationship Hard Substance Use*Parental Monitoring Hard Substance Use*Parental Support Hard Substance Use*Parent-child conflicts	1.Gender 2.Age 3.Race 4.Family Income		Violent Behaviors Theft Behaviors Violent Behaviors Theft Behaviors Violent Behaviors Theft Behaviors Violent Behaviors Theft Behaviors Violent Behaviors Theft Behaviors Violent Behaviors Theft Behaviors Violent Behaviors Theft Behaviors

Hard Substance Use*Teacher-Student Relationship		Violent Behaviors Theft Behaviors
NMPDU *Parental Monitoring		Violent Behaviors Theft Behaviors
NMPDU *Parental Support		Violent Behaviors Theft Behaviors
NMPDU *Parent-child conflicts		Violent Behaviors Theft Behaviors
NMPDU *Teacher-Student Relationship		Violent Behaviors Theft Behaviors
Social Substance use*Positive drug prevention communication		Violent Behaviors Theft Behaviors
Hard Substance use*Positive drug prevention communication		Violent Behaviors Theft Behaviors
NMPDU*Positive drug prevention communication		Violent Behaviors Theft Behaviors

Chapter Summary

This chapter outlined the research design of the present dissertation study. All 13,722 adolescents aged from 12-17 years composed the sample of this study. The dependent variables (violent behaviors and theft), the key independent variables (social substance use, hard substance use, and non-medical prescription drug use), the moderators (low parental monitoring, low parental support, and positive drug prevention communication), and the control variables, as well as the coding methods, multiple imputation methods, and data transformation approach were introduced in this chapter. Steps to impute missing data were described. Tests to ensure the data met appropriate assumptions for planned analysis were also described. Finally, the analysis steps were described.

CHAPTER 5

FINDINGS

This chapter provides detailed and informative reporting of descriptive analyses, including univariate and bivariate analyses. In addition, four multivariate linear regression models were employed to examine all the hypotheses. Because the dissertation study was aimed to generalize statistical findings to the whole population of adolescents who were 12 to 17 years old in the United States, weights were applied to the descriptive analysis and multivariate linear regression analysis. When examining the effects of weights upon data, few descriptive differences were noted (see Tables 12-14). Given the congruence between raw data and weighted data, in addition to the stable parameters observed across both sets of estimates, weighted data were applied to provide a more accurate portrait of adolescents in the United States. Lastly, as previously discussed in chapter 3, the following hypotheses were examined using regression models:

H_1: The greater the level of substance use/misuse, the greater the number of delinquent behaviors (violent and theft).

H_2: Parental monitoring moderates the relationships between substance use and delinquent behaviors (violent and theft). As parental monitoring is stronger, the association between substance use and delinquent behaviors will be weaker.

H_3: Parental support moderates the relationships between substance use and delinquent behaviors (violent and theft). As parental support is stronger, the association between substance use and delinquent behaviors will be weaker.

H_4: Parent-Child conflict moderates the relationship between substance use and

delinquent behaviors (violent and theft). With more family conflict, the association between substance use and delinquent behaviors will be stronger.

H_5: Positive drug prevention communication moderates the relationships between substance use and delinquent behaviors (theft and violent). The more exposure to positive drug prevention communication, the weaker the association between substance use and delinquent behaviors.

Results from the univariate and bivariate statistics regarding social substance use, hard substance use, and non-medical prescription drug use, as well as violent behaviors and theft, are reported. The results aim to provide an overall understanding of similarities and differences in relationships between substance use and adolescent delinquent behaviors in the U.S. In addition, the analysis investigates the type of substance use associated with delinquent behaviors among U.S. adolescents.

Descriptive Findings

Adolescent Violent and Theft Behaviors

The results come from a large sample of adolescents (*N*=13,722) applying weighted univariate analysis. As shown in Table 12, the vast majority of survey respondents (83.2%) were not involved in a serious fight in the 12 months before the survey was administered. Of respondents, 13.1% were involved in a serious fight one or two times in the 12 months before the survey was administered, and even fewer adolescents were involved in more than two serious fights. As with serious fights, the vast majority of respondents (87.8%) were not involved in a group fight in the previous year. Of respondents, 9.2% reported being involved in group fights one or two times, and even fewer adolescents were involved in such fights more than two times. Regarding carrying handguns, a majority of respondents (94.8%) reported never carrying a gun in the past year.

Of respondents, 3.2% carried a handgun one or two times, and even fewer carried a handgun more times. Also shown in Table 12, the vast majority of respondents (95.2%) reported having no intent to seriously hurt somebody, while 4% of respondents reported an intent to seriously hurt somebody one or two times in the past year, and even fewer reported intent to hurt others more than two times. The majority of adolescents in the present study did not engage in violent behaviors.

As for theft, the vast majority (95.2%) of respondents reported never having stolen anything of worth in the past year. Of respondents, 4.0% reported stealing things worth more than $50 one or two times, and smaller numbers reported thefts more than two times.

In sum, the majority of adolescents were not engaged in either violent behaviors or theft in the present study. Among all types of violent behaviors, 16.9% of adolescents were involved in serious fights, 12.2% were involved in group fights, 5.5% ever carried a handgun, and 4.8% of adolescents hurt somebody intentionally at least once in past 12 months before the survey was administered. Notably, among adolescents who had ever carried a handgun, approximately 1% of them carried a handgun more than 10 times in the past 12 months before the survey was administered. In other words, compared to other types of violent behaviors, frequently carrying handguns showed relatively higher frequencies among adolescents.

Table 12

Descriptive Information about Outcomes of Total Sample

Factor			Total Sample (13,722)	
			N	*%* *(Weighted %)*
Violent Behaviors	Serious Fight	Never	11,326	82.5 (83.2)
		1 or 2 times	1,854	13.5 (13.1)
		3 to 5 times	348	2.5 (2.4)
		6 to 9 times	105	0.8 (0.7)
		10 or more times	89	0.6 (0.7)
	Group Fight	Never	11,998	87.4 (87.8)
		1 or 2 times	1,297	9.5 (9.2)
		3 to 5 times	251	1.8 (1.8)
		6 to 9 times	87	0.6 (0.6)
		10 or more times	89	0.6 (0.6)
	Carried a Handgun	Never	12,938	94.3 (94.8)
		1 or 2 times	488	3.6 (3.2)
		3 to 5 times	131	1.0 (0.9)
		6 to 9 times	54	0.4 (0.6)
		10 or more times	111	0.8 (0.8)
	Intent to Seriously Hurt Somebody	Never	13.073	95.3 (95.2)
		1 or 2 times	534	3.9 (4.0)
		3 to 5 times	69	0.5 (0.4)
		6 to 9 times	22	0.2 (0.2)
		10 or more times	24	0.2 (0.2)
Theft Behavior: Stole Anything Worth > $50		Never	13,239	96.5 (95.2)
		1 or 2 times	310	2.3 (4.0)
		3 to 5 times	54	0.4 (0.4)
		6 to 9 times	42	0.3 (0.3)
		10 or more times	77	0.6 (0.6)

Demographic Characteristics

Of the sample, 49.1% were female and 50.9% were male. As for race/ethnicity, 52.8% of respondents were non-Hispanic White, 13.6% non-Hispanic Black, 24% Hispanic, 5.3% Asian, and 4.0% some other non-Hispanic race or ethnicity, including those reporting more than one race (see Table 13). Regarding annual household income, 5.3% of respondents had less than $10,000 annual income, 10.5% had between $10,000 - $19,999, 9.5% had between $20,000 - $29,999, 8.6% had between $30,000 - $39,999, 9.0% had between $40,000 - $49,999, 13.7% had between $50,000 - $74,999, and 43.4% of respondents had more than $75,000 annual income.

Substance Use

As previously discussed in Chapter 3, social substance use is a new variable computed by combining three survey variables: ever smoked cigarettes, ever used alcohol, and ever used marijuana. As shown in Table 14, of the study sample, approximately 33.0% (yes=1) reported using any one social substance at least once. The variables contributing to the new "social substance use" variable is shown in Table 13. Particularly, nearly 10.7% of respondents reported ever smoking cigarettes, 27.6% reported having used alcohol, and 15.5% reported having used marijuana in the past 12 months before the survey was administered.

Hard substance use was also a computed variable using five survey variables, including ever used cocaine, crack, heroin, LSD, and/or methamphetamine. As shown in Table 14, only 2.3% of adolescents have ever used any of the hard substances in the past month. Details of the variables comprising the new computed variable are shown in Table 13.

The non-medical prescription drug use (NMPDU) was another computed variable combining three survey variables including ever used painkillers, tranquilizers, and/or stimulants not directed by doctors. As shown in Table 14, about 6.7% of participants reported ever using NMPDU in the past year. Details of the variables comprising the newly computed variable are shown in Table 13; 4.8% of adolescents reported the use of painkillers and 2.2% reported the use of tranquilizers and stimulants not directed by doctors, respectively. Using painkillers not directed by doctors revealed relatively higher frequencies in NMPDU variables in the present study. The majority of adolescents in the study did not report using any types of drugs in the past year.

Moderating Variables

The primary purpose of this dissertation study is to assess the moderation effects of the relationship between substance use and adolescent delinquent behaviors, therefore, it is important to understand each of the moderating variables. Low parental monitoring is a total score of four items, including parents checked homework, made adolescents do chores, limited TV time, and limited friends' time. As shown in Table 13, of the sample, more than half of the parents always (50.9%) checked homework and 29.1% of respondents' parents sometimes helped check their homework, while 11.2% and 8.8% of adolescents' parents either seldom or never checked homework, respectively. Nearly 51% of adolescents' parents had made their children do chores, and approximately 38% of parents had sometimes made their children do chores; however, 7.9% and 3.2% of parents had either seldom or never made their children do chores, respectively. While notably, 41.1% of adolescents' parents had never limited their amount of TV time and approximately 20% of them seldom limited their children's amount of TV time, 27% of respondents' parents sometimes limited TV time and about 13% of them had always limited the amount of TV time. Moreover, approximately 20% and nearly 40% of respondents' parents either had seldom or never limited the time hanging out with friends, respectively, while about 38% and 26% of respondents' parents had always or sometimes limited the time when adolescents were hanging out with friends, respectively.

Low parental support is another total score computed from three independent variables, including parents helped with homework, parents said "good job" to their children, and parents were proud of their children. A majority of respondents' parents had either always (53%) or sometimes (33%) let them know when they had done a good job. Nearly 10% and 4% of parents had either seldom or never said a good job to their children, respectively. Additionally, most of

the respondents' parents either always (56%) or sometimes (29%) had told their children they were proud of them for something their children had done, while 10% and 5% of parents were either seldom or never proud of their children, respectively. Compared to low parental monitoring, each item in low parental support varied slightly different from each other.

As previously discussed, parent-child conflicts were dummy coded as four independent variables: never had parent-child conflicts, had low level of conflicts, had medium level of conflicts, and had high level of conflicts during the past 12 months when the survey was administered. Nearly 20% of adolescents had never had conflicts, that is, the frequency of arguing or fighting, with at least one of their parents for the past 12 months. Approximately 30% of adolescents who reported having a low level of conflicts (one or two times) with their parents, and around 22% of adolescents reported having a medium level of conflicts (three to five times) with their parents. However, approximately 29% of adolescents reported having a high level of conflicts (more than six times) in the past 12 months before the survey was administered. Notably, about half of adolescents reported having parent-child conflicts with their parents or guardians more than six times.

The last set of moderating variables is positive drug prevention communication, consisting of a total score of four dichotomous independent variables related to drug prevention communication. Of adolescents in this study, most adolescents had received some type of drug communication in or out of school. As shown in Table 13, approximately 40% of respondents had received a special class about drug and alcohol in school, while nearly 61% of respondents had films about drugs and alcohol in class. Notably, approximately 37% of adolescent had watched films about drugs and alcohol out of school, but about 64% of adolescents had heard about drug

preventions out of school. In sum, each item in the positive drug prevention communication varied differently. Most adolescents in the present study had drug prevention films in school but not out of school, and more than half of adolescents had not received a special class related to drug prevention communication.

Table 13

Descriptive Information about Explanatory Factors of Total Sample

Factor			Total Sample (13,722)	
			n	*% (Weighted %)*
Gender		Female	6,672	48.6 (49.1)
		Male	7,050	51.4 (50.9)
Race/Ethnicity		White	7,247	52.8 (52.6)
		Black	1,817	13.2 (13.6)
		Latinx	3.048	22.2 (24.0)
		Asian	561	4.1 (5.3)
		Other	984	7.2 (4.0)
Household Income		Less than $10,000	721	5.3 (5.3)
		$10,000 - $19,999	1,485	10.8 (10.5)
		$20,000 - $29,999	1,403	10.2 (9.5)
		$30,000 - $39,999	1,222	8.9 (8.6)
		$40,000 - $49,999	1,275	9.3 (9.0)
		$50,000 - $74,999	2,043	14.9 (13.7)
		$75,000 or more	5,573	40.6 (43.4)
Social Substance Use	Ever Smoked a Cigarettes	Yes	1,637	11.9 (10.7)
		No	12,085	88.1 (89.3)
	Ever Used Alcohol	Yes	3,939	28.7 (27.6)
		No	9,783	71.3 (72.4)
	Ever Used Marijuana	Yes	2,289	16.7 (15.5)
		No	11,433	83.3 (84.5)
Hard Substance Use	Ever Used Cocaine	Yes	120	0.9 (0.7)
		No	13,602	99.1 (99.3)
	Ever Used Crack	Yes	23	0.2 (0.1)
		No	13,699	99.1 (99.3)
	Ever Used Heroin	Yes	24	0.2 (0.1)
		No	13,698	99.8 (99.9)
	Ever Used LSD	Yes	223	1.6 (1.6)
		No	13,499	98.4 (98.4)
	Ever Used Methamphetamine	Yes	59	0.4 (0.4)
		No	12,663	99.6 (99.6)
Non-Medical Prescription Drug Use	Ever Used Painkiller Not Directed by Doctor	Yes	703	5.1 (4.8)
		No	13,019	94.9 (95.2)
		Yes	302	2.2 (2.2)

	Ever Used Tranquilizer Not Directed by Doctor	No	13,420	97.8 (97.8)
	Ever Used Stimulant Not Directed by Doctor	Yes	306	2.2 (2.1)
		No	13,416	97.8 (97.9)
Low Parental Monitoring	Parents Have Checked If You Have Done Homework in the Past 12 Month	Always	7,024	51.2 (50.9)
		Sometimes	3,976	29.0 (29.1)
		Seldom	1,537	11.2 (11.2)
		Never	1,185	8.6 (8.8)
	Parents Made You Do Work/Chores in the Past 12 Month	Always	7.047	51.4 (50.9)
		Sometimes	5,175	37.7 (38.1)
		Seldom	1,060	7.7 (7.9)
		Never	440	3.2 (3.2)
	Parents Limited the Amount of TV Time in the Past 12 Month	Always	1,728	12.6 (13.2)
		Sometimes	3,735	27.2 (41.1)
		Seldom	2,670	19.5 (19.3)
		Never	5,589	40.7 (39.6)
	Parents Limited the Time with Friends in the Past 12 Month	Always	5,245	38.2 (38.2)
		Sometimes	3,605	26.3 (26.4)
		Seldom	2,124	15.5 (15.4)
		Never	2,748	20.0 (19.9)
Low Parental Support	Parents Helped with Homework in the Past 12 Month	Always	7,549	55.0 (54.7)
		Sometimes	3,223	23.5 (24.0)
		Seldom	1,408	10.3 (10.1)
		Never	1,542	11.2 (11.3)
	Parents Let You Know You've Done a Good Job in the Past 12 Month	Always	7,348	53.5 (52.6)
		Sometimes	4,439	32.3 (33.4)
		Seldom	1,331	9.7 (9.5)
		Never	604	4.4 (4.5)
	Parents Proud of You	Always	7,715	56.2 (55.8)
		Sometimes	4,009	29.2 (29.6)
		Seldom	1,372	10.0 (10.0)
		Never	626	4.6 (4.7)
Parent-child Conflicts (Past 12 Month)		Never	2,734	19.9 (20.3)
		Low	4,009	29.2 (29.1)
		Medium	3,024	22.0 (21.6)
		High	3,961	29.8 (28.9)
Positive Drug Prevention Communication	Special Class about Drugs and Alcohol	Yes	5,624	41.0 (39.8)
		No	8,098	59.0 (60.2)
	Films About Drugs and Alcohol in Class	Yes	8,414	61.3 (60.5)
		No	5,308	38.7 (39.8)
	Films About Drugs and Alcohol out of Class	Yes	5,116	37.3 (36.4)
		No	8,606	62.7 (63.6)
	Heard Drugs or Alcohol Prevention out of School	Yes	9,870	71.9 (63.6)
		No	3,852	28.1 (36.4)

Table 14

Descriptive Information about Computed Variables of Total Sample

Factor		*n* (%)	Min	Max
Violent Behaviors		13,722	1	20
Theft Behavior		13,722	1	5
Social Substance Use	Yes	4,532 (33.0%)	0	1
	No	9,190 (67.0%)		
Hard Substance Use	Yes	315 (2.3%)	0	1
	No	13,407 (97.7%)		
Non-Medical Prescription Drug Use	Yes	914 (6.7%)	0	1
	No	12,808 (93.3%)		
Low Parental Monitoring		13,722	1	16
Low Parental Support		13,722	1	12
Child-Parent Conflicts		13,722	1	4
Positive Drug		11,858 (86.4%)	0	1
Prevention Communication	Yes			
	No	1,864 (13.6%)		

Bivariate Findings

Bivariate analyses consistently presented in the present study as demographic characteristics, substance use, and moderation effects (see Tables 15-25). According to the different characteristics of independent variables, different bivariate analyses were employed. Independent sample t-tests were performed to investigate the relationship between adolescent delinquent behaviors and binary variables, including gender, race/ethnicity, social substance use, hard substance use, non-medical prescription drug use, and positive drug prevention communication. Analysis of variance (ANOVA) was applied to the variable of parent-child conflicts. Bivariate Pearson correlations were employed to examine the relationship between adolescent delinquent

behaviors and continuous independent variables, including annual household income, parental monitoring, and parental support.

Demographic Characteristics vs. Adolescent Delinquent Behaviors

Regarding violent behaviors (see Table 15), on average, male adolescents (*M=4.639*) engaged in a higher level of violent behaviors compared to female adolescents (*M=4.401*). The difference between males and females in terms of violent behaviors was significantly different, at $t_{(12,860)}$ =-11.401, p<.001. African American adolescents (*M=4.732*) involved a higher level of violent behaviors than White adolescents (*M=4.491*). The difference between African American and White adolescents in terms of violent behaviors was a significant $t_{(2,715)}$ =-6.527, p<.001, while the difference between Latinx and White adolescents in the violent behavior was not significantly different at $t_{(4,710.4)}$ =-1.375, p=.169. Adolescents who are Asian (*M=4.312*) were less likely to be involved in violent behaviors than were White adolescents (*M=4.532*). The difference between Asian and White adolescents in violent behaviors was a significantly different $t_{(616.14)}$ =4.411, p<.001.

As for annual household income, as shown in Table 16, Pearson's product-moment correlation test found a significant negative association between annual household income and violent behaviors (r=-0.089) $t_{(13,720)}$ = -10.449, p<.001).

Regarding adolescent theft, as shown in Table 18, on average, male adolescents (*M=1.057*) engaged in a higher level of theft compared to female adolescents (*M=1.041*). The differences between males and females in terms of theft were a significantly different $t_{(13,543)}$ = -2.893, p<.01. African American adolescents (*M=1.065*) were involved a higher level of theft than White adolescents (*M=1.047*). The difference between African American and White adolescents in terms of theft was a significantly different $t_{(2,254)}$ =-2.065, p<.01. However, the difference

between Latinx and White adolescents in theft was not significantly different, at $t_{(4,545.7)}$ =-1.304, p=.192. Also, the difference between Asian and White in theft was not significantly different, at $t_{(595.69)}$ =-0.275, p=.783. Finally, there was no significant difference between White adolescents and other racial/ethnic groups in the present study. As for annual household income, as shown in Table 19, Pearson's product-moment correlation test found a significant negative association between annual household income and the level of theft, (r=*-0.020*) $t_{(13,720)}$ = -2.322, p<.001, among adolescents in the study.

In sum, bivariate analyses yielded that male adolescents showed higher levels of involving in delinquent behaviors than female adolescents. African American adolescents revealed a higher level of delinquent behaviors compared to other adolescents. However, the associations between other race/ethnic categories and delinquent behaviors were not significant. Also, annual household income was significantly negatively associated with delinquent behaviors. Adolescents with lower household income showed a higher level of engaging in both violent and theft behaviors.

Substance Use vs. Adolescent Delinquent Behaviors

As previously discussed, social substance use, hard substance use, and non-medical prescription drug use are key independent variables in this study. Independent sample t-tests were conducted to investigate relationships between three types of substance use and adolescent delinquent behaviors. As shown in Table 15, adolescents who have used social substances showed a significantly greater level of engaging in violent behaviors (M = *4.803*) compared to those who never used social substances (M=*4.385*), $t_{(6247.9)}$ =-16.119, p<.001. As for theft, Table 18, shows that adolescents who used social substances (M=*1.112*) also reported a significantly higher level of involvement in theft than those who never used social substance (M=*1.018*), $t_{(5133.8)}$ =-12.177,

p<.001. Adolescents who have used hard substances (*M=5.895*) showed a significantly greater level of engaging in violent behaviors than those who never used social substances (*M=4.491*), $t_{(316.47)}$ =-8.968, p<.001. As for non-violent behaviors, adolescents who used hard substances (*M=1.479*) also reported a significantly higher level of theft than those who never used social substances (*M=1.039*), $t_{(315.09)}$ =-7.496, p<.001.

Moreover, adolescents who used non-medical prescription drugs (*M=5.196*) reported a significantly greater level of exhibiting violent behaviors than those who have never used non-medical prescription drugs (*M=4.475*), $t_{(952.27)}$ =-10.365, p<.001. Regarding theft, adolescents who used non-medical prescription drugs (*M=1.265*) showed a significantly greater level of exhibiting theft behaviors than those who have never used non-medical prescription drugs (*M=1.034*), $t_{(927.34)}$ =-8.866, p<.001. In sum, three key substance use variables were significantly associated with delinquent behaviors among US adolescents.

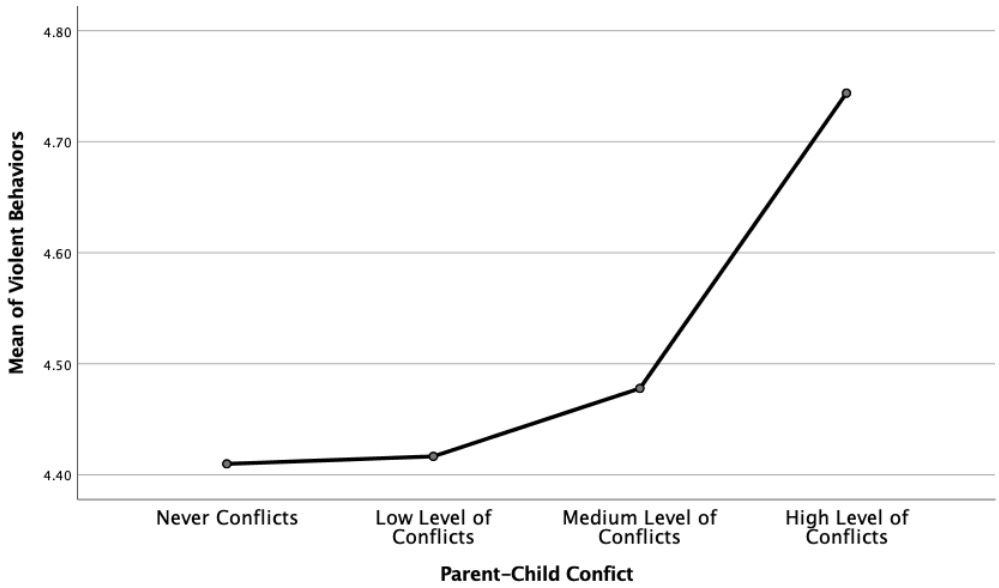
Moderation Effects vs. Adolescent Delinquent Behaviors

In chapter 3, I explained that low parental monitoring and support were total scores of different variables; higher scores showed lower levels of monitoring and support from parents. Regarding adolescent violent behaviors, bivariate Pearson product-moment correlation yielded that parental monitoring (*r=0.081*), $t_{(13,720)}$ =9.524, p<.001 was positively significantly associated with adolescent violent behaviors (see Table 16). That is, adolescents with less parental monitoring showed a higher level of violent behaviors. Low parental support (*r=0.121*), $t_{(13,720)}$ =14.292, p<.001 was positively significantly associated with adolescent violent behaviors. That is, adolescents with less parental support were engaged in a higher level of violent behaviors. Furthermore, ANOVA was applied to examine group means of relationships between parent-child con-

flicts and violent behaviors among adolescents. As shown in Table 17, there was a significant effect of parent-child conflict on the level of adolescent violent behaviors, $F(3,13,721) = 61.904$, $p<.001$, indicating that, as the frequency of parent-child conflict increased, violent behaviors among adolescents increased proportionately (see Figure 4.1).

Figure 4.1

Between Groups Means Plots of Parent-Child Conflict and Violent Behaviors



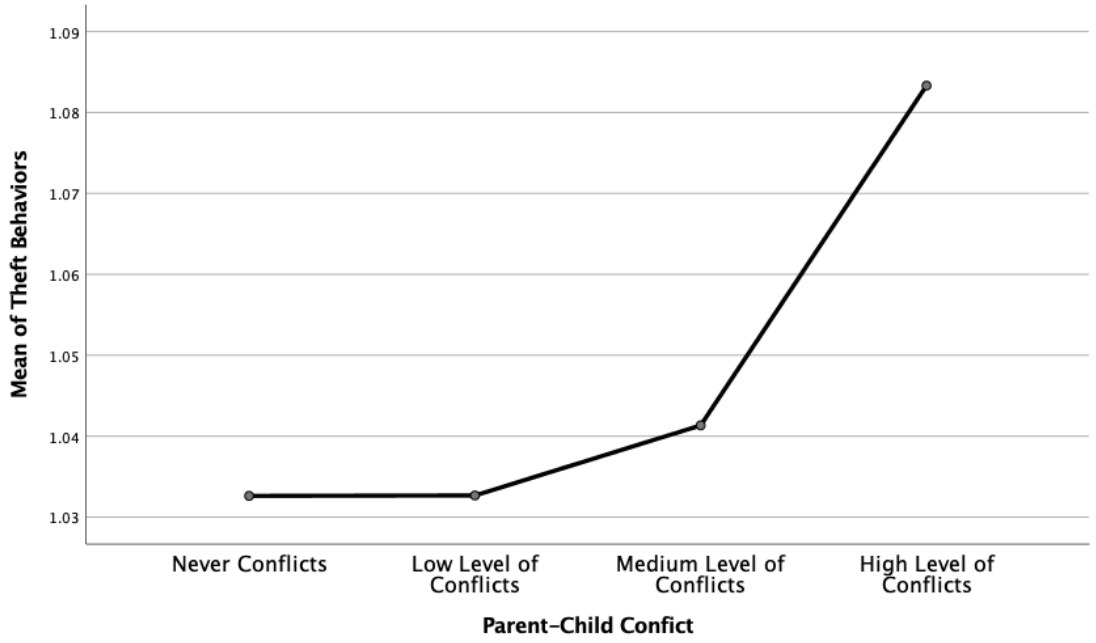
As shown in Table 15, the bivariate Welch two-sample t-test yielded that adolescents who have not received any positive drug prevention communication (*M=4.487*) reported a significantly lower level of engaging in violent behaviors than those adolescents who have received any types of drug communications (*M=4.751*), $t_{(2155.8)}$ =6.621, p<.001.

In terms of adolescent theft, as shown in Table 18, low parental monitoring (*r=0.063*), $t_{(13,720)}$ =7.375, p<.001 was positively significantly associated with adolescent theft. That is, adolescents with less parental monitoring showed a higher level of theft delinquent behaviors; however, this correlation between low parent monitoring and adolescent theft behaviors was weak. Low parental support (*r=0.091*), $t_{(13,720)}$ =10.722, p<.001 was positively significantly associated

with adolescent theft, however, this correlation between low parent support and adolescent theft was weak, as adolescents with less parental support had a higher level of theft. Furthermore, as shown in Table 20, there was a significant effect of parent-child conflict on the level of adolescent theft, F (3, 13,721) = 20.724, p<.001, indicating that as the frequency of parent-child conflicts increased, theft behaviors among adolescents increased proportionately (see Figure 4.2).

Figure 4.2

Between Groups Means Plots of Parent-Child Conflict and Theft Behaviors



In sum, moderating variables representing family relationships and positive drug prevention communication were significantly associated with adolescent delinquent behaviors in the present study.

Moderation Effects vs. Adolescent Gender and Race/Ethnicity

At last, it is also important to investigate the associations between all the moderation effects and adolescent gender and race/ethnicity (see Tables 21-26). Accounting for gender differences (see Table 21), there were significant effects of parental support, F (1, 13,720) = 24.466,

p<.001; parent-child conflicts, *F* (1, 13,720) = 273.629, *p*<.001; and positive drug prevention communication, *F* (1, 13,720) = 29.763, *p*<.001, between male and female adolescents. Regarding racial/ethnic differences, African American adolescents were significantly associated with parental monitoring, *F* (1, 13,720) = 0.001, *p*<.001; parent-child conflicts, *F* (1, 13,720) = 2.923, *p*<.001; and positive drug prevention communication, *F* (1, 13,720) = 27.429, *p*<.001, compared to White adolescents in the present study (see Table 22). Latinx adolescents were significantly associated with parental monitoring, *F* (1, 13,720) = 45.371, *p*<.001; parental support, *F* (1, 13,720) = 67.000, *p*<.001; parent-child conflicts, *F* (1, 13,720) = 12.728, *p*<.001; and positive drug prevention communication, *F* (1, 13,720) = 14.711, *p*<.001, compared to White adolescents (see Table 23). Compared to White adolescents, Asian adolescents were only significantly associated with parental support, *F* (1, 13,720) = 41.154, *p*<.001, and parent-child conflicts, *F* (1, 13,720) = 3.196 *p*<.001 (see Table 24). Notably, compared to White adolescents, adolescents in other racial/ethnic groups were not significantly associated with moderation effects in the present study (see Table 23).

Table 15

Welch Two Sample T-Test of Adolescent Violent Behaviors

Factor		Violent Behaviors				
		Mean	*T*	*df*	*p-Value*	*95% CI*
Gender	Male	4.639	-11.401	12,860	0.000***	(-0.197, -0.278)
	Female	4.401				
African American	Yes	4.732	-6.527	2,175	0.000***	(-0.313, -0.168)
	No	4.491				
Latinx	Yes	4.551	-1.375	4,710.4	0.169	(-0.087, 0.015)
	No	5.515				
Asian	Yes	4.312	4.411	616.14	0.000***	(0.122, 0,318)
	No	4.532				
Other Race	Yes	4.584	-1.641	1,147	0.101	(-0.144, 0,013)
	No	4.518				
Social Substance Use	Yes	4.803	-16.119	6247.9	0.000***	(-0.468, -0.366)
	No	4.385				
	Yes	5.895	-8.968	316.47	0.000***	(4.491, 5.895)

Hard Substance Use	No	4.491				
Non-Medical Prescription Drug Use	Yes	5.196	-10.365	952.27	0.000***	(4.475, 5.196)
	No	4.475				
Positive Drug Prevention Communication	Yes	4.487	6.621	2155.8	0.000***	(0.185, 0.341)
	No	4.751				

Note. *$p < .05$; **$p < .01$; ***$p < .001$

Table 16

Pearson's Product-Moment Correlation for Adolescent Violent Behaviors

Factor	Violent Behaviors				
	Pearson's r	*T*	*df*	*p-Value*	*95% CI*
Household Income	-0.089	-10.449	13,720	0.000***	(-0.105, -0.072)
Low Parental Monitoring	0.081	9.524	13,720	0.000***	(0.064, 0.098)
Low Parental Support	0.121	14.292	13,720	0.000***	(0.105, 0.138)

Note. *$p < .05$; **$p < .01$; ***$p < .001$

Table 17

One-Way ANOVA for Parent-Child Conflict and Adolescent Violent Behaviors

	Violent Behaviors				
Parent-Child Conflict	*Sum of Squares*	*df*	*Mean Squares*	*F*	*p-Value*
Between Groups	279.550	3	93.183	61.904	.000****
Within Groups	20649.580	13,718	1.505		
Total	20929.131	13,721			

Table 18

Welch Two Sample T-Test of Adolescent Theft Behaviors

Factor	Theft Behaviors					
	Mean		*T*	*df*	*p-Value*	*95% CI*
Gender	Male	1.057	-2.893	13,543	.004**	(-0.005, -0.027)
	Female	1.041				
African American	Yes	1.065	-2.056	2,254	0.04**	(-0.037, -0.001)
	No	1.047				
Latinx	Yes	1.056	-1.304	4,545.7	0.192	(-0.023, 0.004)
	No	1.047				
Asian	Yes	1.053	-0.275	595.69	0.783	(-0.036, 0,037)
	No	1.049				
Other Race	Yes	1.052	-0.257	1,132.4	0.800	(-0.024, 0.019)
	No	1.049				
	Yes	1.112	-12.177	5133.8	0.000***	(-0.109, -0.079)

Social Substance Use	No	1.018				
Hard Substance Use	Yes	1.479	-7.496	315.09	0.000***	(-0.556, -0.325)
	No	1.039				
Non-Medical Prescription Drug Use	Yes	1.265	-8.866	927.34	0.000***	(-0.282, -0.180)
	No	1.034				
Positive Drug Prevention Communication	Yes	1.044	3.393	2146.9	0.000***	(0.015, 0.057)
	No	1.080				

Note. *$p < .05$; **$p < .01$; ***$p < .001$

Table 19

Pearson's Product-Moment Correlation for Adolescent Theft Behaviors

Factor	Theft Behaviors				
	Pearson's r	*T*	*df*	*p-Value*	*95% CI*
Household Income	-0.020	-2.322	13,720	0.000***	(-0.570, -0.649)
Low Parental Monitoring	0.063	7.375	13,720	0.000***	(0.046, 0.079)
Low Parental Support	0.091	10.722	13,720	0.000***	(0.075, 0.108)

Note. *$p < .05$; **$p < .01$; ***$p < .001$

Table 20

One-Way ANOVA for Parent-Child Conflict and Adolescent Theft Behaviors

	Theft Behaviors				
Parent-Child Conflict	*Sum of Squares*	*Df*	*Mean Squares*	*F*	*p-Value*
Between Groups	6.640	3	2.213	20.724	.000****
Within Groups	1465.156	13,718	.107		
Total	1471.796	13,721			

Note. *$p < .05$; **$p < .01$; ***$p < .001$

Table 21

One-Way ANOVA for Moderation Effects and Adolescent Gender

	Gender					
		Sum of Squares	*df*	*Mean Square*	*F*	*p-Values*
Parental Monitoring	Between Groups	.010	1	.010	.001	.969
	Within Groups	90124.206	13720	6.659		
Parental Support	Between Groups	121.827	1	121.827	24.466	.000***
	Within Groups	65635.944	13720	4.784		

Parent-Child Conflicts	Between Groups	326.064	1	326.046	273.629	.000***
	Within Groups	16348.257	13720	1.192		
Positive Drug Prevention Communication	Between Groups	3.387	1	3.487	29.763	.000***
	Within Groups	1607.307	13720	.117		

Note. *$p < .05$; **$p < .01$; ***$p < .001$

Table 22

One-Way ANOVA for Moderation Effects and Adolescent Race/Ethnicity

	African American (*ref*=White)					
		Sum of Squares	*df*	*Mean Square*	*F*	*p-Values*
Parental Monitoring	Between Groups	228.429	1	228.429	.001	.000***
	Within Groups	89895.787	13720	6.552		
Parental Support	Between Groups	14.005	1	14.005	2.923	.087
	Within Groups	65743.767	13720	4.792		
Parent-Child Conflicts	Between Groups	571.527	1	571.527	486.957	.000***
	Within Groups	16348.257	13720	1.192		
Positive Drug Prevention Communication	Between Groups	3.214	1	3.214	27.429	.000***
	Within Groups	1607.580	13720	.117		

Note. *$p < .05$; **$p < .01$; ***$p < .001$

Table 23

One-Way ANOVA for Moderation Effects and Adolescent Race/Ethnicity

	Latinx (*ref*=White)					
		Sum of Squares	*df*	*Mean Square*	*F*	*p-Values*
Parental Monitoring	Between Groups	296.701	1	296.701	45.371	.000***
	Within Groups	89827.514	13720	6.547		
Parental Support	Between Groups	319.560	1	319.560	67.000	.000***
	Within Groups	65438.212	13720	4.770		

Parent-Child Conflicts	Between Groups	15.455	1	15.455	12.728	.000***
	Within Groups	16348.257	13720	1.192		
Positive Drug Prevention Communication	Between Groups	1.725	1	1.725	14.711	.000***
	Within Groups	1607.068	13720	.117		

Note. *$p < .05$; **$p < .01$; ***$p < .001$

Table 24

One-Way ANOVA for Moderation Effects and Adolescent Race/Ethnicity

	Asian (*ref*=White)					
		Sum of Squares	*df*	*Mean Square*	*F*	*p-Values*
Parental Monitoring	Between Groups	17.058	1	17.058	2.597	.107
	Within Groups	90107158	13720	6.568		
Parental Support	Between Groups	196.655	1	196.655	41.154	.000***
	Within Groups	65561.116	13720	4.779		
Parent-Child Conflicts	Between Groups	3.602	1	3.602	2.964	.000***
	Within Groups	16348.257	13720	1.192		
Positive Drug Prevention Communication	Between Groups	.375	1	.375	3.196	.074
	Within Groups	1607.068	13720	.117		

Note. *$p < .05$; **$p < .01$; ***$p < .001$

Table 25

One-Way ANOVA for Moderation Effects and Adolescent Race/Ethnicity

	Other Race/Ethnicity (*ref*=White)					
		Sum of Squares	*df*	*Mean Square*	*F*	*p-Values*
Parental Monitoring	Between Groups	8.206	1	8.206	1.249	.246
	Within Groups	90116.010	13720	6.568		
Parental Support	Between Groups	16.837	1	16.837	3.514	.061
	Within Groups	65740.934	13720	4.792		
Parent-Child Conflicts	Between Groups	4.302	1	4.302	3.541	.060

	Within Groups	16674.303	13720	1.215		
Positive Drug Prevention Communication	Between Groups	.003	1	.003	.026	.872
	Within Groups	1610.791	13720	.117		

Note. *$p < .05$; **$p < .01$; ***$p < .001$

Regression Results

Multivariate linear regression was conducted to investigate the relationship between substance use and adolescent delinquency with key substance use variables, control variables, moderating variables, and interaction terms, and the outcome variables with appropriate weights. As previously discussed in chapter 3, four regression models were examined by adding control variables, moderating variables, and interaction terms step by step to assess relationships between substance use and adolescent delinquency.

Model 1

Linear regression models including only the three substance use variables were conducted to investigate the relationships between substance use and two principal outcomes (see Table 26). As with the other bivariate tests, results showed that all three forms of substance use were significantly positively associated with both adolescent violent and theft behaviors. Hence, study results show support for Hypothesis #1. Regarding adolescent violence, social substance use ($b=0.301, p<.001$) was positively associated with violent behaviors. That is, adolescents were more likely to engage in violent behaviors when they smoked cigarettes and used alcohol and marijuana. Hard substance use ($b=1.003, p<.001$) was also positively associated with violent behaviors. Adolescents showed a higher likelihood of involving violent behaviors when they used hard substances, including cocaine, LSD, and heroin. Non-medical prescription drug use ($b=.368, p<.001$) was also associated with violent behaviors. Adolescents reported a higher likelihood of violent behaviors when they used non-medical prescription drugs.

In terms of theft, social substance use (*b=0.053, p<.001*) was significantly associated with theft. Adolescents who reported using social substances were more likely to engage in theft behaviors. Adolescents were also more likely to be involved in theft behaviors when they used hard substances (*b=0.328, p<.001*), which was positively associated with adolescent theft. Finally, non-medical prescription drug use (*b=0.138, p<.001*) was also significantly associated with theft in Model 1. In other words, adolescents who reported using non-medical prescription drugs showed a higher likelihood of engaging in theft delinquent behaviors.

In Model 1, all three forms of substance use were significantly and positively associated with both violent and theft behaviors among U.S. adolescents, which supports Hypothesis #1. Hard substance use appeared to be a stronger risk factor related to adolescent delinquency than social substances use and non-medical prescription drug use in Model 1, as reflected in hard substance use showing larger coefficient values than other forms of substances.

Model 2

After including the controlling demographic variables in the regression models (see Table 27), the results showed no differences among three key substance use variables in relation to delinquent behaviors. That is, all three forms of substance use remained positively associated with violent and theft behaviors. Hence, after adding control variables, study results show support for Hypothesis #1. Demographic characteristics were associated with delinquent behaviors in various ways. As for gender, compared to female adolescents, male adolescents were more likely to engage in both violent (*b=0.245, p<.001*) and theft (*b=0.018, p<.001*) behaviors. As for race/ethnicity, results differed for violent and theft behaviors. Compared to White adolescents, African American adolescents (*b=0.225, p=.253*) were more likely to engage in violent behaviors. Regarding theft, African American adolescents (*b=0.133, p<.001*) were also more likely to

report involvement in theft compared to White adolescents. However, in Model 2, Latinx, Asian, and adolescents with other racial/ethnic background were not more likely to engage in violent behaviors compared to White adolescents. In terms of involvement in theft, Latinx (*b=0.015, p<.05*) and Asian (*b=0.028, p<.05*) adolescents were more likely to engage in theft than were White adolescents, but adolescents with other racial/ethnic backgrounds were not more likely to engage in theft compared to White adolescents.

The last control variable added to Model 2 was annual household income, which was negatively associated with violent behaviors. Regression results show that adolescents with lower household income had a greater likelihood of reporting violent behaviors (*b=-0.041, p<.001*) than those with higher household income, but notably, annual household income was not significantly associated with theft (*b=0.002, p=0.668*).

In sum, regarding substance use, after adding control variables, the significant relationship of all three forms of substance use and adolescent delinquency were not changed in Model 2. Additionally, of the control variables, male adolescents were more likely than females to be involved in both violent and theft behaviors. African American adolescents reported a greater likelihood of both violent and theft behaviors than adolescents of other racial/ethnic groups. Additionally, the present study also found that adolescents with lower household incomes were more likely to exhibit violent behaviors than those adolescents with higher household incomes.

Table 26

Multivariate Regression Model 1

Factors	Violent Behaviors				Theft Behaviors			
	Coeff.b	S.E.	*t*	p-Value	*Coeff.b*	S.E.	*T*	p-Value
(Intercept)	3.539	0.046	77.138	0.000***	0.706	0.120	58.950	0.000***
Social Substance Use	0.457	0.031	14.979	0.000***	0.083	0.008	10.380	0.000***

Hard Substance Use	1.719	0.172	9.966	0.000***	0.631	0.045	14.010	0.000***
Non-Medical Prescription Drug Use	0.707	0.100	7.031	0.000***	0.386	0.026	14.720	0.000***
Residual S.E.: 0.314 on 13711 degrees of freedom					0.313 on 13711 degrees of freedom			
Multiple R-Square: 0.075					0.086			
Adjusted R-Square: 0.074					0.085			
F-Statistics: 111.1					129.4			

Note. *$p < .05$; **$p < .01$; ***$p < .001$

Table 27

Multivariate Regression Model 2 with Control Variables

Factors	Violent Behaviors				Theft Behaviors			
	Coeff.b	S.E.	*t*	p-Value	*Coeff.b*	S.E.	*t*	p-Value
(Intercept)	3.976	0.157	25.344	0.000***	0.851	0.041	20.583	0.000***
Social Substance Use	0.308	0.023	13.614	0.000***	0.058	0.006	9.130	0.000***
Hard Substance Use	0.996	0.073	13.658	0.000***	0.329	0.019	16.945	0.000***
Non-Medical Prescription Drug Use	0.368	0.044	8.286	0.000***	0.138	0.012	11.646	0.000***
Gender (ref=Female)	0.245	0.020	12.070	0.000***	0.018	0.005	3.269	0.000**
African American (ref=White)	0.225	0.033	6.802	0.000***	0.032	0.008	3.639	0.000***
Latinx (ref=White)	0.036	0.027	1.348	0.178	0.015	0.007	2.123	0.034*
Asian (ref=White)	-0.078	0.052	-1.486	0.137	0.028	0.013	2.029	0.042*
Other (ref=White)	0.077	0.041	1.877	0.060	0.006	0.011	0.526	0.598
Annual Household Income	-0.041	0.005	-7.425	0.000***	0.002	0.014	0.188	0.851
Residual S.E.: 1.188 on 13710 degrees of freedom					0.313 on 13710 degrees of freedom			
Multiple R-Square: 0.075					0.086			
Adjusted R-Square: 0.074					0.085			
F-Statistics: 101					117.6			

Note. *$p < .05$; **$p < .01$; ***$p < .001$

Moderation Effects

As previously discussed, the primary purpose of this study is to investigate the moderating effects of parental monitoring, parental support, parent-child conflicts, and positive drug prevention communication on the relationship between three types of substance use and adolescent delinquency. The regression Model 3 and Model 4 aimed to test hypothesis #2 to hypothesis #5, with each moderating variable and interaction terms included in regression models (see Tables 28 & 29). According to the present findings, Model 3 without interaction terms partly supported research hypotheses #2 to #5. The final regression Model 4 with interaction terms partly supported hypotheses #2 to #5 and suggested promising insights for future social work research and practice.

Model 3

After adding moderating variables into the multivariate regression model (see Table 28), the relationship between three forms of substance use and two forms of adolescent delinquency were not changed. Additionally, hard substance use maintained a stronger association with both violent ($b=0.961, p<.001$) and theft ($b=0.324, p<.001$) behaviors compared to social substance use and non-medical prescription drug use. Furthermore, regarding control variables, there were significant changes among three forms of substance use and demographic characteristics after adding moderators compared to Model 2.

As previously discussed in chapter 3, among moderating variables for both parental monitoring and parental support, higher scores reflect less monitoring and less support from parents. Parental monitoring ($b=0.013, p<.01$) was significantly positively associated with violent behaviors. That is, adolescents with less parental monitoring were more likely to report involvement in violent behaviors. Low parental monitoring ($b=0.002, p=0.054$) was not significantly associated

with theft. Low parental support was significantly associated with both violent (*b=0.024, p<.001*) and theft (*b=0.005, p<.001*) behaviors among adolescents. In other words, adolescents with less parental support were more likely to be involved in both violent and theft delinquent behaviors. Compared to having a high level of parent-child conflicts, adolescents who reported that they never had conflicts (*b=-0.358, p<.001*), a low level of conflicts (*b=-0.276, p<.01*), and a medium level of conflicts (*b=-0.220, p<.01*) were all less likely to engage in both violent and theft behaviors. In other words, adolescents who reported fewer conflicts with their parents showed a lower level of engaging in both violent and theft behaviors. Positive drug prevention communication was also negatively associated with both violent (*b=-0.190, p<.001*) and theft (*b=-0.023, p<.01*) behaviors. As shown in Model 3, adolescents who received any types of drug prevention communication reported a lower level of involvement in both violent and theft behaviors.

In sum, after adding moderating variables into the regression model, the findings revealed that moderating variables did not modify previous relationships found between all three forms of substance use and two types of adolescent delinquency. All three forms of substance use were significantly associated with both violent and theft behaviors in Model 3. Moreover, moderation effects increased the explanatory power of demographic variables in the regression model. Finally, among all the moderating variables, parent-child conflict variables had a stronger association with violent behaviors than did other moderating variables in Model 3.

Table 28

Multivariate Regression Model 3 with Moderating Effects

Factors	Violent Behaviors				Theft Behaviors			
	Coeff.b	S.E.	*T*	p-Value	*Coeff.b*	S.E.	*t*	p-Value
(Intercept)	4.800	0.049	97.523	0.000***	1.037	0.012	78.154	0.000***
Social Substance Use	0.227	0.023	9.779	0.000***	0.045	0.006	7.193	0.000***
Hard Substance Use	0.961	0.072	13.301	0.000***	0.324	0.019	16.698	0.000***
Non-Medical Prescription Drug Use	0.306	0.044	6.941	0.000***	0.130	0.012	10.961	0.000***
Gender (ref=Female)	0.278	0.020	13.620	0.000***	0.020	0.005	3.707	0.000***
African American (ref=White)	0.282	0.033	8.471	0.000***	0.036	0.009	4.045	0.000***
Latinx (ref= White)	0.045	0.027	1.677	0.094	0.015	0.007	2.121	0.034*
Asian (ref= White)	-0.100	0.052	-1.927	0.054	0.024	0.014	1.695	0.090
Other (ref= White)	0.078	0.041	1.930	0.053	0.005	0.011	0.485	0.627
Annual Household Income	-0.041	0.005	-7.482	0.000***	-0.001	0.001	-0.131	0.896
Low Parental Monitoring	0.013	0.004	3.040	0.002**	0.002	0.001	1.930	0.054
Low Parental Support	0.024	0.005	4.521	0.000***	0.005	0.001	3.432	0.000***
Family Conflicts (ref=high level of parent-child conflicts)								
Never	-0.358	0.032	-11.186	0.000***	-0.027	0.009	-3.192	0.001**
Low	-0.276	0.027	-10.054	0.000***	-0.026	0.007	-3.536	0.000***
Medium	-0.220	0.029	-7.626	0.000***	-0.025	0.007	-2.284	0.001**
Positive Drug Prevention Communication (ref=No)	-0.1898	0.030	-6.332	0.000***	-0.023	0.008	-2.852	0.004**
Residual S.E.: 1.178 on 13705 degrees of freedom					0.313 on 13710 degrees of freedom			
Multiple R-Square: 0.091					0.089			
Adjusted R-Square: 0.091					0.087			
F-Statistics: 86.36					83.17			

Note. *$p < .05$; **$p < .01$; ***$p < .001$

Model 4

Model 4 was the final model of multivariate regression analyses, and added interaction terms with all three forms of substance and the moderating variables (see Table 29). The inclusion of interaction terms showed that certain factors partly modified the relationships between three forms of substance use and adolescent delinquency. Hence, the final regression model partly supported Hypothesis #2 to #5. The regression models showed that all three forms of substance use remained significantly positively associated with both violent and theft behaviors in the final regression model. Hard substance use showed the strongest relationships, with the highest coefficient value among all three forms of substances, between both adolescent violent and theft behaviors in Model 4. Compared to Model 3, there were no significant changes in each moderating variable associated with violent and theft behaviors among adolescents, yet Model 4 provided promising insights on interaction terms in terms of adolescent delinquency.

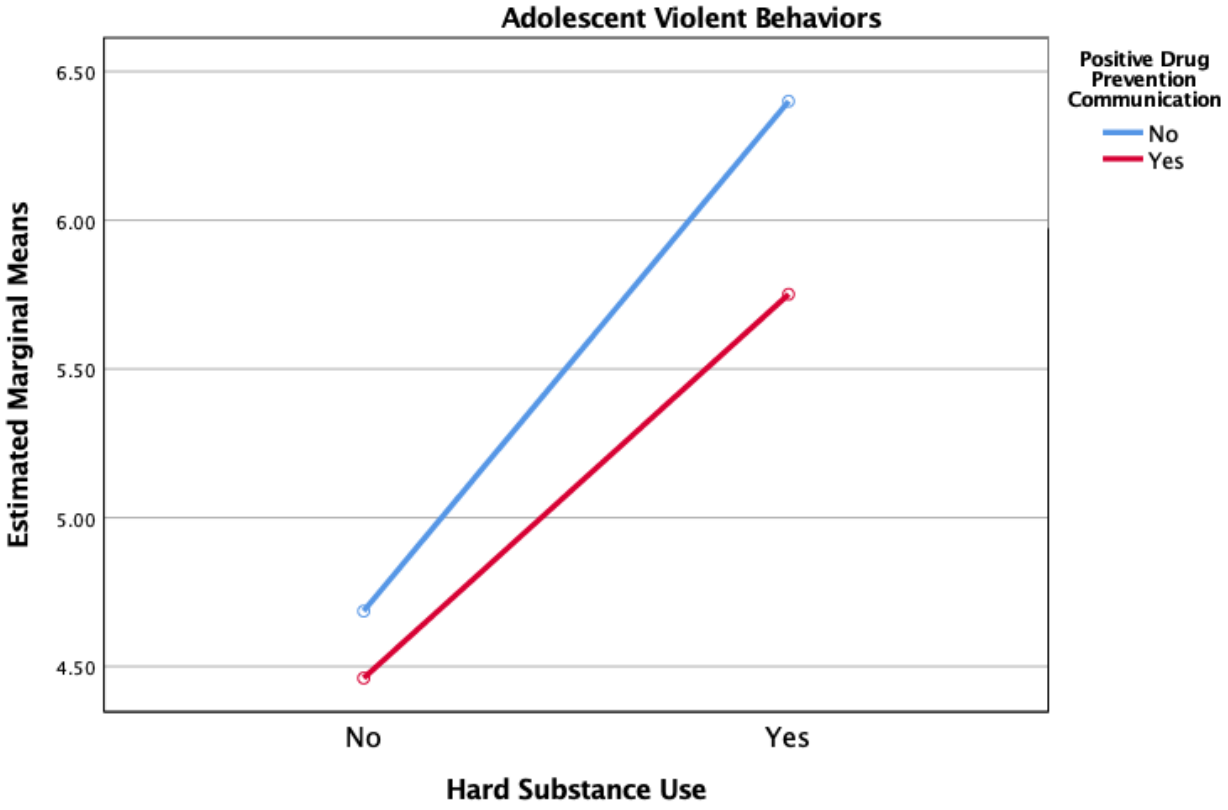
Notably, after adding interaction terms into Model 4, regarding adolescent violent behaviors, only one interaction term had a significant moderating effect on the relationship between substance use and violent behaviors. Model 4 shows that adolescents who used hard substances and who received positive drug prevention communication ($p<.05$) were less likely to engage in violent behaviors (see Figure 4.3).

As shown in Figure 4.3, adolescents who reported using hard substances but who had not received any types of positive drug prevention communication were significantly more likely to engage in violent delinquent behaviors compared to those who reported using hard substances but had received positive drug prevention communication. In other words, receiving positive drug prevention communication significantly buffered the associations between hard substance

use and violent behaviors among U.S. adolescents. Positive drug prevention communication appeared to be effective in reducing adolescent violent behaviors among users of hard substances.

Figure 4.3

Moderation Effects of Positive Drug Prevention Communication on the Relationship between Violent Behaviors and Hard Substance Use

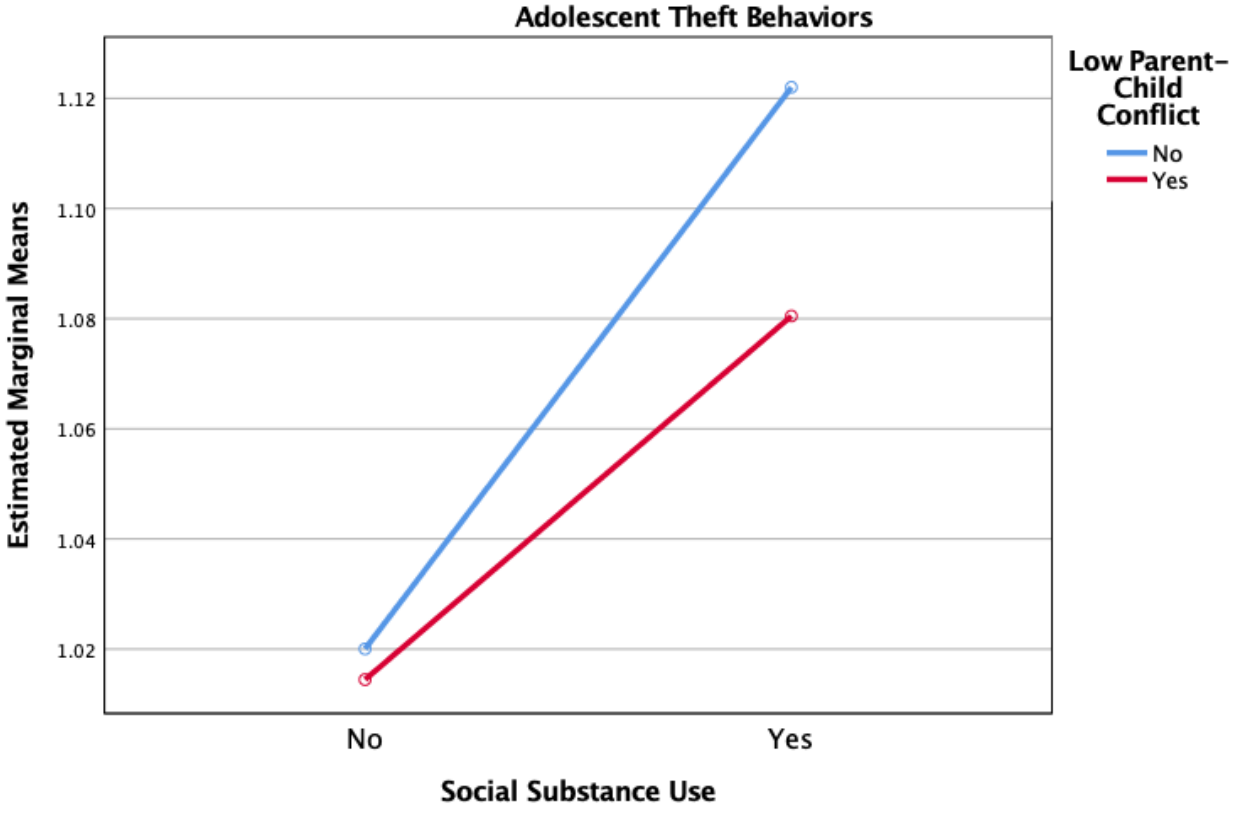


Regarding theft behaviors in Model 4, the five interaction terms identified significant moderating effects associated with the relationship between substance use and theft delinquent behaviors. The interaction between social substance use and minimal parent-child conflicts was significantly associated with theft (see Figure 4.4).

As shown in Figure 4.4, less parent-child conflict significantly buffered the relationships between social substance use and theft behaviors. Adolescents with minimal parent-child conflicts who also had used social substances were significantly less likely to engage in theft delinquent behaviors compared to those who had much family conflict and used social substances.

Figure 4.4

Moderation Effects of Parent-Child Conflict on the Relationship between Theft Behaviors and Social Substance Use

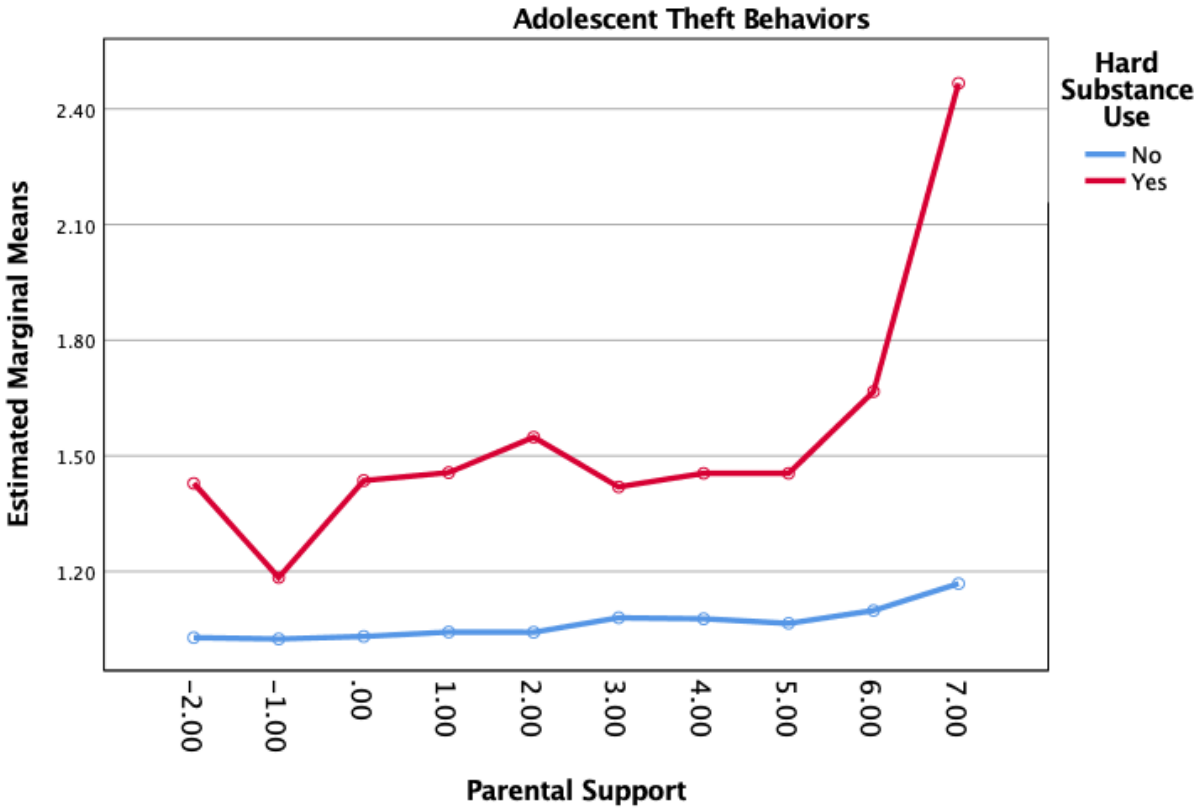


The interaction between hard substance use and parental support revealed a significant association with theft behaviors (see Figure 4.5). As shown in Figure 4.5, adolescents who had less parental support (a higher value on the scale means less parental support) and reported using

hard substances were significantly more likely on average to engage in theft delinquent behaviors compared to those who reported not using hard substances.

Figure 4.5

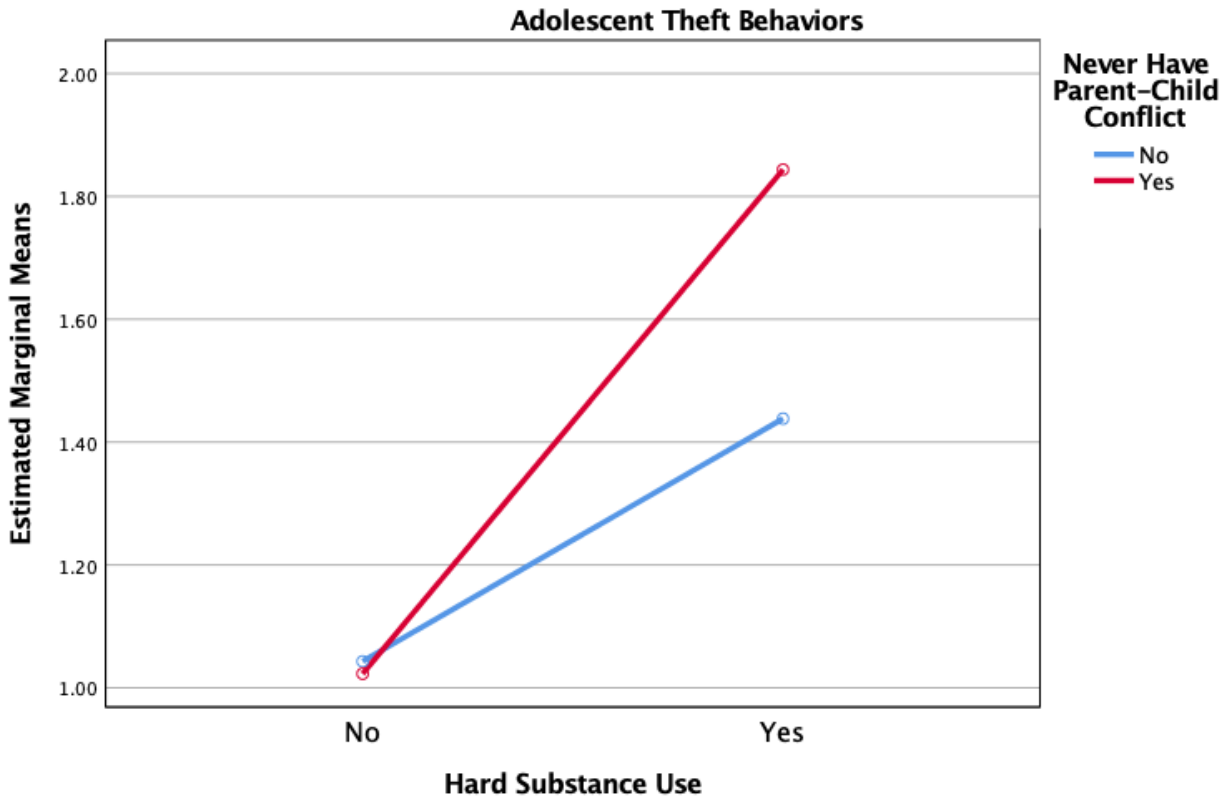
Moderation Effects of Parental Support on the Relationship between Theft Behaviors and Hard Substance Use



The interaction between hard substance use and never having family conflicts was also significantly associated with adolescent theft (see Figure 4.6). Notably, as shown in Figure 4.6, adolescents who never had parent-child conflicts and reported using hard substances were significantly more likely on average to engage in theft compared to those who had much family conflict and reported using hard substances.

Figure 4.6

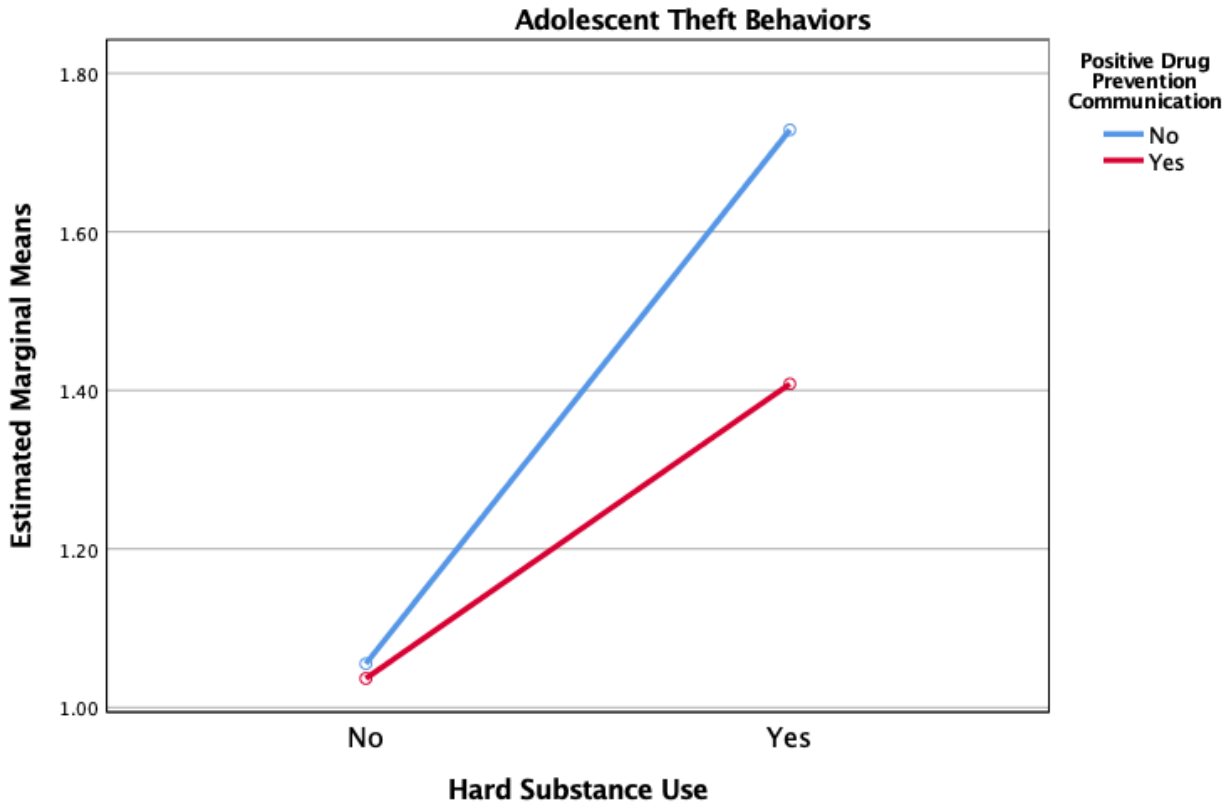
Moderation Effects of Never Have Family Conflict on the Relationship between Theft Behaviors and Hard Substance Use



Additionally, as with violent behaviors, the interaction between hard substance use and positive drug prevention communication was significantly associated with theft behaviors (see Figure 4.7). As shown in Figure 4.7, adolescents who had not received any types of positive drug prevention communication and who also reported using hard substances were significantly more likely on average to engage in theft than were those who had received the positive drug prevention communication.

Figure 4.7

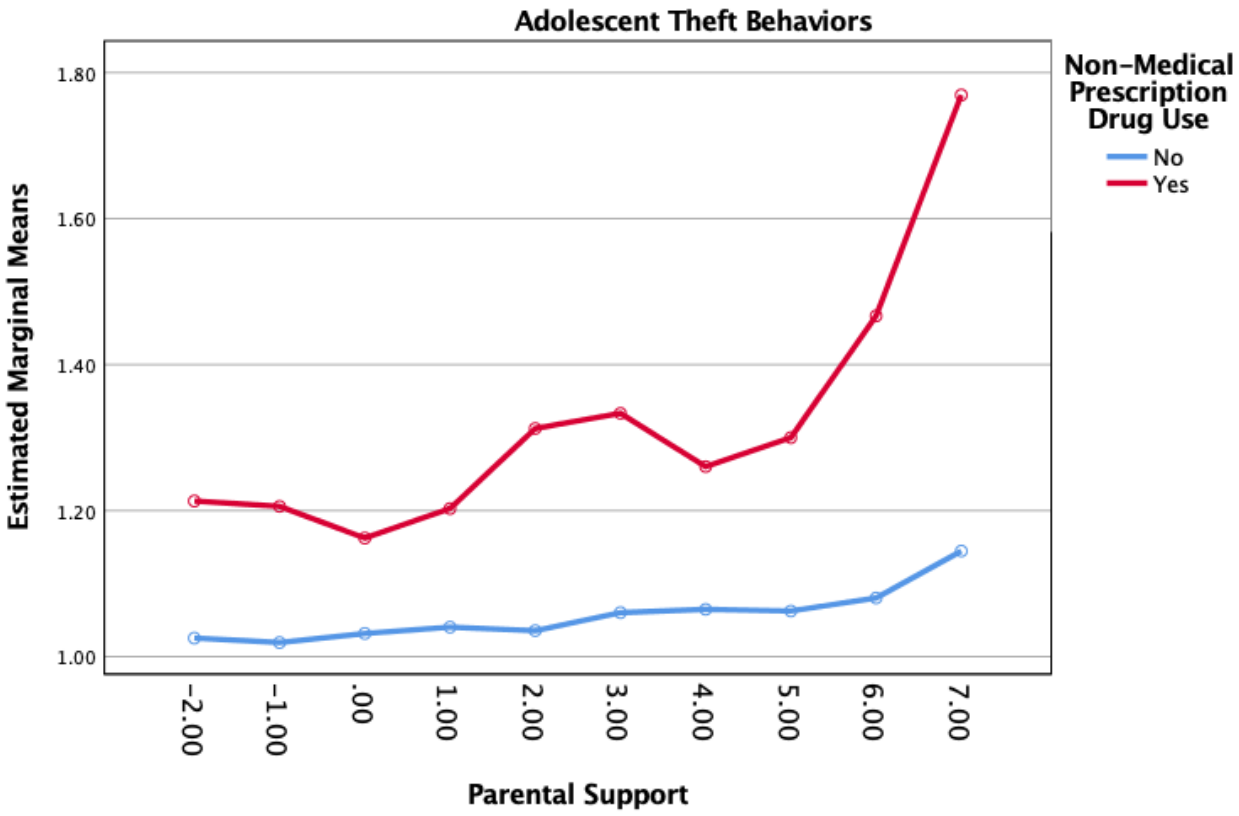
Moderation Effects of Positive Drug Prevention Communication on the Relationship between Theft Behaviors and Hard Substance Use



Finally, the interaction between non-medical prescription drug use and parental support was significantly associated with theft behaviors (see Figure 4.8). As shown in Figure 4.8, adolescents who reported receiving less parental support (indicated by a higher score on the scale) and who also used non-medical prescription drugs were significantly more likely to engage in theft behaviors compared to those who reported less parental support and reported not using non-medical prescription drugs.

Figure 4.8

Moderation Effects of Parental Support on the Relationship between Theft Behaviors and Non-Medical Prescription Drug Use



Other interaction terms revealed non-significant moderation effects on the relationship between substance use and theft behaviors among the U.S. adolescents in the present study.

In sum, all three forms of substance use were significantly associated with both violent and theft behaviors in Model 4. Hard substance use was revealed as the strongest factor related to both violent and theft behaviors, compared to social substance use and non-medical prescription drug use. In terms of adolescent violent behaviors, hard substance use with positive drug prevention communication were the only significant moderating effects. Regarding theft behaviors,

hard substance use with parental support, never had family conflicts, and positive drug prevention communication had moderating effects on the relationship between substance use and adolescent theft behaviors. Furthermore, non-medical prescription drug use with parental support also had a significant moderating effect on the relationship between substance use and adolescent theft behaviors.

Table 29

Multivariate Regression Model 4 with Interaction Terms

Factors	Violent Behaviors				Theft Behaviors			
	Coef.b	S.E.	*T*	p-Value	*Coef.b*	S.E.	*T*	p-Value
(Intercept)	4.743	0.055	86.555	0.000***	1.022	0.015	69.822	0.000***
Social Substance Use	0.321	0.072	4.453	0.000***	0.062	0.019	3.205	0.001**
Hard Substance Use	1.370	0.197	6.955	0.000***	0.378	0.053	7.186	0.000***
Non-Medical Prescription Drug Use	0.396	0.127	3.134	0.002**	0.156	0.034	4.613	0.000***
Gender (ref=Female)	0.277	0.020	13.568	0.000***	0.021	0.005	3.923	0.000***
African American (ref= White)	0.283	0.033	8.493	0.000***	0.037	0.009	4.122	0.000***
Latinx (ref= White)	0.045	0.027	1.658	0.097	0.013	0.007	1.859	0.063
Asian (ref= White)	-0.100	0.052	-1.910	0.056	0.026	0.014	1.874	0.061
Other (ref= White)	0.077	0.041	1.890	0.059	0.005	0.011	0.499	0.617
Annual Household Income	-0.042	0.006	-7.519	0.000***	-0.001	0.001	-0.464	0.643
Low Parental Monitoring	0.016	0.005	2.963	0.003**	0.001	0.001	0.637	0.524
Low Parental Support	0.019	0.007	2.749	0.006**	0.002	0.002	1.396	0.162
Family Conflicts (ref=high level of conflicts)								
Never	-0.356	0.038	-9.362	0.000****	-0.025	0.010	-2.471	0.013*
Low	-0.269	0.034	-7.861	0.000****	-0.013	0.009	-1.451	0.147
Medium	-0.205	0.037	-5.514	0.000****	-0.007	0.010	-0.736	0.462
Positive Drug Prevention Communication	-0.131	0.037	-3.513	0.000****	-0.014	0.001	-1.369	0.171
Social Substance Use* Low Parental Monitoring	-0.005	0.009	-0.415	0.678	0.003	0.002	0.413	0.158

Social Substance Use*Low Parental Support	0.013	0.011	1.210	0.226	-0.002	0.003	-0.867	0.386
Social Substance Use*Never Parent-Child Conflicts	0.004	0.072	0.055	0.956	-0.030	0.019	-1.569	0.117
Social Substance Use*Low Level of Parent-Child Conflicts	0.003	0.060	0.055	0.955	-0.034	0.016	-2.102	0.036*
Social Substance Use*Medium Level of Family Conflicts	0.000	0.062	0.007	0.994	-0.030	0.016	-1.836	0.066
Social Substance Use*Positive Drug Prevention Communication	-0.113	0.066	-1.725	0.085	0.007	0.018	0.360	0.719
Hard Substance Use*Low Parental Monitoring	-0.030	0.029	-1.053	0.293	0.011	0.007	1.462	0.144
Hard Substance Use*Low Parental Support	-0.007	0.031	-0.230	0.293	0.035	0.008	4.240	0.000***
Hard Substance Use* Never Parent-Child Conflicts	0.118	0.252	0.496	0.639	0.442	0.067	6.556	0.000***
Hard Substance Use* Low Level of Parent-Child Conflicts	-0.370	0.191	-1.944	0.052	0.037	0.051	0.728	0.467
Hard Substance Use* Medium Level of Parent-Child Conflicts	-0.109	0.190	-0.574	0.566	-0.075	0.051	-1.484	0.138
Hard Substance Use*Positive Drug Prevention Communication	-0.353	0.180	-1.964	0.049*	-0.202	0.048	-4.222	0.000***
NMPDU* Parental Monitoring	-0.006	0.017	-0.355	0.722	-0.001	0.004	-0.396	0.692
NMPDU* Low Parental Support	-0.005	0.019	-0.303	0.762	0.017	0.005	3.320	0.000***
NMPDU*Never Family Conflicts	0.085	0.210	0.406	0.685	0.066	0.039	1.717	0.086
NMPDU*Low Level of Parent-Child Conflicts	0.033	0.118	0.283	0.777	-0.041	0.032	-1.308	0.191
NMPDU*Medium of Level of Parent-Child Conflicts	-0.160	0.116	-1.381	0.167	-0.052	0.031	-1.684	0.092

NMPDU*Positive Drug Prevention Communication	-0.071	0.119	-0.592	0.553	-0.035	0.32	-1.104	0.270
Residual S.E.: 1.177 on 13690 degrees of freedom					0.311 on 13690 degrees of freedom			
Multiple R-Square: 0.093					0.097			
Adjusted R-Square: 0.091					0.096			
F-Statistics: 45.44					47.79			

Note. *$p < .05$; **$p < .01$; ***$p < .001$

Comparing Regression Models

After examining each regression model, it is necessary and important to decide which model fits the data well (see Table 30). The present study employed analysis of variance (ANOVA) as a model test approach to compare each two nested regression models. Comparing Model 1 vs. Model 2, the ANOVA yielded a significant ($p<.001$) result that multivariate linear regression preferred a more complex model with demographic control variables. To compare Model 2 vs. Model 3, the ANOVA revealed a significant ($p<.001$) result that regression analyses preferred a model with both control and moderating variables. More importantly, comparing Model 3 vs. Model 4, the ANOVA also yielded a significant ($p<.001$) result to show the multivariate regression preferred a more complex model with interaction terms. Model fit tests showed that to investigate the relationships between substance use and adolescent delinquency, the regression analyses preferred a more elaborate model with interaction terms and moderation effects.

In sum, Regression Model 4 was a better fit for the data. To investigate the relationship between substance use and adolescent delinquency, the multivariate regression model indicated that adequate fit with more parameters and interaction terms was preferred. The significant results of regression models' fit presented that investigating moderation effects was necessary to best explain the relationship between substance use and adolescent delinquency in the United States.

Table 30

Multivariate Regression Model Comparing

Model 2 vs Model 1				Model 3 vs Model 2				Model 4 vs Model 3			
Res.Df	RSS	F	*P*	Res.Df	RSS	F	*p*	Res.Df	RSS	F	*p*
13,712	0.360			13,706	0.356			13,690	0.353		
13,717	0.363	29.998	0.000***	13,712	0.360	19.260	0.000***	13,706	0.356	6.141	0.000***

Chapter Summary

This chapter describes the research findings of the present dissertation study. Based on bivariate analysis, male adolescents, African American adolescents, social substances use, hard substances use, non-medical prescription drug use, and received positive drug prevention communication were significantly associated with both violent and theft behaviors. Being Asian was only significantly associated with violent behaviors among U.S. adolescents. The final regression model partly supported research hypotheses #1 to #5. The three forms of substance use were positively associated with both violent and theft behaviors. Male adolescents and African American adolescents revealed a higher likelihood of engaging in both violent and theft behaviors than female adolescents and adolescents who are in other ethnicity backgrounds. Adolescents who lived in a family with more annual income showed less likelihood of involving in violent behaviors. Weaker parental monitoring and weaker parental support led to significantly increased violent behaviors among U.S. adolescents. Compared to having much parent-child conflict, adolescents with fewer parent-child conflicts had significantly reduced violent behaviors. Adolescents who had ever received positive drug prevention communication had less likelihood of exhibiting violent behaviors.

Regarding moderation effects, minimal parent-child conflicts buffered the relationship between social substance use and theft behaviors among U.S. adolescents. Parental support buff-

ered the relationship between hard substance use and non-medical prescription drug use and adolescent theft behaviors. The most important finding based on the regression model was the buffering effects of positive drug prevention communication. Adolescents who received any positive drug prevention communication significantly reduced both illicit drug use and adolescent delinquency among U.S. adolescents.

CHAPTER 6

DISCUSSION AND CONCLUSION

The purpose of this study was to use an eco-systems theoretical framework to investigate moderating factors from multiple layers of the eco-system on the relationship between three forms of substance use and adolescent delinquency. After exploring associations that have been established in the existing literature between three types of substance use and the study outcomes (Research Question #1), the study examined possible associations and moderation effects between risk and protective factors related to family relationships and mass media, and the principal outcomes (Research Questions #2 to #5). The existing literature has often neglected to investigate potential moderating effects related to social relationships and the influence of mass media on the associations between substance use and adolescent delinquency. Hence, prior to this study, few potential moderating effects had been firmly established. This concluding Chapter includes a summary of the major findings previously reported in concert with each research question and its related hypotheses, and addresses research implications and limitations.

Summary of Findings

The study offers important insights about the roles of parental support, parent-child conflicts, and positive drug prevention communication in moderating the association between three types of substance use and adolescent delinquency. The findings show a fairly low prevalence of both violent and theft behaviors among adolescents. The frequency distribution of delinquent behaviors (Table 12) revealed that the majority of adolescents in the study were not engaged in either violent or theft behaviors.

The results supported the first hypothesis, that the usage of three types of substances was significantly and positively associated with both violent and theft behaviors among adolescents. Among the three types of substance use, hard substance use revealed the strongest association with adolescent delinquency. In other words, adolescents who used more hard substances were more likely to be involved in adolescent delinquency, both violent and theft.

The findings of tests for moderation effects partially supported the hypotheses related to family relationships and positive drug prevention communication. Both low parental monitoring and low support were significantly and positively associated with violent behaviors, but not theft behaviors, among adolescents. That is, adolescents who experienced lower parental monitoring and support engaged in more violent behaviors. Regarding parent-child conflicts, compared to having many parent-child conflicts during the past 12 months, never having parent-child conflicts, having minimal conflicts, and having some conflicts were significantly and negatively associated with violent behaviors. That is, adolescents with fewer parent-child conflicts were less likely to engage in violent behaviors. However, this effect is driven by the comparison between those adolescents who never have parent-child conflicts and those who had many parent-child conflicts. Also, parent-child conflicts were not associated with theft behaviors. Finally, positive drug prevention communication was significantly and negatively associated with adolescent violent behaviors. Adolescents who received any type of positive drug prevention communication via mass media engaged in fewer violent behaviors.

The interaction terms applied in this study partially supported the hypotheses. In terms of violent behaviors, the negative association between positive drug prevention communication and violent behaviors was strongest for adolescents who used hard substances. Interestingly, in most cases, the moderating factors had stronger effects on theft behaviors than violent behaviors. As

for social substance use, having minimal parental conflict decreased the association between social substance use and theft delinquent behaviors. Regarding hard substance use, adolescents using hard substances reported less parental support, and the association between hard substance use and theft delinquent behaviors was stronger. Additionally, receiving any type of positive drug prevention communication significantly lowered the association between hard substance use and theft delinquent behaviors. As for non-medical prescription drug use, users of non-medical prescription drugs reported less parental support, and the association between NMPDU and theft delinquent behaviors was strong.

In sum, in this study, positive drug prevention communication was the most prominent and the strongest moderating factor in the relationship between hard substance use and adolescent delinquency. Parental support had the second strongest moderating effect on the relationship between hard substance use and adolescent theft delinquent behaviors. Application of these major findings to the broader context of research in the area of reducing the association between substance use and adolescent delinquency is provided below, as well as future directions for this research.

Value of the Theoretical Framework.

An ecological theoretical framework was helpful for identifying potential moderating effects on the relationship between three forms of substance use and adolescent delinquency. The ecological theoretical framework pointed to the three moderating factors assessed in the study: parental support, parent-child conflicts, and positive drug prevention communication. The findings suggest that stronger parental support to adolescents who use hard substances or non-medical prescription drugs could decrease involvement in theft delinquent behaviors. In addition, among adolescents who use hard substances, arguably the most vulnerable group, positive drug

prevention communication seems to reduce engagement in delinquent behaviors. Moreover, reducing parent-child conflict among adolescents who use substances socially could reduce participation in theft delinquent behaviors.

All of the above findings and interaction effects were in line with my expectation. However, contrary to my expectation, low parental monitoring did not moderate the relationship between substance use and adolescent delinquency. Below, I apply these findings to the broader context of efforts to prevent or reduce adolescent delinquency, and discuss future implications for social work practice, research, and policy. First, a discussion of the most significant study findings is presented below.

Most Important Findings

Major Conclusions for Research Question #1 & Hypothesis#1: investigating associations between three forms of substance use and adolescent delinquency.

The present findings fully support the research hypothesis #1 and confirm the strong associations between social substance use, hard substance use, and non-medical prescription drug use and adolescent delinquency, replicating existing literature. The results confirm past research finding that substance use is associated with adolescent delinquency. That is, adolescents who ever used any types of three forms of substances showed a higher level of adolescent delinquency than nonusers in the United States, which is in accordance with previous studies (Fagan et al., 2014; Kilpatrick et al., 2000; Swahn & Donovan, 2004). In both bivariate and multivariate analyses, social substance use, including tobacco, alcohol, and marijuana, was significantly associated with both violent and theft behaviors among U.S. adolescents, which mirrored the previous studies (Cheng & Li, 2017b; Li & Cheng, 2017). Adolescence is a period of rapid developmental changes including, physical, psychological, mental, and neurobiological, transitioning to

early adulthood. In this period, the high level of exposure to tobacco, alcohol, and marijuana may affect adolescents' biological and neurobiological development. Chassin et al. explained that the usage of alcohol and marijuana slowed down the process of psychosocial maturity and increased the likelihood of challenging social norms and risk-taking behaviors among adolescents. Consequently, social substance use would increase the anti-constitutional trends against mainstream societal values to increase the impulsivity and risk-taking behaviors among adolescents.

Specifically, the findings also confirm that hard substance use, such as cocaine, heroin, LSD, and meth, has the strongest association with adolescent delinquency. That is, hard substance use strongly increases the likelihood of participation in both violent and theft delinquent behaviors compared to social substance use. This finding indicates that even though only a very small portion of adolescents use hard substances, special attention should be paid to adolescent hard substance use in future studies and social work practice. Obtaining hard substances, such as heroin or LSD, may be not as easy as getting access to alcohol, tobacco, and marijuana. Hence, violent delinquent behaviors, such as armed robbery, might be a way to gain income to purchase hard substances. This finding underscores that it is critical to acquire a better understanding of drug and violence interventions that would affect the trajectories from hard substance use to adolescent delinquency to improve the desistence process for illicit drugs (Mulvey et al., 2010).

Furthermore, in this study, non-medical prescription drug use, including pain killers, tranquilizers, stimulants, and sedatives, represent opioid-related drug use. The study found that non-medical prescription drug use was positively associated with delinquent behaviors among U.S. adolescents, which is also consistent with previous studies (Forsyth et al., 2017; Monnat & Rigg, 2016; Sung et al., 2005; Vaughn et al., 2012). This is a concern due to the ease with which ado-

lescents can get access to prescription medicine with non-medical purposes; for instance, adolescents may use parents' prescribed medication at home, or obtain it from their peers at school. Sung et al. (2005) indicated that the prescription opioid drug use seemed to be currently fashionable among adolescents who were using multiple illicit drugs. The present finding indicates that there is a strong need for both better monitoring of medical prescriptions in healthcare systems and parental involvement in prescription drug use among adolescents. Acknowledging the complexity of adolescent delinquency, including the potential for three forms of substance use, and giving more attention to it, will promote the development of appropriate treatments and delinquency prevention programs among adolescents in the future.

Major Conclusions for Research Question #2 & Hypothesis #2: investigating the moderating effect of low parental monitoring on the relationships between three forms of substance use and adolescent delinquency.

The present findings partly support research hypothesis #2 for violent behaviors, and confirm that low parental monitoring among adolescent substance users was positively associated with violent behaviors among U.S. adolescents, which is consistent with previous studies (Henneberger et al., 2016; Kolla et al., 2017; Li & Cheng, 2017). Although it appeared that numerous studies have revealed that low parental monitoring increased the risk of illicit substance use and juvenile delinquency, most of the existing studies have not discussed the reasons why the shortage of parental monitoring was significantly associated with juvenile delinquency. One plausible explanation could be that low parental monitoring indicated that parents were short of parental knowledge to provide sufficient parenting, supervising, and adapting to children's behaviors over the course of adolescence. The present study suggested that improving parental

knowledge and parental practice is a potential step for reducing the risk of violent behaviors among adolescent substance users.

However, low parental monitoring did not moderate the associations between any of the three forms of substance use and adolescent delinquency. Low parental monitoring might be interacting with other risk factors, such as sociodemographic characteristics or delinquent peer affiliations. Henneberger et al. (2016) indicated that the buffer effect of parental monitoring on delinquent behaviors among adolescents significantly varied with ethnic groups. Parental monitoring is a significant protective factor against delinquent behaviors among African American adolescents. Dishion and McMahon (1998) indicated that parental monitoring was a significant mediator between delinquent behaviors and delinquent peer affiliations among adolescents. Therefore, future studies might also need to explore factors that buffer the effect of parental monitoring on the development of multiple externalizing behaviors and the relationship between substance use and delinquent behaviors during adolescence (Barnes et al., 2006).

Major Conclusions for Research Question #3 & Hypothesis #3: investigating the moderation effects of low parental support on the relationships between three forms of substance use and adolescent delinquency.

As previously discussed, parental support reflects a dimension of positive parental involvement, parental warmth and caring, and parental affection that adolescents daily experience from their parents. The present findings partly supported the research hypothesis #3 for violent behaviors, and confirmed that low parental support was significantly associated with violent behaviors among U.S. adolescents, which is in line with previous studies (Fletcher et al., 2004; Lippold et al., 2014; Lippold et al., 2018; Rohner & Britner, 2002; Veneziano, 2003). In other words, adolescents who received less support from their parents were more likely to involve in

violent behaviors. On one hand, adolescents who received less support from their parents might feel a strong rejection from their parents. Rohner (1986) indicated that a significant lack of parental support influenced adolescent behavioral functioning, delinquency, and substance use across different cultures. Rohner and Britner (2002) explained that a lack of parental support is the major predisposing factor associated with nearly all forms of delinquent behaviors among adolescents in the United States. On the other hand, strong parental support encouraged adolescents to be more open to their parents about problems, experiences, and activities during adolescence (Yun et al., 2016). Therefore, establishing a strong supportive parent-adolescent relationship could reduce adolescents' impulse or adrenaline on seeking risk-taking behaviors.

Regarding interaction terms, low parental support had a modest moderating effect in the relationship between non-medical prescription drug use and theft behaviors. Since low parental support was not associated with adolescent theft behaviors, this moderation effect on hard substance use and non-medical prescription drug use relating to theft behaviors might be possible, for low parental support has indirect impact or it was significant only by chance statistically. However, this significant moderation effect might have meaningful practical significance on adolescent theft behaviors. Classic studies in the field of family structure and delinquency have shown that lack of parental support was significantly associated with substance use and delinquent behaviors (Rohner, 1986; Rohner & Britner, 2002; Veneziano, 2003). Conversely, strong parental support might have a buffer effect on reducing substance use to mitigate adolescent delinquency. The moderation effect might reveal a process of lowering adolescent delinquency in the United States. Moreover, previous findings of multiple studies provide the possibility that parental support might naturally mediate on the associations between other family structural variables and delinquent behaviors among adolescents across different cultures (Rohner & Britner,

2002; Vazsonyi et al., 2015; Yun et al., 2016). Present findings provide an insightful understanding of a strong supportive parenting style that could buffer adolescent theft behaviors through different types of substance use. Future studies and interventions should put efforts into establishing a supportive parent-adolescent relationship on mitigating delinquent behaviors with an understanding and supportive family climate.

Major Conclusions for Research Question #4 & Hypothesis #4: investigating the moderation effects of parent-child conflicts on the relationships between three forms of substance use and adolescent delinquency.

The findings supported the research hypothesis #4 for adolescent delinquent behaviors and confirmed that parent-child conflict was significantly associated with delinquent behaviors among U.S. adolescents, which is consistent with previous studies (Aseltine et al., Gore & Gordon, 2000; Bui, 2009; Kim, 2006; Klahr, McGue, et al., 2011; Klahr et al., 2011; Sigfusdottir et al., 2004; Van Doorn et al., 2008). Parent-child conflicts are very common and inevitable, especially during adolescence, due to different expectations on independence and autonomy among parents and adolescents. This study indicated that frequent parent-child conflicts were associated with a high level of engagement in adolescent delinquent behaviors. Regarding tests of the interaction effect, a low level of parent-child conflicts buffered the relationship between social substance use and theft delinquent behaviors. This finding suggests that adolescents who use social substances, such as marijuana, and who had fewer parent-child conflicts and fewer experiences with stressful situations in their family, were less likely than other users of social substances to be involved in delinquent behaviors, which is consistent with findings of other studies (Aseltine et al., 2000; Sigfusdottir et al., 2004). Aseltine et al. (2000) explained that social substance use and adolescent delinquency were dependent upon adolescents' social and personal resources,

such as parent-child conflicts. Notably, however, the present finding indicated that adolescents who never had conflicts with their parents were significantly associated with a higher likelihood of involving in both theft behaviors and hard substances use. As previously discussed, parent-child conflicts are inevitable, especially over the course of adolescence, therefore, one possible explanation is that those adolescents who reported that they never had conflicts with parents might not have parents at home. Thus, among this particular population of adolescents without parents, this specific situation might be associated with the increased likelihood of involving in adolescent delinquency and hard substances use. On the other hand, never had parent-child conflict might be a significant moderator, only by chance, statistically.

Previous studies also provided promising explanations of the associations between parent-child conflicts and adolescent delinquency. Behavioral genetic research revealed that the shared environment of the family partially contributed to increasing parent-child conflicts and adolescent delinquent behaviors (Klahr et al., 2011). Burt et al. (2003) found that shared environmental factors contributed to increasing parent-child conflicts, which explained 12% of the total variance in adolescents externalizing behavioral problems in biological families. According to this aforementioned finding by Burt, Klahr et al. replicated the study, applied a sample of adolescents in adopted families, and confirmed that shared environment was the "true" cause leading parent-child conflicts and adolescent delinquent behaviors. The present findings add to the understanding of social work implications of interrelatedness between parent-child conflicts, substance use, and adolescent delinquency. The study shows the importance of education programs and interventions that focus on improving skills and strategies for both parents and adolescents to cope with conflicts in their family.

Major Conclusions for Research Question #5 & Hypothesis #5: investigating the moderation effects of positive drug prevention communication on the relationships between three forms of substance use and adolescent delinquency.

The findings partially supported research hypothesis #5 in that positive drug prevention communication was significantly negatively associated with violent behaviors. That is, adolescents who had ever received positive drug preventions via mass media were less likely to exhibit violent delinquent behaviors, which is consistent with previous studies (Botvin et al., 2006; Dunn et al., 2018; Hawkins, et al., 1988; Hawkins et al., 2009). Regarding interaction terms, this dissertation study found that among adolescents who used hard substances, positive drug prevention communication buffered both violent and theft behaviors. These findings create an argument for greater integration of drug prevention, especially targeted toward adolescents using illicit drugs.

The findings suggest that positive drug prevention communication via mass media may be an effective way of mitigating both illicit drug use and delinquent behaviors over the course of adolescence. In other words, positive drug prevention communication may hold even greater promise when it focuses on adolescents with multiple risk factors for delinquency and hard substance use (Hawkins et al., 1988). Illicit drug use, youth violence, and delinquency share similar etiological determinants, hence these behaviors may be reduced by common intervention or prevention approaches (Botvin et al., 2006). This might explain one of the reasons that drug prevention communication showed the potential for reducing both substance use and adolescent delinquency.

It is worth observing that adolescents are an age group with frequent exposure to mass media. From a drug prevention standpoint, drug prevention communication has been found to

increase trustworthiness among peer groups and networks, because adolescents can share prevention messages and indirectly create a drug-free environment (Dunn et al., 2018). For social work practice, the findings suggest that school-based positive drug prevention communication should target adolescents with multiple risk factors, including using any forms of substance, violence, delinquency, and other types of risk-taking behaviors, as well as encourage adolescents to share the prevention messages with their peer groups.

Implications for Social Work Practice

The social work professions' contributions to practice in the connected fields of adolescent substance use and delinquency, and the significance of this study to social work were discussed in Chapter 2. Given the study results, additional implications for social work practice are further highlighted in this section.

This study provides additional understanding of the potential of mezzo-level and exo-system-level factors to moderate relationships between substance use and adolescent delinquency, which is of great relevance to social work practice. For several reasons, social workers are well-positioned to facilitate behavioral changes and promote the overall well-being of U.S. adolescents. First, social workers have a tradition of providing child welfare services and supporting children and families. Social workers play a critical role in educating children coping with social stressors or strains that compound physical, psychological, and mental stressors they experience, as well as in meeting complex needs in children who are in their adolescence. The present study found that positive drug prevention communication significantly weakened the association between substance use and adolescent delinquency, particularly for hard substance use and non-medical prescription drug use. The findings are consistent with a classic review study that concluded that the more federal investment in drug prevention, the less drug use among adolescents

in the United States (Mulvey et al., 2010). Collaborating films or videos related to drug prevention in curriculums has a low cost in school settings, but it appears a promising approach in mitigating drug use and adolescent delinquency. The present findings also could make a case for strengthening collaborations among social workers, educators, and teachers targeting drug and violence prevention among adolescents in school settings. In other words, social workers can play a role as an important part of the education team in classrooms, advocating and administering positive drug prevention communication and violence prevention seamlessly and naturally.

In addition to providing and advocating drug and violence prevention in school settings, social workers are also well-equipped to facilitate family services involving both parents and adolescents. This study indicated that parental support weakened the relationship between substance use and adolescent delinquency, while parent-child conflicts strengthened the association of this relationship among U.S. adolescents. Such findings suggest that social workers might advocate for and provide counseling sessions that focus on promoting and changing family dynamics, improving parenting knowledge and skills, and providing emotional support for coping with parent-child conflicts for both parents and adolescents. Accordingly, social workers should establish more prevention training and educational programs for teaching parents the importance of monitoring, rulemaking, support, and involvement with adolescents (Ladis et al., 2019). Ladis et al. suggested that social work practitioners need to put more efforts in educating parent skills and encouraging parental involvement; applying school-based drug and violence prevention strategies; teaching substance refusing and coping strategies in the early stage of adolescence; and targeting more common risk and protective factors for externalizing behavioral problems across the adolescent developmental period. This study's results add to the empirical support for similar social work interventions.

Implications for Social Work Future Research

The present study offers relevant and timely findings for mitigating both substance use and delinquent behaviors among adolescents in the United States. This study identifies multi-faceted moderation effects on the relationship between substance use and delinquent behaviors, and provides support for potentially promising and effective prevention strategies for reducing both substance use and adolescent delinquency. The findings indicate that incorporating positive drug prevention communication in the curriculum in formal school education could be an effective means to help adolescents to comprehend the consequences of substance use. Adolescent substance use and violence prevention concern not only important behavioral changes, but are also a precondition for improving overall adolescent well-being. Based on this study's findings, future studies might further explore several things. First, how does the moderating effect of drug prevention communication on the relationship between substance use and adolescent delinquency hold up in longitudinal studies? Second, what types and contents of positive drug prevention communication are the most impactful for reducing both substance use and adolescent delinquency? Third, what amount or "dose" of drug prevention communication will achieve the strongest effect on mitigating substance use and delinquent behaviors with minimum costs? To answer these questions, more randomized control trial studies might be needed to examine the dose and frequency of providing drug prevention communication in schools or communities.

As to family dynamics, low parental monitoring was, surprisingly, not a significant moderator on the relationships between substance use and adolescent delinquency in this study. Several studies have shown that parental monitoring was a significant protective factor associated with either substance use or delinquent behaviors among adolescents (Kerr et al., 2010b; Ryan et

al., 2010), however, in this study, parental monitoring was not a significant moderator on relationships between substance use and adolescent delinquency. One plausible explanation is that the measuring of parental monitoring in different studies varied slightly or was inconsistent in different datasets. In other words, there is a need for standardized measurements of parental monitoring of adolescents or school-aged children. Therefore, in the future, scholars and professionals in social work, education, and other disciplines should collaborate in developing a set of standardized measures of parental monitoring and other factors related to family dynamics that can be applied to any surveys or questionnaires. A set of standardized measurements of family dynamics would not only improve consistent results in statistical tests, but would also help social work practitioners to target specific parenting behaviors in family dynamics in mitigating adolescent substance use and delinquent behaviors. Future studies might apply the standardized measurement of family dynamics, such as parental monitoring, parental support, and parent-child conflicts, as moderators that would strengthen, weaken, or reverse the relationship between substance use and adolescent delinquency.

Implications for Social Work Policy

Social work's long history of policy advocacy has promoted and improved the overall well-being of children, adolescents, and families in the United States. This study confirmed the active roles of positive drug prevention communication and family dynamics had impacts on the associations between substance use and delinquent behaviors among U.S. adolescents. Media campaigns and policy advocacy against adolescent substance use are one of the best characteristics of adolescent drug prevention programs (Montoya et al., 2003). Additionally, Gorman

(1998) indicated interventions that targeted changing fundamental attitudes and norms were established, of which in school-based drug prevention was the essential component mitigating substance use among adolescents.

Accordingly, the findings of the present study also make a case for special consideration of drug and violence prevention among adolescents. The findings point to a set of priority areas that need to be highlighted and reiterated in a policy agenda of school-based drug and violence prevention. The study reconfirmed the strong relationships among hard substance use, non-medical prescription drug use, and adolescent delinquency. Policy and law-making should focus on these three separate substance use priority areas particularly relevant to heroin/cocaine-related and opioid-related drug use with delinquent behaviors among U.S. adolescents. There is justification for examining hard substance use and non-medical prescription drug use, especially opioid use, among adolescents who are involved in delinquent behaviors. Based on the study findings, it is urgent and critical to advocate for policies targeting the adolescent population and to promote effective prevention and treatment, particularly for hard substance use and non-medical prescription drug use.

On the other side of the fence, not only is it important for social work practitioners to advocate for policymaking related to improving drug and violence prevention programs, but it is also critical to enhance the drug diversion control system in the United States in order to reduce the accessibility to illicit drugs among adolescents. The growing popularity and availability of these three forms of illicit drugs among adolescents has created new opportunities for illegal diversion, trafficking, and misuse (Sung et al., 2005). Successful control of the accessibility, diversion, trafficking, and selling of illicit drugs improved public safety and health, and thereby mitigated future delinquency and crimes among adolescents (Simoni-Wastila & Tompkins, 2001).

Limitations

Although this study generates critical information about moderating effects on the relationships between substance use and adolescent delinquency, a few limitations need to be acknowledged when interpreting the study's findings. First of all, this is a cross-sectional study, therefore, causal effects are not able to be examined or asserted. The present findings only showed correlations between different factors associated with delinquent behaviors among adolescents.

Potential co-occurrence of other types of theft delinquent behaviors was overlooked by the National Survey on Drug Use and Health (NSDUH), 2017. Unfortunately, due to the strong correlation between substance use and selling illicit drugs, the present study used only the variable of minor theft as the indicator of theft delinquent behavior. Therefore, conclusions involving theft delinquent behavior were hindered by the measurement limitation. This study was also hindered by the quality of the independent variables. For instance, the substance use variables did not provide sufficient information on the frequency of using substances. The key variables for the three forms of substance use were dichotomous variables that represented whether a substance had ever been used in a lifetime. Given this condition, the researcher was not able to investigate the association between the frequency of using substances and adolescent delinquency.

Moreover, as previously discussed in Chapter 3, the positive drug prevention communication variable was also a dichotomous variable measuring whether adolescents had ever received any types of films or videos related to drug prevention in/out of school. According to the NSDUH 2017, there was not sufficient information provided related to types, film or video contents, dose, and frequency of drug prevention drug communication that adolescents ever received in/out of school. Therefore, the present dissertation study was only able to investigate general

moderation effects of positive drug prevention communication on the relationship between substance use and adolescent delinquency. Future studies might need to explore what types of positive drug prevention communication are the most impactful. Future studies might also investigate which frequency of receiving positive drug prevention communication would be most effective in mitigating adolescent delinquency.

The predictive capacity of the regression models is another limitation. It is important to observe that the R^2 values in all of the regression models (ranging from approximately .07 to .09) indicate that the variables in the models explain a tiny fraction of the variance in both violent and theft behaviors. Adolescent delinquent behaviors are complex and difficult to explain well. It is important to interpret findings of the study in a context of knowing that most of the variance in adolescent delinquent behaviors remain unexplained.

Finally, and related to the limitation mentioned above, as with many studies involving secondary analysis of existing data, the study is limited by the variables available. An ideal test of how factors in the adolescent ecosystem may moderate the relationship between substance use and delinquency would have included measures of more critical components in the adolescent ecosystem. For example, it would have been good to be able to measure delinquent peer affiliation, school misconduct, and school acceptance, etc. The study is particularly limited in measures from the macro system. The race/ethnicity variable perhaps begins to represent a proxy measure of important systemic barriers and limitations affecting many adolescents and contributing to both substance use and delinquent behaviors. The greater involvement of African-American adolescents in delinquent behaviors may be a reflection of macro system biases and barriers that

affect African-American youth in the U.S. Despite this limitation, the present study makes an argument for fuller consideration of the adolescent ecosystem in advancing understanding of ways to mitigate negative consequences of adolescent substance use.

Chapter Summary

This chapter is the discussion and conclusion of this dissertation study. First, the study confirmed the strong associations between three forms of substance use and adolescent delinquency. Adolescents who had ever used any types of substances increased the likelihood of exhibiting both violent and theft behaviors among U.S. adolescents. Second, the present study also confirmed that positive drug prevention communication via mass media may be an effective way of mitigating both illicit drug use and delinquent behaviors over the course of adolescence. This study also provides additional understanding of moderating effects on mezzo-level and exo-system-level factors influencing relationships between substance use and adolescent delinquency, which is of great relevance to social work practice, future research, and policy. Three major limitations of this study were noted in the end.

REFERENCES

Abuse, S. (2017). Mental Health Services Administration. Key substance use and mental health indicators in the United States: Results from the 2016 National Survey on Drug Use and Health (HHS Publication No. SMA 17-5044, NSDUH Series H-52). Rockville, MD: Center for Behavioral Health Statistics and Quality. *Substance Abuse and Mental Health Services Administration*.

Agnew, R., Matthews, S. K., Bucher, J., Welcher, A. N., & Keyes, C. (2008). Socioeconomic status, economic problems, and delinquency. *Youth & Society*, *40*(2), 159-181.

Antakly, G. (2005). Ecological framework. *Population (English Edition)*, *July*, 1–15. https://doi.org/10.1093/acrefore/9780199975839.013.118

Aseltine, R. H., Gore, S., & Gordon, J. (2000). Life stress, anger and anxiety, and delinquency: An empirical test of general strain theory. *Journal of Health and Social Behavior*, *41*(3), 256. https://doi.org/10.2307/2676320

Asscher, J. J., Wissink, I. B., Deković, M., Prinzie, P., & Stams, G. J. J. M. (2014). Delinquent behavior, poor relationship quality with parents, and involvement with deviant peers in delinquent and nondelinquent adolescents: Different processes, informant bias, or both? *International Journal of Offender Therapy and Comparative Criminology*, *58*(9), 1001–1019. https://doi.org/10.1177/0306624X13491389

Augenstein, T. M., Thomas, S. A., Ehrlich, K. B., Daruwala, S., Reyes, S. M., Chrabaszcz, J. S., & De Los Reyes, A. (2016). Comparing multi-informant assessment measures of parental monitoring and their links with adolescent delinquent behavior. *Parenting*, *16*(3), 164–186. https://doi.org/10.1080/15295192.2016.1158600

Auty, K. M., Farrington, D. P., & Coid, J. W. (2017). The intergenerational transmission of criminal offending: Exploring gender-specific mechanisms. *British Journal of Criminology*, *57*(1), 215–237. https://doi.org/10.1093/bjc/azv115

Bailey, S. L., Flewelling, R. L., & Rosenbaum, D. P. (1997). Characteristics of students who bring weapons to school. *Journal of Adolescent Health*, *20*(4), 261–270. https://doi.org/10.1016/S1054-139X(96)00283-2

Bao, Z., Zhang, W., Lai, X., Sun, W., & Wang, Y. (2015). Parental attachment and Chinese adolescents' delinquency: The mediating role of moral disengagement. *Journal of Adolescence*, *44*(55), 37–47. https://doi.org/10.1016/j.adolescence.2015.06.002

Barnes, G. M., Hoffman, J. H., Welte, J. W., Farrell, M. P., & Dintcheff, B. A. (2006). Effects of parental monitoring and peer deviance on substance use and delinquency. *Journal of Marriage and Family*, *68*(4), 1084–1104. https://doi.org/10.1111/j.1741-3737.2006.00315.x

Bartholow, B. D. (2018). The aggressive brain: Insights from neuroscience. *Current Opinion in Psychology*, *19*, 60–64. https://doi.org/10.1016/j.copsyc.2017.04.002

Bay, U. (2015). *Ecological social work theory*. *December 2017*, 1–20. https://doi.org/10.1093/acrsefore/9780199975839.013.1166

Begue, L., Roche, S., & Duke, A. (2016). Young and armed: A cross-sectional study on weapon carrying among adolescents. *Psychology Crime & Law*, *22*(5), 455–472. https://doi.org/10.1080/1068316x.2015.1120871

Bernat, D. H., Oakes, J. M., Pettingell, S. L., & Resnick, M. (2012). Risk and direct protective factors for youth violence: Results from the national longitudinal study of adolescent health. *American Journal of Preventive Medicine*, *43*(2 SUPPL. 1), S57–S66. https://doi.org/10.1016/j.amepre.2012.04.023

Boles, S. M., & Miotto, K. (2003). Substance abuse and violence: A review of the literature. *Aggression and violent behavior*, *8*(2), 155-174.

Botvin, G. J., Griffin, K. W., & Nichols, T. D. (2006). Preventing youth violence and delinquency through a universal school-based prevention approach. *Prevention Science*, *7*(4), 403–408. https://doi.org/10.1007/s11121-006-0057-y

Boxer, P., Rowell Huesmann, L., Bushman, B. J., O'Brien, M., & Moceri, D. (2009). The role of violent media preference in cumulative developmental risk for violence and general aggression. *Journal of Youth and Adolescence*, *38*(3), 417–428. https://doi.org/10.1007/s10964-008-9335-2

Brennan, I. R., & Moore, S. C. (2009). Weapons and violence: A review of theory and research. *Aggression and Violent Behavior*, *14*(3), 215–225. https://doi.org/10.1016/j.avb.2009.03.003

Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist*, *32*(7), 513–531. https://doi.org/10.1037/0003-066X.32.7.513

Bronfenbrenner, U. (1986). Ecology of the family as a context for human development: Research perspectives. *Developmental psychology*, *22*(6), 723.

Bronfenbrenner, U. (1992). Ecological systems theory Six theories of child development: Revised formulations and current issues (pp. 187-249). *Londres: Jessica Kingsley*.

Bronfenbrenner, U. (1994). Ecological models of human development. In *Readings on the development of children* (Vol. 3, pp. 37–43). http://www.psy.cmu.edu/~siegler/35bronfebrenner94.pdf

Brown, B. B., Mounts, N., Lamborn, S. D., & Steinberg, L. (1993). Parenting practices and peer group affiliation in adolescence. *Child development*, *64*(2), 467-482. Development Stable URL : http://www. *Child Development*, *64*(2), 467–482.

Bui, H. N. (2009). Parent-child conflicts, school troubles, and differences in delinquency across immigration generations. *Crime & Delinquency*, *55*(3), 412–441. https://doi.org/10.1177/0011128707306122

Burt, S. A., Krueger, R. F., McGue, M., & Iacono, W. (2003). Parent-child conflict and the comorbidity among childhood externalizing disorders. *Archives of General Psychiatry*, *60*(5), 505. https://doi.org/10.1001/archpsyc.60.5.505

Catalano, R. F., White, H. R., Fleming, C. B., & Haggerty, K. P. (2011). Is nonmedical prescription opiate use a unique form of illicit drug use? *Addictive Behaviors*, *36*(1–2), 79–86. https://doi.org/10.1016/j.addbeh.2010.08.028

Centers for Disease Control and Prevention. *(2018).* Youth Risk Behavior Survey: data summary and trends report 2007-2017. *Atlanta (GA.).*

Chassin, L., Dmitrieva, J., Modecki, K., Steinberg, L., Cauffman, E., Piquero, A. R., Knight, G. P., & Losoya, S. H. (2010). Does adolescent alcohol and marijuana use predict suppressed growth in psychosocial maturity among male juvenile offenders? *Psychology of Addictive Behaviors*, *24*(1), 48–60. https://doi.org/10.1037/a0017692

Cheng, T. C., & Lo, C. C. (2015). Change in adolescents' alcohol-use patterns, from non-drinking to non-heavy drinking or heavy drinking. *Journal of Drug Issues*, *45*(4), 447–459. https://doi.org/10.1177/0022042615604013

Cheng, T.C., & Li, Q. (2017). Adolescent delinquency in child welfare system: A multiple disadvantage model. *Children and Youth Services Review*, *73*, 205–212. https://doi.org/10.1016/j.childyouth.2016.12.018

Connolly, E. J., Schwartz, J. A., Jackson, D. B., & Beaver, K. M. (2018). How far does the apple fall from the tree? Maternal delinquency and sex-specific patterns of offspring delinquent behavior. *Journal of Criminal Justice*, *54*(December 2017), 50–61. https://doi.org/10.1016/j.jcrimjus.2017.12.004

Cox, E., Leung, R., Baksheev, G., Day, A., Toumbourou, J. W., Miller, P., Kremer, P., & Walker, A. (2016). Violence prevention and intervention programmes for adolescents in Australia: A systematic review. *Australian Psychologist*, *51*(3), 206–222. https://doi.org/10.1111/ap.12168

Curcio, A. L., & Mak, A. S. (2016). Adolescent drinking and delinquent activities: Associations and gender differences. *Journal of Psychologists and Counsellors in Schools*, *26*(1), 100–114. https://doi.org/10.1017/jgc.2015.19

Currie, C., Roberts, C., Morgan, A., Smith, R., Settertobulte, W., & Samdal, O. (2002). Young people's health in context: Health behavior in School-aged Children (HBSC) study: International report from the 2001/2002 survey. *Health Policy for Children and Adolescents*, *4*, 110–119.

Defoe, I. N., Farrington, D. P., & Loeber, R. (2013). Disentangling the relationship between delinquency and hyperactivity, low achievement, depression, and low socioeconomic status: Analysis of repeated longitudinal data. *Journal of Criminal Justice*, *41*(2), 100-107.

Dahlberg, L. L. (1998). Youth violence in the United States. *American Journal of Preventive Medicine*, *14*(4), 259–272. https://doi.org/10.1016/S0749-3797(98)00009-9

De Los Reyes, A., Goodman, K. L., Kliewer, W., & Reid-Quinones, K. (2010). The longitudinal consistency of mother-child reporting discrepancies of parental monitoring and their ability to predict child delinquent behaviors two years later. *Journal of Youth and Adolescence*, *39*(12), 1417–1430. https://doi.org/10.1007/s10964-009-9496-7

Delisi, M., Angton, A., Behnken, M. P., & Kusow, A. M. (2015). Do adolescent drug users fare the worst? Onset type, juvenile delinquency, and criminal careers. *International Journal of Offender Therapy and Comparative Criminology*, *59*(2), 180–195. https://doi.org/10.1177/0306624X13505426

Den Hamer, A., Konijn, E. A., & Keijer, M. G. (2014). Cyberbullying behavior and adolescents' use of media with antisocial content: A cyclic process model. *Cyberpsychology, Behavior, and Social Networking*, *17*(2), 74–81. https://doi.org/10.1089/cyber.2012.0307

Den Hamer, A. H., & Konijn, E. A. (2015). Adolescents' media exposure may increase their cyberbullying behavior: A longitudinal study. *Journal of Adolescent Health*, *56*(2), 203–208. https://doi.org/10.1016/j.jadohealth.2014.09.016

Desai, R. A., Falzer, P. R., Chapman, J., & Borum, R. (2012). Mental illness, violence risk, and race in juvenile detention: Implications for disproportionate minority contact. *American Journal of Orthopsychiatry*, *82*(1), 32–40. https://doi.org/10.1111/j.1939-0025.2011.01138.x

Deutsch, A. R., Crockett, L. J., Wolff, J. M., & Russell, S. T. (2012). Parent and peer pathways to adolescent delinquency: Variations by ethnicity and neighborhood context. *Journal of Youth and Adolescence*, *41*(8), 1078–1094. https://doi.org/10.1007/s10964-012-9754-y

Dishion, T. J., Patterson, G. R., Stoolmiller, M., & Skinner, M. L. (1991). Family, school, and behavioral antecedents to early adolescent involvement with antisocial peers. *Developmental Psychology*, *27*(1), 172–180. https://doi.org/10.1037/0012-1649.27.1.172

Dishion, Thomas J, & McMahon, R. J. (1998). *Parental monitoring and the prevention of child and adolescent problem behavior: A conceptual and empirical formulation*. 15.

Donnelly, E. A. (2017). The disproportionate minority contact mandate: An examination of its impacts on juvenile justice processing outcomes (1997-2011). *Criminal Justice Policy Review*, *28*(4), 347–369. https://doi.org/10.1177/0887403415585139

Doran, N., Luczak, S. E., Bekman, N., Koutsenok, I., & Brown, S. A. (2012). Adolescent substance use and aggression: A review. *Criminal Justice and Behavior*, *39*(6), 748–769. https://doi.org/10.1177/0093854812437022

Douglas, K. R., Chan, G., Gelernter, J., Arias, A. J., Anton, R. F., Weiss, R. D., Brady, K., Poling, J., Farrer, L., & Kranzler, H. R. (2010). Adverse childhood events as risk factors for substance dependence: Partial mediation by mood and anxiety disorders. *Addictive Behaviors*, *35*(1), 7–13. https://doi.org/10.1016/j.addbeh.2009.07.004

Dunn, H. K., Pearlman, D. N., Beatty, A., & Florin, P. (2018). Psychosocial determinants of teens' online engagement in drug prevention social media campaigns: Implications for public health organizations. *The Journal of Primary Prevention*, *39*(5), 469–481. https://doi.org/10.1007/s10935-018-0522-y

Duran-Bonavila, S., Vigil-Colet, A., Cosi, S., & Morales-Vives, F. (2017). How individual and contextual factors affects antisocial and delinquent behaviors: A comparison between young offenders, adolescents at risk of social exclusion, and a community sample. *Frontiers in Psychology*, *8*(OCT), 1–12. https://doi.org/10.3389/fpsyg.2017.01825

Elliot, D. S. (1994). Serious violent offenders: Onset, developmental course, and termination—The American Society of Criminology 1993 Presidential Address. *Criminology*, *32*(1), 1–21.

Elliott, D. S. (1994). Serious violent offenders: Onset, developmental course, and termination. *The American Society of Criminology*.

Fagan, A. A., van Horn, M. L., David Hawkins, J., & Jaki, T. (2013). Differential effects of parental controls on adolescent substance use: For whom is the family most important? *Journal of Quantitative Criminology*, *29*(3), 347–368. https://doi.org/10.1007/s10940-012-9183-9

Fagan, A. A., Wright, E. M., & Pinchevsky, G. M. (2014). The protective effects of neighborhood collective efficacy on adolescent substance use and violence following exposure to violence. *Journal of Youth and Adolescence*, *43*(9), 1498–1512. https://doi.org/10.1007/s10964-013-0049-8

Farineau, H. M. (2016). An ecological approach to understanding delinquency of youths in foster care. *Deviant Behavior*, *37*(2), 139–150. https://doi.org/10.1080/01639625.2014.1004025

Farrell, A. D., & Flannery, D. J. (2006). Youth violence prevention: Are we there yet? *Aggression and Violent Behavior*, *11*(2), 138–150. https://doi.org/10.1016/j.avb.2005.07.008

Farrington, D. P., Loeber, R., & Elliott., D. S. (1990). Advancing knowledge about the onset of delinquency and crime. In *Advances in Clinical Child Psychology* (pp. 238–342).

Fischer, J., Aydin, N., Kastenmüller, A., Frey, D., & Fischer, P. (2012). The delinquent media effect: Delinquency-reinforcing video games increase players attitudinal and behavioral inclination toward delinquent behavior. *Psychology of Popular Media Culture*, *1*(3), 201–205. https://doi.org/10.1037/a0028114

Fitzmaurice, G. M., Kenward, M. G., Molenberghs, G., Tsiatis, A. A., & Verbeke, G. (2014). Handbook of Missing Data (pp. 235).

Fix, R. L., Fix, S. T., Wienke Totura, C. M., & Burkhart, B. R. (2017). Disproportionate minority contact among juveniles adjudicated for sexual, violent, and general offending. *Crime & Delinquency*, *63*(2), 189–209. https://doi.org/10.1177/0011128715626162

Fletcher, A. C., Steinberg, L., & Williams-Wheeler, M. (2004). Parental influences on adolescent problem behavior: Revisiting Stattin and Kerr. *Child Development*, *75*(3), 781–796. https://doi.org/10.1111/j.1467-8624.2004.00706.x

Ford, J. A. (2005). Substance use, the social bond and delinquency. *Recherche En Soins Infirmiers*, *75*(70), 82–89.

Forsyth, C. J., Biggar, R. W., Chen, J., & Burstein, K. (2017). Examining heroin use and prescription opioid misuse among adolescents. *Criminal Justice Studies*, *30*(3), 320–329. https://doi.org/10.1080/1478601X.2017.1286836

Fraser, M. W., Kirby, L. D., & Smokowski, P. R. (2004). Risk and resilience in childhood. *Risk and resilience in childhood: An ecological perspective*, *2*, 13-66.

Friedman, A. S., Terras, A., & Glassman, K. (2002). Multimodel substance use intervention program for male delinquents. *Journal of Child & Adolescent Substance Abuse*, *11*(4), 43–65. https://doi.org/10.1300/J029v11n04_03

Gamez-Guadix, M., Straus, M. A., Carrobles, J. A., Munoz-Rivas, M. J., & Almendros, C. (2010). Corporal punishment and long-term behavior problems: The moderating role of positive parenting and psychological aggression. *Psicothema*, *22*(4), 529–536.

Gault-Sherman, M. (2013). The gender gap in delinquency: Does SES matter? *Deviant Behavior*, *34*(4), 255–273. https://doi.org/10.1080/01639625.2012.735610

Germain, C. (1973). An Ecological Perspective in Casework Practice. *Social Casework*, *57*(7), 419–426.

Tsui, J. C. (2014). Breaking Free do the Prison Paradigm: Integrating Restorative Justice Techniques into Chicago's Juvenile Justice System. *J. Crim. L. & Criminology*, *104*, 635.

Gitterman, A., & Germain, C. B. (2008). Ecological framework. *Encyclopedia of Social Work*, *December 2017*, 97–102. https://doi.org/10.1093/acrefore/9780199975839.013.118

Gitterman, A., & Heller, N. R. (2011). Integrating social work perspectives and models with concepts, methods and skills with other professions' specialized approaches. *Clinical Social Work Journal*, *39*(2), 204–211. https://doi.org/10.1007/s10615-011-0340-7.

Glueck, S. (1953). The home, the school, and delinquency. *Harvard Educational Review*, *23*(1), 17.

Gorman, D. M. (1998). The irrelevance of evidence in the development of school-based drug prevention policy, 1986-1996. *Evaluation Review*, *22*(1), 118–146. https://doi.org/10.1177/0193841X9802200106

Greene, R. R. (2013). *Resilience*. NASW Press and Oxford University Press. https://doi.org/10.1093/acrefore/9780199975839.013.344

Hanlon, T. E., Bateman, R. W., Simon, B. D., O'Grady, K. E., & Carswell, S. B. (2002). An early community-based intervention for the prevention of substance abuse and other delinquent behavior. *Journal of Youth and Adolescence*, *31*(6), 459–471. https://doi.org/10.1023/A:1020215204844

Harris-McKoy, D. A. (2016). Adolescent delinquency: Is too much or too little parental control a problem? *Journal of Child and Family Studies*, *25*(7), 2079–2088. https://doi.org/10.1007/s10826-016-0383-z

Loeber, R., & Farrington, D. P. (Eds.). (1998). *Serious and violent juvenile offenders: Risk factors and successful interventions*. Sage Publications.

Hawkins, J. D., Jenson, J. M., Catalano, R. F., & Lishner, D. M. (1988). Delinquency and drug abuse: Implications for social services. *Social Service Review*, *62*(2), 258–284. https://doi.org/10.1086/644546

Hawkins, J. D., Oesterle, S., Brown, E. C., Arthur, M. W., Abbott, R. D., Fagan, A. A., & Catalano, R. F. (2009). Results of a type 2 translational research trial to prevent adolescent drug use and delinquency: A test of communities that care. *Archives of Pediatrics & Adolescent Medicine*, *163*(9), 789. https://doi.org/10.1001/archpediatrics.2009.141

Helfgott, J. B. (2015). Criminal behavior and the copycat effect: Literature review and theoretical framework for empirical investigation. *Aggression and Violent Behavior*, *22*, 46–64. https://doi.org/10.1016/j.avb.2015.02.002

Helstrom, A., Bryan, A., Hutchison, K. E., Riggs, P. D., & Blechman, E. A. (2004a). Tobacco and alcohol use as an explanation for the association between externalizing behavior and illicit drug use among delinquent adolescents. *Prevention Science*, *5*(4), 267–277. https://doi.org/10.1023/B:PREV.0000045360.23290.8f

Henggeler, S., Cunningham, P., Pickrel, S., Schoenwald, S., & Brondino, M. (1996). Multisystemic therapy: An effective violence prevention approach for serious juvenile offenders. *Journal of Adolescence*, *19*(1), 47–61. https://doi.org/10.1006/jado.1996.0005

Henneberger, A. K., Varga, S. M., Moudy, A., & Tolan, P. H. (2016). Family functioning and high risk adolescents' aggressive behavior: Examining effects by ethnicity. *Journal of Youth and Adolescence*, *45*(1), 145–155. https://doi.org/10.1007/s10964-014-0222-8

Herrera, V. M., & McCloskey, L. A. (2001). Gender differences in the risk for delinquency among youth exposed to family violence. *Child Abuse and Neglect*, *25*(8), 1037–1051. https://doi.org/10.1016/S0145-2134(01)00255-1

Horstkötter, D., Berghmans, R., Feron, F., & De Wert, G. (2014). "One can always say no." Enriching the bioethical debate on antisocial behaviour, neurobiology and prevention: Views of juvenile delinquents. *Bioethics*, *28*(5), 225–234. https://doi.org/10.1111/j.1467-8519.2012.01997.x

Hotaling, G. T., Straus, M. A., & Lincoln, A. J. (1989). Intrafamily violence, and crime and violence outside the family. *Crime and Justice*, *11*, 315-375.

Howard, M. O., & Jenson, J. M. (1999). *Youth violence: Current research and recent practice innovations* (J. M. Jenson & M. O. Howard, Eds.). NASW Press Washington, DC.

Howell, D. (2007). Statistical methods for psychology Thomson Wadsworth. *Belmont, CA*, 318-324.

Huang, D. Y. C., Lanza, H. I., Murphy, D. A., & Hser, Y. I. (2012). Parallel development of risk behaviors in adolescence: Potential pathways to co-occurrence. *International Journal of Behavioral Development*, *36*(4), 247–257. https://doi.org/10.1177/0165025412442870

Intravia, J., Pelletier, E., Wolff, K. T., & Baglivio, M. T. (2017). Community disadvantage, prosocial bonds, and juvenile reoffending. *Youth Violence and Juvenile Justice*, *15*(3), 240–263. https://doi.org/10.1177/1541204016639350

Jabar, A., Lawal, A., Mehtar, Z., & Matzopoulos, R. (2016). Substance abuse programs that reduce violence in a youth population: A systematic review. *Journal of Alcohol and Drug Education*, *60*(2), 8–15.

Johnson, E. M., & Belfer, M. L. (1995). Substance abuse and violence: cause and consequence. *Journal of Health Care for the Poor and Underserved*, *6*(2), 113–121. https://doi.org/10.1353/hpu.2010.0578

Jonson-Reid, M. (1998). Youth violence and exposure to violence in childhood. *Aggression and Violent Behavior*, *3*(2), 159–179. https://doi.org/10.1016/S1359-1789(97)00009-8

Puzzanchera, C., & Hockenberry, S. (2018). Characteristics of Delinquency Cases Handled in Juvenile Court 2015. *National Center for Juvenile Justice National Center for Juvenile Justice. Retrieved from http://www. ncjj. org/pdf/Data% 20snapshots*, *202016*.

Kabacoff, R. (2015). *R in action: Data analysis and graphics with R* (Second edition). Manning.

Kann, L., McManus, T., Harris, W. A., Shanklin, S. L., Flint, K. H., Queen, B., ... & Lim, C. (2018). Youth risk behavior surveillance—United States, 2017. *MMWR Surveillance Summaries*, *67*(8), 1.

Kendler, K. S., Ohlsson, H., Morris, N. A., Sundquist, J., & Sundquist, K. (2015). A Swedish population-based study of the mechanisms of parent-offspring transmission of criminal behavior. *Psychological Medicine*, *45*(5), 1093–1102. https://doi.org/10.1017/S0033291714002268

Kerr, M., Stattin, H., & Burk, W. J. (2010a). A reinterpretation of parental monitoring in longitudinal perspective. *Journal of Research on Adolescence*, *20*(1), 39–64. https://doi.org/10.1111/j.1532-7795.2009.00623.x

Kerr, M., Stattin, H., & Burk, W. J. (2010b). A Reinterpretation of parental monitoring in longitudinal perspective. *Journal of Research on Adolescence*, *20*(1), 39–64. https://doi.org/10.1111/j.1532-7795.2009.00623.x

Kilpatrick, D. G., Acierno, R., Saunders, B., Resnick, H. S., Best, C. L., & Schnurr, P. P. (2000). Risk factors for adolescent substance abuse and dependence: Data from a national sample. *Journal of Consulting and Clinical Psychology*, *68*(1), 19–30. https://doi.org/10.1037/0022-006X.68.1.19

Kim, H. S., & Kim, H. S. (2008). The impact of family violence, family functioning, and parental partner dynamics on Korean juvenile delinquency. *Child Psychiatry and Human Development*, *39*(4), 439–453. https://doi.org/10.1007/s10578-008-0099-4

Kim, K. J. (2006). Parent–adolescent conflict, negative emotion, and estrangement from the family of origin. *Research in Human Development*, *3*(1), 45–58. https://doi.org/10.1207/s15427617rhd0301_5

Klahr, A. M., McGue, M., Iacono, W. G., & Burt, S. A. (2011). The association between parent–child conflict and adolescent conduct problems over time: Results from a longitudinal adoption study. *Journal of Abnormal Psychology*, *120*(1), 46–56. https://doi.org/10.1037/a0021350

Klahr, A. M., Rueter, M. A., McGue, M., Iacono, W. G., & Alexandra Burt, S. (2011). The relationship between parent-child conflict and adolescent antisocial behavior: confirming shared environmental mediation. *Journal of Abnormal Child Psychology*, *39*(5), 683–694. https://doi.org/10.1007/s10802-011-9505-7

Kolla, N. J., Meyer, J. H., Bagby, R. M., & Brijmohan, A. (2017). Trait anger, physical aggression, and violent offending in antisocial and borderline personality disorders. *Journal of Forensic Sciences*, *62*(1), 137–141. https://doi.org/10.1111/1556-4029.13234

Kondrat, M. E. (2008). *Person-in-Environment*. *2013*(July), 1–15. https://doi.org/10.1093/acrefore/9780199975839.013.285

Ladis, B. A., Macgowan, M., Thomlison, B., Fava, N. M., Huang, H., Trucco, E. M., & Martinez, M. J. (2019). Parent-focused preventive interventions for youth substance use and problem behaviors: A systematic review. *Research on Social Work Practice*, *29*(4), 420–442. https://doi.org/10.1177/1049731517753686

Lalayants, M., & Prince, J. D. (2014). Delinquency, depression, and substance use disorder among child welfare-involved adolescent females. *Child Abuse and Neglect*, *38*(4), 797–807. https://doi.org/10.1016/j.chiabu.2013.08.008

Lambie, I., Randell, I., & McDowell, H. (2014). "Inflaming your neighbors": Copycat firesetting in adolescents. *International Journal of Offender Therapy and Comparative Criminology*, *58*(9), 1020–1032. https://doi.org/10.1177/0306624X13492657

Latvala, A., Kuja-Halkola, R., Långström, N., & Lichtenstein, P. (2015). Paternal antisocial behavior and sons' cognitive ability: A population-based quasiexperimental study. *Psychological Science*, *26*(1), 78–88. https://doi.org/10.1177/0956797614555726

Laurens, K. R., Tzoumakis, S., Kariuki, M., Green, M. J., Hamde, M., Harris, F., Carr, V. J., & Dean, K. (2017). Pervasive influence of maternal and paternal criminal offending on early childhood development: A population data linkage study. *Psychological Medicine*, *47*(5), 889–901. https://doi.org/10.1017/S0033291716003007

Ledwell, M., & King, V. (2015). Bullying and internalizing problems-gender differences and the buffering role of parental communication. *Journal of Family Issues*, *36*(5), 543–566. https://doi.org/10.1177/0192513X13491410

Lee, J., Hunter, S. C., & Patton, D. U. (2016). Understanding the correlates of face-to-face and cyberbullying victimization among u.s. adolescents: A social-ecological analysis. *Violence and Victims*, *31*(4), 638–663.

Leslie, L. K., James, S., Monn, A., Kauten, M. C., Zhang, J., & Aarons, G. (2010). Health-risk behaviors in young adolescents in the child welfare system. *Journal of Adolescent Health*, *47*(1), 26–34. https://doi.org/10.1016/j.jadohealth.2009.12.032

Levenson, J., & Grady, M. (2016). Childhood adversity, substance abuse, and violence: Implications for trauma-informed social work practice. *Journal of Social Work Practice in the Addictions*, *16*(1–2), 24–45. https://doi.org/10.1080/1533256X.2016.1150853

Li, Q., & Cheng, T. C. (2017). New evidence in physical violent behaviors among school-aged children: A multiple disadvantages model. *Children and Youth Services Review*, *81*(June), 301–308. https://doi.org/10.1016/j.childyouth.2017.08.021

Lippold, M. A., Greenberg, M. T., Graham, J. W., & Feinberg, M. E. (2014). Unpacking the effect of parental monitoring on early adolescent problem behavior: Mediation by parental knowledge and moderation by parent–youth warmth. *Journal of Family Issues*, *35*(13), 1800–1823. https://doi.org/10.1177/0192513X13484120

Lippold, M. A., Hussong, A., Fosco, G. M., & Ram, N. (2018). Lability in the parent's hostility and warmth toward their adolescent: Linkages to youth delinquency and substance use. *Developmental Psychology*, *54*(2), 348–361. https://doi.org/10.1037/dev0000415

Llorca, A., Richaud, M. C., & Malonda, E. (2017). Parenting styles, prosocial, and aggressive behavior: The role of emotions in offender and non-offender adolescents. *Frontiers in Psychology*, *8*(AUG), 1–11. https://doi.org/10.3389/fpsyg.2017.01246

Mallett, C. A. (2015). Comorbid adolescent difficulties: Social work prevention of delinquency and serious youthful offending. *Journal of Evidence-Informed Social Work*, *12*(5), 509–523. https://doi.org/10.1080/15433714.2014.942020

Markowitz, A. J., & Ryan, R. M. (2016). Father absence and adolescent depression and delinquency: A comparison of siblings approach. *Journal of Marriage and Family*, *78*(5), 1300–1314. https://doi.org/10.1111/jomf.12343

Marotta, P. L., & Voisin, D. R. (2017). Testing three pathways to substance use and delinquency among low-income African American adolescents. *Children and Youth Services Review*, *75*, 7–14. https://doi.org/10.1016/j.childyouth.2017.02.009

Martin, M. J., McCarthy, B., Conger, R. D., Gibbons, F. X., Simons, R. L., & Brody, G. H. (2011). The enduring significance of racism: Discrimination and delinquency among Black American youth. *Journal of Research on Adolescence*, *21*(3), 662–676. https://doi.org/10.1111/j.1532-7795.2010.00699.x.

Mason, W. A., Hitch, J. E., Kosterman, R., McCarty, C. A., Herrenkohl, T. I., & Hawkins, J. D. (2010). Growth in adolescent delinquency and alcohol use in relation to young adult crime, alcohol use disorders, and risky sex: A comparison of youth from low- versus middle-income backgrounds. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *51*(12), 1377–1385. https://doi.org/10.1111/j.1469-7610.2010.02292.x

Masten, A. S., & Coatsworth, J. D. (1998). The development of competence in favorable and unfavorable environments. Lessons from research on successful children. *The American Psychologist*, *53*(2), 205–220. https://doi.org/10.1037/0003-066X.53.2.205

May, D. C. (1999). Scared kids, unattached kids, or peer pressure: Why do students carry firearms to school?. *Youth & Society*, *31*(1), 100-127.

McCance-Katz, E. F. (2019). The National Survey on Drug Use and Health: 2017. *Substance Abuse and Mental Health Services Administration. https://www. samhsa. gov/data/sites/default/files/nsduh-ppt-09-2018. pdf. Accessed May*, *7*.

McCauley, J. L., Danielson, C. K., Amstadter, A. B., Ruggiero, K. J., Resnick, H. S., Hanson, R. F., Smith, D. W., Saunders, B. E., & Kilpatrick, D. G. (2010). The role of traumatic event history in non-medical use of prescription drugs among a nationally representative sample of US adolescents. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *51*(1), 84–93. https://doi.org/10.1111/j.1469-7610.2009.02134.x

Melotti, G., & Passini, S. (2018). Drug use and violence among adolescents: The mediation effect of attitudes supporting violence. *Journal of Child and Adolescent Substance Abuse*, *27*(4), 244–250. https://doi.org/10.1080/1067828X.2018.1462282

Mersky, J. P., Topitzes, J., & Reynolds, A. J. (2013). Impacts of adverse childhood experiences on health, mental health, and substance use in early adulthood: A cohort study of an urban, minority sample in the U.S. *Child Abuse & Neglect*, *37*(11), 917–925. https://doi.org/10.1016/j.chiabu.2013.07.011

Meyer, C. H. (1983). *Clinical social work in the eco-systems perspective*. Columbia University Press.

Miley, K. K., O'Melia, M., & DuBois, B. (2001). Generalist social work practice: An empowering approach.

Miller, P. G., Butler, E., Richardson, B., Staiger, P. K., Youssef, G. J., MacDonald, J. A., Sanson, A., Edwards, B., & Olsson, C. A. (2016). Relationships between problematic alcohol consumption and delinquent behaviour from adolescence to young adulthood. *Drug and Alcohol Review*, *35*(3), 317–325. https://doi.org/10.1111/dar.12345

Monahan, K. C., Rhew, I. C., Hawkins, J. D., & Brown, E. C. (2014). Adolescent pathways to co-occurring problem behavior: The effects of peer delinquency and peer substance use. *Journal of Research on Adolescence*, *24*(4), 630–645. https://doi.org/10.1111/jora.12053

Monnat, S. M., & Rigg, K. K. (2016). Examining rural/urban differences in prescription opioid misuse among us adolescents: Rural/urban adolescent prescription opioid misuse. *The Journal of Rural Health*, *32*(2), 204–218. https://doi.org/10.1111/jrh.12141

Montoya, I. D., Atkinson, J., & McFaden, C. W. (2003). Best characteristics of adolescent gateway drug prevention programs. *Journal of Addictions Nursing*, *14*(2), 75–83. https://doi.org/10.1080/10884600390230466

Mulvey, E. P., Schubert, C. A., & Chassin, L. (2010). *Substance use and delinquent behavior among serious adolescent offenders: (506942011-001)* [Data set]. American Psychological Association. https://doi.org/10.1037/e506942011-001

Murphy, S. M., McPherson, S., & Robinson, K. (2014). Non-medical prescription opioid use and violent behaviour among adolescents. *Journal of Child and Adolescent Mental Health*, *26*(1), 35–47. https://doi.org/10.2989/17280583.2013.849607

Nakawaki, B., & Crano, W. (2015). Patterns of substance use, delinquency, and risk factors among adolescent inhalant users. *Substance Use and Misuse*, *50*(1), 114–122. https://doi.org/10.3109/10826084.2014.961611

Nixon, C. L. (2014). Current perspectives: The impact of cyberbullying on adolescent health. *Adolescent Health, Medicine and Therapeutics*, *5*, 143. https://doi.org/10.2147/AHMT.S36456

Noffsinger, S., Clements-Nolle, K., Bacon, R., Lee, W., Albers, E., & Yang, W. (2012). Substance use and fighting among male and female high school youths: A brief report. *Journal of Child & Adolescent Substance Abuse*, *21*(2), 105–116. https://doi.org/10.1080/1067828X.2012.636706

Noyori-Corbett, C., & Moon, S. S. (2010). Multifaceted reality of juvenile delinquency: An empirical analysis of structural theories and literature. *Child and Adolescent Social Work Journal*, *27*(4), 245–268. https://doi.org/10.1007/s10560-010-0205-x

Nye, F. I., Short, J. F., & Olson, V. J. (1958). Socioeconomic status and delinquent behavior. *The American Journal of Sociology*, *63*(4), 381–389.

Oesterle, S., Hawkins, J. D., Steketee, M., Jonkman, H., Brown, E. C., Moll, M., & Haggerty, K. P. (2012). A Cross-national comparison of risk and protective factors for adolescent drug use and delinquency in the United States and the Netherlands. *Journal of Drug Issues*, *42*(4), 337–357. https://doi.org/10.1177/0022042612461769

Office of Juvenile Justice and Delinquency Prevention. (2019). OJJDP Fact Sheet.

Olson, C. K. (2004). Media violence research and youth violence data:Why do they conflict? *Acad Psychiatry*, *28*(2), 144–150. https://doi.org/ 10.1176/appi.ap.28.2.144

Palmer, E. J., & Hollin, C. R. (2001). Sociomoral reasoning, perceptions of own parenting and self-reported delinquency. *Applied Cognitive Psychological*, *15*, 85–100. https://doi.org/10.1016/0191-8869(96)00058-X

Puzzanchera, C. (2018). *Juvenile Arrests, 2016* (p. 12).

Rankin, Josep H., & Kern, R. (1994). Parental attachments and delinquency. *Criminology*, *32*(4).

Rankin, Joseph H., & Wells, L. E. (1990). The effect of parental attachments and direct controls on delinquency. *Journal of Research in Crime and Delinquency*, *27*(2), 140–165. https://doi.org/10.1177/0022427890027002003

Rekker, R., Keijsers, L., Branje, S., Koot, H., & Meeus, W. (2017). The interplay of parental monitoring and socioeconomic status in predicting minor delinquency between and within adolescents. *Journal of Adolescence*, *59*, 155–165. https://doi.org/10.1016/j.adolescence.2017.06.001

Rekker, R., Pardini, D., Keijsers, L., Branje, S., Loeber, R., & Meeus, W. (2015). Moving in and out of poverty: The within-individual association between socioeconomic status and juvenile delinquency. *PLoS ONE*, *10*(11), 1–17. https://doi.org/10.1371/journal.pone.0136461

Rohner, R. P. (1986). *The warmth dimension: Foundations of parental acceptance-rejection theory*. Sage Publications, Inc.

Rohner, R. P., & Britner, P. A. (2002). Worldwide mental health correlates of parental acceptance-rejection: Review of cross-cultural and intracultural evidence. *Cross-Cultural Research*, *36*(1), 16-47.

Ruigrok, N., Van Atteveldt, W., Gagestein, S., & Jacobi, C. (2017). Media and juvenile delinquency: A study into the relationship between journalists, politics, and public. *Journalism*, *18*(7), 907–925. https://doi.org/10.1177/1464884916636143

Rutter, M. (2006). Implications of resilience concepts for scientific understanding. *Annals of the New York Academy of Sciences*, *1094*(1), 1–12. https://doi.org/10.1196/annals.1376.002

Rutter, M. (1987). Psychosocial resilience and protective mechanisms. *American journal of orthopsychiatry*, *57*(3), 316-331.

Ryan, S. M., Jorm, A. F., & Lubman, D. I. (2010). Parenting factors associated with reduced adolescent alcohol use: A systematic review of longitudinal studies. *Australian & New Zealand Journal of Psychiatry*, *44*(9), 774–783. https://doi.org/10.1080/00048674.2010.501759

Sanchez, R. (2018). *Inside the Florida school massacre, moment by moment—CNN*. https://www.cnn.com/2018/02/18/us/parkland-florida-school-shooting-accounts/index.html

Savolainen, J., Applin, S., Messner, S. F., Hughes, L. A., Lytle, R., & Kivivuori, J. (2017). Does the gender gap in delinquency vary by level of patriarchy? A cross-national comparative analysis. *Criminology*, *55*(4), 726–753. https://doi.org/10.1111/1745-9125.12161

Shetgiri, R., Boots, D. P., Lin, H., & Cheng, T. L. (2016). Predictors of weapon-related behaviors among African American, Latino, and White Youth. *Journal of Pediatrics*, *171*, 277–282. https://doi.org/10.1016/j.jpeds.2015.12.008

Shoemaker, D. J. (2018). *Theories of delinquency: An examination of explanations of delinquent behavior*. Oxford University Press.

Shpiegel, S., Lister, J. J., & Isralowitz, R. (2016a). Relationships between delinquency and substance use among adolescents emancipating from foster care. *Journal of Social Work Practice in the Addictions*, *16*(1–2), 113–131. https://doi.org/10.1080/1533256X.2016.1164059

Shpiegel, S., Lister, J. J., & Isralowitz, R. (2016b). Relationships between delinquency and substance use among adolescents emancipating from foster care. *Journal of Social Work Practice in the Addictions*, *16*(1–2), 113–131. https://doi.org/10.1080/1533256X.2016.1164059

Shulman, L. (2012). *Brooks/Cole empowerment series: The skills of helping individuals, families, groups, and communities*. Cengage Learning.

Sigfusdottir, I.-D., Farkas, G., & Silver, E. (2004). The role of depressed mood and anger in the relationship between family conflict and delinquent behavior. *Journal of Youth and Adolescence*, *33*(6), 509–522. https://doi.org/10.1023/B:JOYO.0000048065.17118.63

Simoni-Wastila, L., & Tompkins, C. (2001). Balancing diversion control and medical necessity: The case of prescription drugs with abuse potential. *Substance Use & Misuse*, *36*(9–10), 1275–1296. https://doi.org/10.1081/JA-100106227

Squeglia, L. M., Jacobus, J., & Tapert, S. F. (2009). The influence of substance use on adolescent brain development. *Clin EEG Neurosci*, *40*(1), 31–38. https://doi.org/10.1038/nature13314.A

Steinberg, L. (2008). Neuroscience Perspective on Adolescent Risk Taking. *Dev. Rev.*, *28*(1), 1–27. https://doi.org/10.1016/j.dr.2007.08.002.A

Substance Abuse and Mental Health Services Administration. (2017). 2016 national survey on drug use and health: Detailed tables. *Center for Behavioral Statistics and Quality*.

Suh, E. K., & Abel, E. M. (1990). The impact of spousal violence on the children of the abused. *Journal of Independent Social Work*, *4*(4), 27-34.

Sullivan, T. N., Farrell, A. D., & Kliewer, W. (2006). Peer victimization in early adolescence: Association between physical and relational victimization and drug use, aggression, and delinquent behaviors among urban middle school students. *Development and Psychopathology*, *18*(1), 119–137. https://doi.org/10.1017/S095457940606007X

Sung, H.-E., Richter, L., Vaughan, R., Johnson, P. B., & Thom, B. (2005). Nonmedical use of prescription opioids among teenagers in the United States: Trends and correlates. *Journal of Adolescent Health*, *37*(1), 44–51. https://doi.org/10.1016/j.jadohealth.2005.02.013

Sussman, S., Sun, P., Rohrbach, L. A., & Spruijt-Metz, D. (2012). One-year outcomes of a drug abuse prevention program for older teens and emerging adults: Evaluating a motivational interviewing booster component. *Health Psychology*, *31*(4), 476–485. https://doi.org/10.1037/a0025756

Swahn, M., & Donovan, J. (2004). Correlates and predictors of violent behavior among adolescent drinkers. *Journal of Adolescent Health*, *34*(6), 480–492. https://doi.org/10.1016/S1054-139X(03)00368-9

Tabachnick, B. G., & Fidell, L. S. (2007). *Experimental designs using ANOVA* (p. 86-89). Belmont, CA: Thomson/Brooks/Cole.

Tarter, R. E., Kirisci, L., Vanyukov, M., Cornelius, J., Pajer, K., Shoal, G. D., & Giancola, P. R. (2002). Predicting adolescent violence: Impact of family history, substance use, psychiatric history, and social adjustment. *The American Journal of Psychiatry*, *159*(9), 1541–1547. https://doi.org/10.1176/appi.ajp.159.9.1541

Thaxton, S., & Agnew, R. (2004). The nonlinear effects of parental and teacher attachment on delinquency: Disentangling strain from social control explanation. *Justice Quarterly*, *21*(4), 763–791. https://doi.org/10.1080/07418820400095981

Tittle, C. R., & Meier, R. F. (1990). Specifying the SES/delinquency relationship. *Criminology*, *28*.

Tolan, P. H., & Thomas, P. (1995). The implications of age of onset for delinquency risk II: Longitudinal data. *Journal of Abnormal Child Psychology*, *23*(2), 157–181. https://doi.org/10.1007/BF01447087

Tracy, P., Kempf-Leonard, K., & Abramoske-James, S. (2009). Gender differences in delinquency and juvenile justice processing: Evidence from national data. *Crime and Delinquency*, *55*, 171–215. https://doi.org/10.1177/0011128708330628

Traube, D. E., James, S., Zhang, J., & Landsverk, J. (2012a). A national study of risk and protective factors for substance use among youth in the child welfare system. *Addictive Behaviors*, *37*(5), 641–650. https://doi.org/10.1016/j.addbeh.2012.01.015

Traube, D. E., James, S., Zhang, J., & Landsverk, J. (2012b). A national study of risk and protective factors for substance use among youth in the child welfare system. *Addictive Behaviors*, *37*(5), 641–650. https://doi.org/10.1016/j.addbeh.2012.01.015

Tremblay, R. E., Masse, L. C., Vitaro, F., & Dobkin, P. L. (1995). The impact of friends' deviant behavior on early onset of delinquency: Longitudinal data from 6 to 13 years of age. *Development and Psychopathology*, *7*(4), 649–667.

Van Buuren, S., & Groothuis-Oudshoorn, K. (2011). Multivariate imputation by chained equations in R. *Journal of Statistical Software*, *45*(3). https://doi.org/10.18637/jss.v045.i03

Van den Bos, W., Vahl, P., Güroğlu, B., Van Nunspeet, F., Colins, O., Markus, M., Rombouts, S. A. R. B., Van der Wee, N., Vermeiren, R., & Crone, E. A. (2013). Neural correlates of social decision-making in severely antisocial adolescents. *Social Cognitive and Affective Neuroscience*, *9*(12), 2059–2066. https://doi.org/10.1093/scan/nsu003

Van der Voort, A., Linting, M., Juffer, F., Bakermans-Kranenburg, M. J., & van Ijzendoorn, M. H. (2013). Delinquent and aggressive behaviors in early-adopted adolescents: Longitudinal predictions from child temperament and maternal sensitivity. *Children and Youth Services Review*, *35*(3), 439–446. https://doi.org/10.1016/j.childyouth.2012.12.008

Van Doorn, M. D., Branje, S. J. T., & Meeus, W. H. J. (2008). Conflict resolution in parent-adolescent relationships and adolescent delinquency. *The Journal of Early Adolescence*, *28*(4), 503–527. https://doi.org/10.1177/0272431608317608

Vaughn, M. G., Fu, Q., Perron, B. E., & Wu, L.-T. (2012). Risk profiles among adolescent nonmedical opioid users in the United States. *Addictive Behaviors*, *37*(8), 974–977. https://doi.org/10.1016/j.addbeh.2012.03.015

Vaughn, M. G., Nelson, E. J., Salas-Wright, C. P., DeLisi, M., & Qian, Z. (2016). Handgun carrying among White youth increasing in the United States: New evidence from the National Survey on Drug Use and Health 2002-2013. *Preventive Medicine*, *88*(October), 127–133. https://doi.org/10.1016/j.ypmed.2016.03.024

Vazsonyi, A. T., Harris, C., Terveer, A. M., Pagava, K., Phagava, H., & Michaud, P.-A. (2015). Parallel mediation effects by sleep on the parental warmth-problem behavior links: Evidence from national probability samples of Georgian and Swiss Adolescents. *Journal of Youth and Adolescence*, *44*(2), 331–345. https://doi.org/10.1007/s10964-014-0167-y

Veneziano, R. A. (2003). The importance of paternal warmth. *Cross-Cultural Research*, *37*(3), 265–281. https://doi.org/10.1177/1069397103253710

Wall, A. E., & Kohl, P. L. (2007). Substance use in maltreated youth: Findings from the National Survey of Child and Adolescent Well-Being. *Child Maltreatment*, *12*(1), 20–30. https://doi.org/10.1177/1077559506296316

Walters, G. D. (2018). Positive and negative social influences and crime acceleration during the transition from childhood to adolescence: The interplay of risk and protective factors. *Criminal Behaviour and Mental Health*, *28*(5), 414–423. https://doi.org/10.1002/cbm.2088

Wang, J., Iannotti, R. J., & Nansel, T. R. (2009). School bullying among adolescents in the United States: Physical, verbal, relational, and cyber. *Journal of Adolescent Health*, *45*(4), 368–375. https://doi.org/10.1016/j.jadohealth.2009.03.021

Warr, M. (2007). The tangled web: Delinquency, deception, and parental attachment. *Journal of Youth and Adolescence*, *36*(5), 607–622. https://doi.org/10.1007/s10964-006-9148-0

Watts, W. D., & Wright, L. S. (1990). The Realtionship of Alcohol, Tobacco, Marijuana, and Other Illegal Drug Use to Delinquency among Mexican-American, Black, and White Adolescent Males. *Adolescence*, *25*(97), 171.

Weerman, F. M., Bernasco, W., Bruinsma, G. J. N., & Pauwels, L. J. R. (2016). Gender differences in delinquency and situational action theory: A partial test. *Justice Quarterly*, *33*(7), 1182–1209. https://doi.org/10.1080/07418825.2015.1064987

Weng, X., Ran, M. S., & Chui, W. H. (2016). Juvenile delinquency in Chinese adolescents: An ecological review of the literature. *Aggression and Violent Behavior*, *31*, 26–36. https://doi.org/10.1016/j.avb.2016.06.016

Williams, J. H., Ayers, C. D., & Arthur, M. W. (1997). Risk and protective factors in the development of delinquency and conduct disorder. *Risk and resilience in childhood: An ecological perspective*, *2*, 209-250.

Williams, S. A. (2008). *Violence*. NASW Press and Oxford University Press. https://doi.org/10.1093/acrefore/9780199975839.013.409

Wong, J. S., Bouchard, J., Gravel, J., Bouchard, M., & Morselli, C. (2016). Can at-risk youth be diverted from crime? *Criminal Justice and Behavior*, *43*(10), 1310–1329. https://doi.org/10.1177/0093854816640835

Woodson, K. M., Hives, C. C., & Sanders-Phillips, K. (2010). Violence exposure and health-related risk among African American adolescent female detainees: A strategy for reducing recidivism. *Journal of Offender Rehabilitation*, *49*(8), 571–594. https://doi.org/10.1080/10509674.2010.519669

Wu, L. T., & Howard, M. O. (2007). Is inhalant use a risk factor for heroin and injection drug use among adolescents in the United States? *Addictive Behaviors*, *32*(2), 265–281. https://doi.org/10.1016/j.addbeh.2006.03.043

Ybarra, M. L., Diener-West, M., Markow, D., Leaf, P. J., Hamburger, M., & Boxer, P. (2008). Linkages between internet and other media violence with seriously violent behavior by youth. *Pediatrics*, *122*(5), 929–937. https://doi.org/10.1542/peds.2007-3377

Young, A. M., Glover, N., & Havens, J. R. (2012). Nonmedical use of prescription medications among adolescents in the United States: A systematic review. *Journal of Adolescent Health*, *51*(1), 6–17. https://doi.org/10.1016/j.jadohealth.2012.01.011

Yun, H.-J., Cui, M., & Blair, B. L. (2016). The Mediating Roles of Adolescent Disclosure and Parental Knowledge in the Association Between Parental Warmth and Delinquency Among Korean Adolescents. *Journal of Child and Family Studies*, *25*(8), 2395–2404. https://doi.org/10.1007/s10826-016-0425-6

Zaborskis, A., Sirvyte, D., & Zemaitiene, N. (2016). Prevalence and familial predictors of suicidal behaviour among adolescents in Lithuania: A cross-sectional survey 2014. *BMC Public Health*, *16*, 554. https://doi.org/10.1186/s12889-016-3211-x