Substance Use and Suicidal Ideation Among Child Welfare Involved Youth: A Longitudinal Examination

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A dissertation
by

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SUBSTANCE USE AND SUICIDAL IDEATION AMONG CHILD WELFARE INVOLVED YOUTH: A LONGITUDINAL EXAMINATION

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Dissertation Chair: Dr. Thomas O'Hare

Abstract

Substance use and suicide among adolescents is a pervasive problem in the United States. It is estimated that over 190,000 youth go to the emergency department each year as a result of alcohol related injuries and over 5,000 youth are estimated to die each year from alcohol related incidents. Moreover, suicide is the second leading cause of death for adolescents, resulting in more than one in ten deaths among adolescents. Research has demonstrated that a history of childhood abuse is a strong risk factor for suicidal ideation and alcohol misuse and related problems. It is estimated that 29% of maltreated youth engage in substance use with 9% reporting moderate to high levels of use and 5% reporting risky suicidal behavior. Although prior studies provide a foundation for understanding substance use and suicidal thoughts among maltreated youth, some significant gaps remain in the knowledge base including the use of older data, treating all maltreated youth as a homogenous group, and looking at substance use and suicidal thoughts as independent outcomes. This dissertation fills some of these gaps in the empirical literature by focusing on three specific aims: 1) examine the co-occurrence of substance use and suicidal thoughts among maltreated youth; 2) investigate the

longitudinal predictors of substance use and suicidal thoughts among maltreated youth; and 3) assess whether the predictors of substance use and suicidal thoughts are similar or different across placement types (in-home care, kinship care, or foster care). The National Survey on Child and Adolescent Wellbeing (NSCAW II) restricted dataset is used as the primary source for the analyses to address each aim. Policy and practice implications are provided for the fields of addiction, mental health, and child welfare.

DEDICATION

For my family.

“I carry your heart with me (I carry it in my heart)”
- e.e. cummings

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Chapter I. Introduction

Research Focus

Approximately 3.6 million referrals alleging child maltreatment are received in the United States each year (U.S. Department of Health & Human Services, 2016). Nearly two-thirds (61%) of these referrals are screened for further investigation with a substantial proportion eventually defined as child abuse and neglect cases. In 2014, for example, 702,000 children and youth were identified as child abuse and neglect victims (U.S. Department of Health & Human Services, 2016). Since the circumstances and conditions of child and adolescent involvement in the child welfare system are stressful and possibly traumatic, youth involved with the child welfare system compared to other youth may be prone to engage in risky behaviors that can have life-threatening consequences. Although not all maltreated youth are involved in risky behaviors, a large proportion use alcohol and other substances (Ireland, Smith, & Thornberry, 2002) and present with suicidal thoughts and behaviors (Brown, Cohen, Johnson, & Smailes, 1999). Research has demonstrated that a history of childhood abuse is a strong risk factor for suicidal ideation (Zapata et al., 2013) and alcohol misuse and related problems (Widom & Hiller-Sturmhöfel, 2001). Specifically, Wall and Kohl (2007) found that 29% of maltreated youth in the National Survey of Child and Adolescent Wellbeing I (NSCAW I) engage in substance use with 9% reporting moderate to high levels of use and 5% reporting risky suicidal behavior. Further, Heneghan and colleagues (2013) compared adolescents from a child welfare involved sample with adolescents from public high schools and found that the child welfare involved adolescents were approximately 1.5

times more likely to experience suicidal ideation when compared to the adolescents from the public high schools.

Alcohol use increases the risk for suicide attempts among adolescents presenting with suicidal ideation and/or a suicide plan (Schilling, Aseltine, Glanovsky, James, & Jacobs, 2009). Alcohol consumption results in disinhibition of behavior that can enhance the odds of acting on suicidal thoughts (Bagge et al., 2013; Bryan et al., 2016; O'Brien, Becker, Spirito, Simon, & Prinstein, 2014; Sher, 2006). Research has demonstrated both proximal and distal effects of alcohol use on suicide attempts, as well as proximal and distal effects of suicide attempts on alcohol use (Bagge & Sher, 2008). However, these relationships are extremely complex and are in need of further research (Bagge & Sher, 2008).

Prior studies have identified some of the risk factors for substance use and suicidal thoughts and behaviors among maltreated youth. These risk factors have included childhood abuse (Thornberry, Henry, Ireland, & Smith, 2010), an adverse family environment, adverse family and child characteristics, a history of sexual abuse (Brown et al., 1999), conduct problems, and low caregiver relatedness (Wall & Kohl, 2007). In addition, past studies have demonstrated the association between alcohol use and suicidal thoughts and behaviors among non-maltreated youth as well (Schilling, Aseltine, Glanovsky, James, & Jacobs, 2009).

While prior studies provide a substantive foundation in substance use and suicidal thoughts and behaviors among maltreated youth, some significant gaps remain in the knowledge base. First, studies examining substance use and suicidal thoughts and behaviors among maltreated youth and adolescents have often relied on data collected

before 2007 (Brown et al., 1999; Ireland et al., 2002; Wall & Kohl, 2007). Older data limits our ability to generalize findings to the present, when terminology, policies, and placement type preference have changed. Second, past research on maltreated youth has often focused singularly on substance use or suicidal thoughts and behaviors as outcomes, rather than the co-occurrence of these thoughts and behaviors, despite knowing that substance use is a risk factor for suicidal thoughts and behaviors (Tanaka, Wekerle, Lou Schmuck, Paglia-Boak, & MAP Research Team, 2011; Thornberry et al., 2010; Wall & Kohl, 2007). Third, the combination of these problems has been under studied among maltreated youth. As research has demonstrated a strong association between substance use and suicidal thoughts and behaviors among clinical populations, it is important to examine the comorbidity among substance use and suicidal thoughts among youth with a history of maltreatment. Fourth, researchers have often treated maltreated youth as a homogenous group (Wall & Kohl, 2007). However, maltreated youth vary in their type of living arrangements (e.g., kinship care, in home with either biological parents or adoptive parents, foster care) and the pathways to substance use and suicidal thoughts and behavior may be influenced by these various living settings. Nuances exist in the different placement types making a comparison of placement types especially important for practice and policy implications.

Specific Aims

This dissertation intends to fill some of the gaps in the empirical literature by using the NSCAWII, the most recent (2008-2012) longitudinal national data set on maltreated and other youth, focusing on both substance use and suicidal ideation, and

examining the heterogeneity of maltreated youth with a special focus on placement types. Specifically, the aims for this dissertation are as follows:

Aim 1: Examine the co-occurrence of substance use and suicidal ideation among maltreated youth.

Aim 2: Investigate the predictors of substance use and suicidal ideation among maltreated youth.

Aim 3: Investigate if the predictors of substance use and suicidal ideation are similar or different across placement types (i.e., remain with biological family, placed in kinship care, or placed in foster care).

Research Questions

The aims and research questions guiding the aims of this dissertation include:

Aim 1: Examine the co-occurrence of substance use and suicidal thoughts among maltreated youth.

Research Question 1. What is the nature of the longitudinal relationship between alcohol use and suicidal ideation among maltreated youth?

Research Question 2. What is the nature of the longitudinal relationship between marijuana use and suicidal ideation among maltreated youth?

Aim 2: Investigate the predictors of substance use and suicidal thoughts among maltreated youth.

Research Question 1. After controlling for time, what factors predict the odds of using substances among maltreated youth?

Research Question 2. After controlling for time, what factors predict the odds of endorsing suicidal ideation among maltreated youth?

Aim 3: Test if the predictors of substance use and suicidal thoughts are similar or different across placement types (i.e., remain with biological family, placed in kinship care, or placed in foster care).

Research Question 1. Do the predictors of substance use differ based on placement type?

Research Question 2. Do the predictors of suicidal ideation differ based on placement type?

Chapter II. Literature Review & Theoretical Framework

Overview of Existing Literature

Child Welfare Involvement

According to the World Health Organization (2016), maltreatment "includes all forms of physical and emotional ill-treatment, sexual abuse, neglect, and exploitation that results in actual or potential harm to the child's health, development or dignity." In order to protect children and youth from maltreatment, "all 50 States, the District of Columbia, American Samoa, Guam, the Northern Mariana Islands, Puerto Rico, and the U.S. Virgin Islands have laws and policies that specify procedures for making and responding to reports of suspected child abuse or neglect" (Child Welfare Information Gateway, 2013, p. 1). Mandated reporters are individuals who are required to report suspicions or evidence of child maltreatment. When an allegation of maltreatment is reported, the Child Protective Service (CPS) agency, a law enforcement agency, or CPS and the law enforcement agency collaboratively engage in an initial screening process to determine if the allegation merits further investigation. When an allegation of maltreatment involves "situations of harm or threatened harm to a child committed by a parent, guardian, or other person responsible for the child's care" (Child Welfare Information Gateway, 2013, p. 4) then the report is often screened in for further investigation.

According to the U.S. Children's Bureau, the purpose of an investigation is to keep the alleged victim safe (Child Welfare Information Gateway, 2016). Investigations can include home visits, interviews and observations with the child, risk and safety assessments, home environment evaluations, interviews with the youth's parents or

caregivers, background checks, and medical or mental health evaluations (Child Welfare Information Gateway, 2016). After the investigation or assessment of the alleged abuse is conducted, cases are either opened or deemed unsubstantiated. If a case is unsubstantiated, then it is closed. However, if it is opened, that typically means the investigation revealed that maltreatment occurred and thus child welfare services are provided in order to ensure the safety of the child. Some of these services may include, parent education, childcare, counseling, and safety planning among others. When officials decide that maltreatment is substantiated, there are two potential outcomes: either the family is provided services and the child stays with their birth family, or the child is removed from the family of origin and placed in an out-of-home placement. Children in out-of-home placements may be placed in kinship care (living with a relative), foster care (living with a non-relative), or in a group home.

Approximately 437,465 children and youth are in foster care on any given day (Child Welfare Information Gateway, 2017), more than 5% of children (or two million children) in the United States live in kinship care arrangements[1] (U.S. Office of Personnel Management, n.d.), and one in seven children (or approximately 57,000) is placed in a group home setting (The Annie E. Casey Foundation, 2014). These numbers are important as the enactment of the Adoption Assistance and Child Welfare Act of 1980 placed an emphasis on in-home placements with birth families when it possible to do so safely. When in-home placements are deemed unsafe, there is a preference for out-

[1] It is important to note that not all children in kinship care are due to removal. According to the 2017 AFCARS report, 32% of children in out-of-home care were placed in kinship care (HHS, 2016).

of-home permanent placements (Annie E. Casey Foundation, 2014). Moreover, for children who are required to be removed from their home, a kinship placement is often the preferred first choice for placement as it enables the child or youth to remain connected to his or her family (Child Welfare Information Gateway, 2014). Despite this preference among child welfare workers and the increase in kinship placements among youth involved in the child welfare system, little research has examined pathways to problem behaviors comparing across placement types. Understanding problem behaviors by placement type requires a thorough understanding of the mechanisms by which alcohol and marijuana use as well as suicidal thoughts and behaviors occur.

Alcohol and Marijuana Use among Child Welfare Involved Youth

Research has demonstrated that a history of child maltreatment is associated with substance use among adolescents and emerging adults (Hooven, Nurius, Logan-Greene, & Thompson, 2012; Lansford et al., 2007; Schilling et al., 2007). Moreover, youth involved with the child welfare system who have a history of maltreatment may be at a greater risk for substance use than their non-maltreated peers, given the myriad of additional challenges that present for many maltreated youth. Some of these challenging experiences include abuse, neglect, household substance use (Aarons et al., 2008; Dube et al., 2003), poverty (Lipsey & Derzon, 1998), under developed social skills (Fantuzzo, delGaudio Weiss, Atkins, Meyers, & Noone, 1998), and academic problems (Sullivan & Knutson, 2000), all of which have been associated with an increased risk of using substances (Jenson, 2004).

While the findings of high substance and alcohol use among maltreated youth seem consistent and substantial, methodological problems have been identified in some

of these prior studies. First, Braciszewski and Stout (2012) note that in a systematic review of six studies comparing youth in foster care to youth in the general population, multiple different time frames were utilized and the studies tended to group younger and older adolescents together. This is problematic as research demonstrates that age is an important factor when determining experimentation and opportunity for substance use and substance use problems. In addition, studies have often treated substance use in a dichotomous way comprising of either substance use, or no substance use. Moreover, it is important to note that many studies define foster care differently. For example, some studies include youth from foster families, group homes, as well as kinship care (Shin, 2004); some include youth with any history of foster care placements (Pilowsky & Wu, 2006); some include youth in foster care from a specific state (Kohlenberg, Nordlund, Lowin, & Treichler, 2002) but do not define exactly what they mean by foster care; and even still, some simply state that they are including foster youth from a variety of out-of-home placements (Thompson & Auslander, 2007; Vaughn, Ollie, Mcmillen, Scott, & Munson, 2007) all when discussing "youth in foster care." This is important as placement types vary significantly in many regards, all of which may result in differences for prevalence of alcohol and marijuana use as well as differences in pathways to alcohol and marijuana use changes (i.e., reductions or increases) in use.

Only one study has examined prevalence of alcohol and marijuana use among different placement settings (Wall & Kohl, 2007). Wall and Kohl (2007) found that rates of alcohol and marijuana use did not statistically differ across foster, kinship, and group home placements. Although alcohol and marijuana use did not significantly differ by placement type, there were some unique differences. Notably, approximately 69% of

youth who remained in home without child welfare services, compared to 94.3% of youth in other out-of-home placements (not including in home, foster care, kinship care, or group care) reported no use. At the same time, 26.7% of youth placed in group homes reported high levels of substance use compared to 0.2% of youth in other out-of-home arrangements and 2.2% of youth in foster care. It is important to note, that despite examining differences in the prevalence of use among the different placement settings, Wall and Kohl (2007) did not examine pathways to use, or changes in use across placement settings.

The negative physical, mental health, and social problems associated with alcohol and marijuana use in adolescence has been well established in the literature. For example, short term use of marijuana is associated with impaired memory, impaired motor coordination, altered judgment, paranoia, and psychosis. At the same time, long term or heavy marijuana use is associated with addiction, altered brain development (particularly with adolescent use), poor educational outcomes, cognitive impairment, diminished life satisfaction and achievement, chronic bronchitis, and increased risk of chronic psychosis disorders (Volkow, Baler, Compton, & Weiss, 2014). Alcohol use during adolescence is associated with negative impacts on brain structure development and behavior (Luciana, Collins, Muetzel, & Lim, 2013). For example, use of alcohol creates both short- and long- term memory and cognitive impairment (Zorumski, Mennerick, & Izumi, 2014). Given the adverse affects of alcohol and marijuana for adolescents, understanding alcohol and drug use trajectories among adolescents is critical. This understanding is particularly important among maltreated youth as they are already at risk for poor health outcomes (Braciszewski & Stout, 2012).

Suicidal Thoughts and Behaviors among Maltreated Youth

A history of child maltreatment is also associated with suicidal thoughts and behaviors among these youth (Heneghan et al., 2013; Wall & Kohl, 2007). Similar to the use of "foster care" as encompassing all maltreated youth in out-of-home placements, the term "suicidality" has often been used to encompass all suicide related thoughts and behaviors ranging from ideation to death by suicide. Consequently, it is important to provide concrete definitions for different suicidal thoughts and behaviors. According to Silverman, Berman, Sanddal, O'Carroll, and Joiner (2007), essential components of suicidality include *suicide-related ideations, suicide-related communications,* and *suicide-related behaviors.* Specifically, the interpersonal theory of suicide (Van Orden et al., 2010) defines *suicidal behavior* as ideations, communications, and behaviors that involve desire and intent to die; a *suicide attempt* as a self initiated, possibly dangerous behavior, with the desire and intent to die, with a non-fatal outcome; and *suicide*, as a suicide attempt that results in death. This dissertation research focuses on suicidal ideations.

Over the past 30 years, the rate of suicide has increased 24% (10.5 to 13.3 per 100,000 persons) in the United States (Curtin, Warner, & Hedegaard, 2016). This is particularly true among adolescents where suicide is the leading cause of death (Center for Disease Control and Prevention, 2011). Although we know many of the risk factors for suicidal behavior, little is known about the processes through which they present risk. Specifically, childhood maltreatment is one risk factor that has been found to increase risk for suicidal thoughts and behavior (Hooven et al., 2012; Schilling et al., 2007).

Past studies have demonstrated that youth involved with the child welfare system report high rates of thoughts and behaviors related to suicide. Specifically, among youth currently in foster care, 32% report suicidal ideation and 8% report a suicide attempt in the past 6 months (Hukkanen, Sourander, & Bergroth, 2003). When comparing rates suicidal thoughts and behaviors between youth with a history of foster care and those youth without a history of out-of-home care, Pilowsky and Wu (2006) found that 26.8% of youth with a history of foster care, compared to only 11.4% of youth without a history of out-of-home care, reported suicidal ideation. Moreover, adolescents with a history of maltreatment in childhood are more than 3 times more likely to have depressive symptoms and suicidal thoughts and behaviors compared to youth without a history of maltreatment (Brown et al., 1999). Brown and colleagues found adverse contextual factors to be particularly strong risk factors for suicide attempts among adolescents. Specifically, family environment and parent and child characteristics were noted as strong risk factors (Brown et al., 1999). Little is known, however, about the specific ways through which maltreatment confers risk for suicidal thoughts and behaviors.

Risk Factors for Suicidal Ideation and Substance Use

In a systematic review, Bridge, Goldstein, and Brent (2006) noted that common risk factors for both suicidal thoughts and behaviors and alcohol and marijuana use include both parent/caregiver variables as well as peer variables. These are described below.

Deviant Peer Affiliation. Peer relationships are often a source of influence for an adolescent's substance using behavior, as well for their suicidal thoughts and behaviors. One reason that peers are particularly influential is because the peer group often defines

the behavioral norms within adolescents' social context. In addition, teens begin to spend increasing time with their peers during adolescence (Steinberg, 2014). Previous school based research suggests that adolescents often affiliate with peers who engage in similar behaviors as their own (Urberg, Luo, Pilgrim, & Degirmencioglu, 2003). Research has also demonstrated that peers also influence each other's behavior (Hartup, 2005). Bridge and colleagues (2006) suggest that associating with a deviant peer group is a risk factor for suicidal thoughts and behaviors as well as alcohol and marijuana use. Moreover, research using structural equation modeling has found deviant peer affiliation is related to suicidal ideation such that having a deviant peer affiliation can increase substance use and depression, which ultimately increases suicidal ideation (Prinstein, Boergers, Spirito, Little, & Grapentine, 2000).

Caregiver Health. Caregivers (i.e., parents) are also influential in an adolescent's substance using behavior and suicidal thoughts and behaviors. Caregiver health is one risk factor for substance use and suicidal thoughts and behaviors. Specifically, having a caregiver with depression and/or a caregiver with alcohol or drug abuse has been identified as risks for poorer outcomes among adolescents and maltreated youth (Dubowitz & Bennett, 2007; Jaffee & Maikovich-Fong, 2011). Moreover, research suggests associations between suicidal ideation and attempts and a poor family environment, parental psychiatric history, and low parental monitoring (King, Gaines, Lambert, Summerfelt, & Bickman, 2000).

Comorbidity of Suicidal Thoughts/Behaviors and Substance Use

Suicidal thoughts and behaviors often do not occur in isolation, but rather are comorbid with alcohol and other drug use. Cross-sectional research has demonstrated that

alcohol use increases the risk for suicide attempts among adolescents presenting with suicidal ideation and/or a suicide plan (Schilling et al., 2009). This can be partly understood by alcohol consumption causing in disinhibition of behavior that can enhance the odds of acting on suicidal thoughts (Bagge et al., 2013; Bryan et al., 2016; O'Brien et al., 2014; Sher, 2006). Moreover, research has demonstrated that both long term distal (Nock et al., 2013) and short term proximal (Bagge & Sher, 2008) alcohol use are risk factors for suicide related behaviors. This is because proximal alcohol use can increase distress, depressed mood, anxiety, aggressiveness, and/or impulsivity and long term distal alcohol use is often associated with negative interpersonal and/or academic problems that can lead to suicidal thinking and behavior (Bagge & Sheer, 2008). Moreover,"adolescents appear particularly vulnerable to the neurotoxic effects of alcohol, and adolescent substance use has adverse consequences on brain development and executive functioning" which can increase adolescents vulnerability to suicide (Bagge & Sheer, 2008, p. 4).

Research has demonstrated an association between marijuana use and depression (Degenhardt, Hall, & Lynskey, 2003). An earlier study utilizing a case control design suggested that marijuana use is a risk factor for suicidal ideations and behaviors (Beautrais, Joyce, & Mulder, 1999). Specifically, Beautrais, Joyce, and Mulder, (1999) found that 16.2% of those who made a suicide attempt presented with a cannabis dependence diagnosis. In the same study, for those without a substance use disorder, only 1.9% attempted suicide. In a longitudinal study examining the degree to which cannabis abuse is a risk factor for depressive symptoms and suicidal thoughts, Bovasso (2001) found that participants with a marijuana use disorder and no history of depression at

baseline were more likely to have suicidal ideation at their follow up assessment when compared to participants who did not have a marijuana use disorder at baseline. These findings suggest that the use of marijuana may possibly lead to suicidal ideation over time (Bovasso, 2001).

Although an abundance of research has examined the comorbidity and proximal relationship between suicidal ideation and alcohol use, these studies often utilized cross sectional data (Bagge et al., 2013; Schilling et al., 2009), relied on data from an inpatient population (McManama O'Brien et al., 2014), or neglected to inquire about intent to die (Nock et al., 2013) limiting the ability to infer causation, generalize to larger populations, and fully understand the complex and nuanced relationship between suicidal ideation and alcohol use. Moreover, research examining the comorbidity and proximal relationship between suicidal ideation and marijuana use is sparse and the relationships between suicidal ideation and substance use have not yet been examined among maltreated youth, a specific group with higher rates of both substance use and suicidal ideation when compared to the general public and when compared to same aged peers.

Theoretical Framework

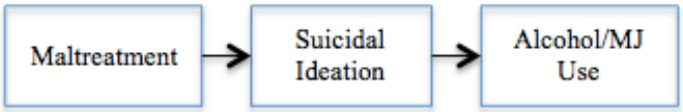
There are a variety of theories utilized to explain the development and progression of substance use and suicidal thoughts and behaviors. To understand their relationship with each other over time among maltreated youth we may consider: (1) Self-Medication Theory, (2) Secondary Mental Disorder, and (3) Social Cognitive Theory.

Self-Medication Theory

According to Khantzian (1997), the self-medication theory originated from clinically observing patients who presented with substance use disorders. The theory

posits that individuals utilize the effects of substances in order to relieve painful affect (Khantzian, 1997). Research has demonstrated that youth with a history of maltreatment often experience painful affect such as depression and suicidal ideation (Pilowsky & Wu, 2006). Consequently, one may hypothesize that in line with the self-medication theory, youth with a history of maltreatment may experiment and/or abuse alcohol and/or marijuana as an attempt to cope with painful affect. In the context of this dissertation, the self-medication theory suggests that a history of maltreatment may lead to suicidal ideation which would in turn lead to the use of alcohol and/or marijuana. See Figure 1 for a graphical representation of the self-medication theory in the context of this dissertation.

Figure 1. Self-Medication Theory

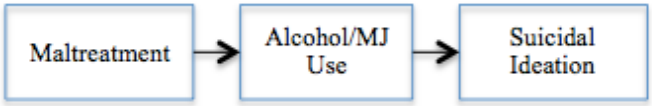


Secondary Mental Disorder Theory

Pompili et al. (2010) outline a theory by which genetic predisposition and environmental stressors lead to mental disorders, hopelessness and pessimism, alcohol abuse, and consequently, suicidal ideation and behavior. This theory has been coined the secondary mental disorder theory (Marschall-Lévesque et al., 2017). In this theory, environmental stressors include a history of maltreatment. Research has noted that children in the child welfare system historically experience some form of maltreatment. Thus, in the context of this research study, the secondary mental disorder theory hypothesizes that maltreatment may lead to alcohol or marijuana use, and in turn, suicidal

ideation. See Figure 2 for a graphical representation of the secondary mental disorder theory in the context of this research.

Figure 2. Secondary Mental Disorder Theory.



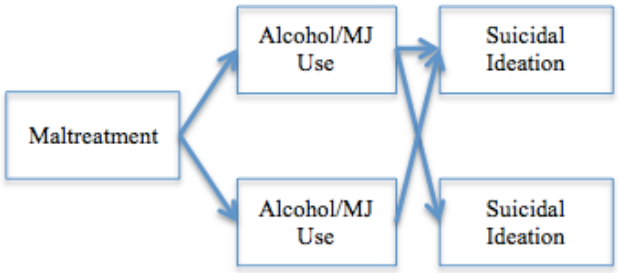
Social Cognitive Theory

Social cognitive theory (Bandura, 1986) stems from earlier behavioral theories and is a modification and enhancement of Bandura's earlier work on social learning theory. A central tenant of social cognitive theory is the idea that individuals are both agents and recipients of their behavioral patterns. Social cognitive theory explains how one may control their behavior through reinforcement and regulation as a means to achieve long-term goal-directed behavior (Bandura, 1986). In addition, social cognitive theory examines human behavior as the outcome of reciprocally interacting cognitive, behavioral, and physiological processes; in turn, these three domains are in a dynamic relationship with the social environment.

Thus, social cognitive theory provides a theoretical framework that can aid in understanding the reciprocal relationship between substance use and suicidal ideation (i.e., relationship between cognitions and behavior). Moreover, social cognitive theory provides a framework to examine how child welfare services, caregiver health, maltreatment type, depression severity, suicidal ideation, alcohol frequency, marijuana frequency, and other drug use are all related. By understanding the core constructs of expectancies and motives within social cognitive theory, hypotheses can be made about

the effects of alcohol and marijuana use on suicidal ideation as well as the effects of suicidal ideation on alcohol and marijuana use. See Figure 3 for a graphical representation of the social cognitive theory in the context of this dissertation.

Figure 3. Social Cognitive Theory.



Commonalities of Theories

Although there are a variety of theories that can be utilized to help explain and understand the relationship between child maltreatment, substance use, and suicidal ideation; including the self-medication theory, secondary mental disorder theory, and the social cognitive theory, a common motivation emerges—the amelioration of distress. On the one hand, theories hypothesize that individuals use substances in order to decrease distress, and on the other hand, research has demonstrated that use of substances can also exacerbate stress. Given the complex and nuanced relationship between substance use and suicidal ideation, ambiguity remains regarding the specific hypothesized relationships. Consequently, this dissertation utilizes the three theories and longitudinal data in order to gain a clearer understanding of this complex relationship.

Hypotheses

Based on the empirical literature and theoretical framework, the following hypotheses were developed in order to address aims 1 through 3. These hypotheses take

into account all three theories, yet are developed based on the social cognitive theory as measuring the reciprocal relationship (as outlined in social cognitive theory) will also test the self-medication theory and the secondary mental disorder theory. Moreover, the social cognitive theory informs the influence that outside factors, such as family and peers (noted in aims 2 and 3), have on the longitudinal relationship between alcohol and marijuana use and suicidal ideation.

Aim 1: Examine the co-occurrence of substance use and suicidal thoughts among maltreated youth.

Research Question 1. What is the nature of the longitudinal relationship between alcohol use and suicidal ideation among maltreated youth?

Hypothesis 1. Alcohol use at T1 will predict alcohol use at T2 and T3.

Hypothesis 2. Suicidal ideation at T1 will predict suicidal ideation at T2 and T3.

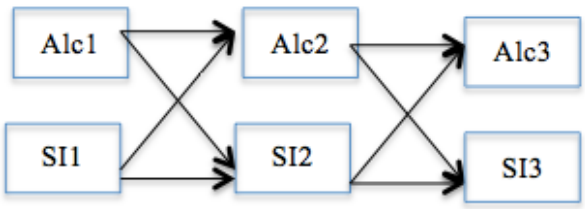
Hypothesis 3. Alcohol use at T1 will predict suicidal ideation at T2.

Hypothesis 4. Suicidal ideation at T1 will predict alcohol use at T2.

Hypothesis 5. Alcohol use at T1 will predict alcohol use at T3, indirectly through suicidal ideation at T2.

Hypothesis 6. Suicidal ideation at T1 will predict suicidal ideation at T3, indirectly though alcohol use at T2.

Figure 4. Hypothesized Model for aim 1, research question 1.



Research Question 2. What is the nature of the longitudinal relationship between marijuana use and suicidal ideation among maltreated youth?

Hypothesis 1. Marijuana use at T1 will predict marijuana use at T2 and T3.

Hypothesis 2. Suicidal ideation at T1 will predict suicidal ideation at T2 and T3.

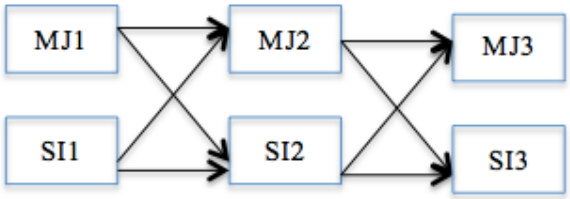
Hypothesis 3. Marijuana use at T1 will predict suicidal ideation at T2.

Hypothesis 4. Suicidal ideation at T1 will predict marijuana use at T2.

Hypothesis 5. Marijuana use at T1 will predict marijuana use at T3, indirectly through suicidal ideation at T2.

Hypothesis 6. Suicidal ideation at T1 will predict suicidal ideation at T3, indirectly though marijuana use at T2.

Figure 5. Hypothesized Model for aim 1, research question 2.



Aim 2: Investigate the predictors of substance use and suicidal thoughts among maltreated youth over time.

Research Question 1. After controlling for time, what factors predict the odds of using substances among maltreated youth?

Hypothesis 1. Age, gender, suicidal ideation, deviant peer affiliation, caregiver health[2], maltreatment type, and placement type will predict substance use among child welfare involved youth over time.

Research Question 2. After controlling for time, what factors predict the odds of endorsing suicidal ideation among maltreated youth?

Hypothesis 2. Age, gender, alcohol use, marijuana use, deviant peer affiliation, caregiver health, maltreatment type, and placement type will predict suicidal ideation.

Aim 3: Test if the predictors of substance use and suicidal thoughts are similar or different across placement types (i.e., remain with biological family, placed in kinship care, or placed in foster care).

Research Question 1. Do the predictors of substance use differ based on placement type?

Hypothesis 1. Predictors of substance use will differ based on placement type.

Research Question 2. Do the predictors of suicidal ideation differ based on placement type?

Hypothesis 1. Predictors of suicidal ideation will differ based on placement type.

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[2] In the context of this research, caregivers are the parents of the youth in the study, whether or not they have legal guardianship over the child.

Chapter III. Methods

Study Design

This dissertation uses the restricted data from the National Survey of Child and Adolescent Wellbeing II (NSCAW II). The NSCAW is a national, longitudinal survey of children and families who have had child protective service investigations. The NSCAW collects data from children, parents, and other caregivers. Reports from caseworkers, teachers, and administrative records are also collected. The overall goal of the NSCAW is to understand child and family wellbeing in relation to their experiences with the child welfare system, family, and community. To date, there have been two rounds of NSCAW: NSCAW I (1996-2007, five waves) and NSCAW II (2008-2010, three waves). This study utilizes NSCAW II data as the landscape of the child welfare population and the policies impacting the child welfare agencies has evolved since NSCAW I. The study was approved under the exempt [Exempt 45 CFR 46. 101(b)] status by the institutional review board (IRB) at the overseeing university.

Sampling

NSCAW II Sample

The target population for the overall NSCAW II study is all children and adolescents age birth to 17.5 in the United States who were subjects of child abuse or neglect investigations conducted by Child Protective Services between Feb 2008 and April 2009. NSCAW II uses a two-stage, stratified random sample design utilizing Primary Sampling Units (PSU'S) from the first NSCAW (NSCAW I). In NSCAW I, the first stage of the sample design separated the United States into nine sampling strata representing the eight states with the largest child welfare caseloads and one strata

including the remaining states and the District of Columbia. The sampling frame included all youth aged birth to 17.5 who had an investigation or assessment opened during the 15-month period beginning in October 1, 1999. However, those states that required a child protective service agency member to contact prospective participants, rather than allowing the NSCAW representatives to contact participants directly, were excluded from the sampling frame. 92 PSU's were then selected from the nine strata. The size of the county child welfare population determined the probability of each PSU. Each PSU was defined as a geographic area served by a single child protective services agency, and usually encompassed one county.

For the NSCAW II, 81 of the original NSCAW PSU's were utilized representing 83 counties in the U.S. From the 81 PSU's 5,873 children and adolescents were randomly selected to participate. Infants and children in out-of-home care were oversampled to obtain a representative sample of these two high-risk groups. With a sample of 5,873, the margin of error is 1.45 with a confidence level of 95%. The sample includes both families with no CPS services (n=1,761) as well as families with ongoing CPS services (n=4,112). From those families receiving ongoing CPS services, the sample is further broken down to include both children and youth who remain in-home (n=3,636), as well as children in youth in out-of-home placements (n=2,237).

Subsample

This dissertation utilizes a subset from the original NSCAW II sample to comprise a panel. Given the analyses focus on youth and adolescence, the subsample includes 1,050 adolescents age 11-17.5 (M_{age} = 169.54 months, 14.13 yrs) at Wave 1, who were subjects of child abuse or neglect investigations conducted by Child Protective

Services within a 15-month period beginning in February 2008. Of these participants, 44.57% (468) of participants identified as male and 55.43% (582) identified as female. The majority of participants identified as White (52.85%), however 30.12% identified as Black, 12.30% identified as American Indian, and 4.72% as Asian, Hawaiian, or Pacific Islander. The majority of participants remained in home (67.52%) with 14.00% currently in kinship care, 12.38% in foster care, and 6.10% in another out of home placement such as a group home.

Measures

The measures used in this dissertation were selected to explore substance use and suicidal ideation among maltreated adolescents, and are described below.

Alcohol Use. Alcohol use frequency was measured using the Health Risk Behaviors Questionnaire at all three waves of data collection. This questionnaire is an adolescent self-report measure developed from the Youth Risk Behavior Surveillance System (YBRSS; Kann et al., 2000). A single item was used to measure the frequency of any alcohol use over the past 30 days. Responses to this item are on a 7-point Likert scale, with options ranging from "0 = zero days" to "6 = all 30 days." Due to small cell sizes this variable was recoded to create a continuous variable using midpoints. Once the variable was in continuous form, it was transformed using the square root transformation as the data was skewed. The data remained skewed and thus it was dichotomized into "1 = past 30-day alcohol use", or "0 = no past 30-day alcohol use".

Marijuana Use. Marijuana use frequency was also measured using the Health Risk Behaviors Questionnaire at all three waves of data collection. A single item was used to measure the frequency of times marijuana was used over the past 30 days.

Responses to this item are on a 6-point Likert scale, with options ranging from "0 = zero times" to "5=50 or more times." Due to small cell sizes this variable was recoded to create a continuous variable using midpoints. Once the variable was in continuous form, it was transformed using the square root transformation as the data was skewed. The data remained skewed and thus it was dichotomized into "1 = past 30-day marijuana use", or "0 = no past 30-day marijuana use".

Suicidal Ideation. Suicidal ideation (SI) was measured from a single item (item 9) from the Childhood Depression Inventory (Kovacs, 1992). The CDI measures symptom severity over the past 2 weeks. Adolescents were asked, "which of these best says how you have felt [in the past 2 weeks]?" The first response (0 = I do not think about killing myself) indicates an absence of SI, whereas the second (1 = I think about killing myself but I wouldn't do it) and third (2 = I want to kill myself) represent SI and suicidal intent, respectively. For the purpose of this dissertation, adolescents who responded with 1 or 2 were identified as adolescents who endorsed suicidal ideation.

Deviant Peer Affiliation. Deviant peer affiliation was measured using the Deviant Peer Affiliation scale (Capaldi & Patterson, 1989). This 6 item scale measures involvement with peers who engage in risky or deviant behaviors with questions regarding how many friends cheated on school tests, how many friends suggested they broke the law, and how many stole. This variable was recoded into a dichotomous variable due to a non normal distribution. A score of 0 indicates the participants were below the median, and a score of 1 indicates they were above the median.

Caregiver Health. Four different measures were used to measure caregiver health. Caregivers physical health was measured using the standardized score from the

Physical Health Summary from the Short Form Health Survey (SF-12; Ware, Kosinski, & Keller, 1996) and caregivers mental health was measured using the standardized score from the Mental Health Summary from the Short Form Health Survey (SF-12; Ware, Kosinski, & Keller, 1996). These two composite scales are calculated from 12 questions with the composite score ranging from 0 to 100. Higher scores indicate greater health. The SF-12 has demonstrated high test-retest correlation reliability (0.89 for physical health and 0.76 for mental health). Validity estimates ranged from 0.43-0.93 for the Physical Health Summary and from 0.60 to 107 for the Mental Health Summary (Ware et al., 1996).

Caregiver alcohol dependence was measured using the total score from the Alcohol Use Disorders Identification Test (AUDIT; Babor, Higgins-Biddle, Saunders, & Monteiro, 2001). The AUDIT was developed by the World Health Organization in order to identify persons with hazardous and detrimental patterns of drinking. The AUDIT consists of 10 questions with response options ranging from 0 to 4. As the AUDIT total score was not normally distributed, the variable was recoded according to AUDIT clinical cut off points (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001). Specifically, scores of 7 or below on the AUDIT were recoded with a 0 = "non hazardous drinking" and scores greater than 7 were recoded to 1 = "hazardous drinking". Several studies have indicated high reliability and validity for the AUDIT. Specifically, high test-retest reliability (r=0.86), high internal consistency reliability, and specificities across a variety of countries and criteria scored on average, in the 0.80's (Babor et al., 2001).

Lastly, caregiver drug abuse was measured using the Drug Abuse Screening Test (DAST; Skinner, 1982). The DSAT consists of 28 self-response questions that measure

the abuse of drugs other than alcohol. Each question has a yes or no answer and a score of “1” was given for each yes response, except for items 4,5, and 7, which are phrased in opposite directions and thus, the no response was given a score of “1”. In this sample, scores for the DSAT were not normally distributed and consequently clinical cut offs were used to recode this variable into a dichotomous variable. Specifically, a 0 represents “No Drug Abuse” while a 1 represents “Drug Abuse.” Validity and reliability have been established for the DSAT. Specifically, the DSAT has demonstrated high internal consistency with coefficients at 0.92 as well as high concurrent validity (Skinner, 1982).

Placement Type. Using administrative records, the participants’ placement type was measured using Wave 1 data. Placements include: 1="In-Home: Biological Parent"; 2="In-Home: Adoptive Parent"; 3="Formal Kinship Care"; 4="Informal Kinship Care"; 5="Foster Care"; 6="Group Home/Residential Program"; and 7="Other Out Of Home Arrangement." The variable was recoded to include, 0= “In-Home”, 1= “Kinship Care”, 2= “Foster Care”, and 3= “Other out of home arrangement, i.e., group home.” This recode was conducted in order to ensure adequate numbers within each group as well as to mirror the recoding in other research using NSCAW data for comparability.

Maltreatment Type. Maltreatment type was measured by caseworker report, using Wave 1 data. Caseworkers were asked, from their perspective, of the abuse or neglect that were reported, which they felt was the most serious. Response options included, physical maltreatment, sexual maltreatment, emotional maltreatment, physical neglect- failure to provide, neglect- lack of supervision, abandonment, moral or legal maltreatment, educational maltreatment, exploitation, other, prematurity or low birth weight, substance exposure at birth, domestic violence, substance abusing parent,

voluntary relinquishment, children in need of services- CHINS, and the investigation/report was the only way to get services. This variable was recoded to ensure an adequate number of respondents in each cell: 0 = "Physical Maltreatment", 1 = "Sexual Maltreatment", 2 = "Emotional Maltreatment", 3 = "Neglect", and 4 = "Other."

Age. Age is continuous variable measured in months. It was normally distributed and mean centered.

Race. Race is a nominal variable with four categories. White is represented by a 0, American Indian is represented by a 1, Asian, Hawaiian, and Pacific Islander are represented by a 2, and Black is represented by a 3.

Gender. Gender is a dichotomous nominal variable with 0 representing Male and 1 representing Female.

Analytic Approach

The NSCAW II restricted data was accessed from the National Data Archive on Child Abuse and Neglect (NDACAN). Data comes from the children, parents, other caregivers, and administrative data. All four perspectives are included in analyses. The data was available in STATA format.

Missing Data

This research study used an unbalanced panel; the number of time periods, or waves, was not the same for all participants. Using an unbalanced panel allows for a larger sample size and consequently, greater statistical power (Kraemer & Blasey, 2016).

Screening of missing data was examined on all variables in this dissertation at all three waves, with the exception of time-invariant predictors. The proportion of missing data for age, race, gender, placement type, and maltreatment type were measured at Wave

1 only. No participants were missing data for age, race, gender, placement type, or maltreatment time. In addition, no participants were missing responses for all key variables in this dissertation at Waves 1, 2, or 3. For the variables measured at all three waves of data collection, the proportion of missing data increased at each additional wave (see table 1). In general, approximately 0-5% of cases were missing data for any variable at Wave 1, 3-6% were missing data for any variable at Wave 2, and 5%-10% were missing data for any variable at Wave 3. Caregiver alcohol dependence at Wave 3 had the highest proportion of missing data (10.4%). Table 1 depicts the proportion and size of missing data for dependent variables at each wave they were collected.

Table 1
Proportion of missing data at Waves 1 through 3 for key variables.

Variable	**Wave 1: Baseline (n)**	**Wave 2: 18-Months (n)**	**Wave 3: 36-Months (n)**
Alcohol Use	0.5% (33)	3.4% (219)	4.9% (316)
Marijuana Use	0.5% (33)	3.4% (218)	4.9% (317)
Suicidal Ideation	0.9% (58)	4.8% (309)	9.8% (636)

After assessing the proportion of missing data for each variable, the data was examined for potential patterns of missing data. The data appears missing at random as virtually no patterns were found for large proportions of the sample. The most common pattern was seen for only 11% of cases: 11% of cases were missing data for suicidal ideation, depression, caregiver physical health, and caregiver mental health at Wave 3.

Next, in order to see if there were differences between those with missing data and those without missing data, a dummy variable was created to represent participants with no missing data, and participants with missing data. T-tests and Mann-Whitney *U*

test statistics were assessed for demographic and dependent variables. A T-test was utilized for the scale variable (age) and Mann-Whitney *U* tests were utilized for dichotomous variables (gender, alcohol use, marijuana use, and suicidal ideation). An independent samples t-test was conducted to compare age for those with missing data and those without missing data. There was a significant difference in age for those with missing data (M_{age}=14.48 years) and those without missing data (M_{age}=12.83 years); $t(1048) = 12.85$, $p < 0.01$. A Mann-Whitney *U* test was conducted to compare gender for those with missing data and those without missing data. There was a significant difference in gender for those with missing data and those without missing data; $U_{Gender} = 5.29$, $p = 0.021$. These results suggest that older adolescents and females were more likely to have missing data than younger adolescents and males. Specifically, 60% of missing data was among females, however 66% of females were reported having no missing data.

A Mann-Whitney *U* test was conducted to compare alcohol use, marijuana use, and suicidal ideation for those with missing data and those without missing data at Waves 2 and 3 of data collection. There were significant differences in alcohol use at Wave 3 and marijuana use at Wave 2 for those with missing data and those without missing data [$U_{W3Alcohol} = 13.65$, $p < 0.01$; $U_{W2Marijuana} = 4.84$, $p = 0.03$]. However, there were no significant differences in alcohol use at Wave 2, marijuana use at Wave 3, or suicidal ideation at Waves 2 or 3 for those with missing data and those without missing data [$U_{W2Alcohol} = 4.31$, $p = 0.05$; $U_{W3Marijuana} = 3.83$, $p = 0.05$; $U_{W2SuicidalIDeation} = 0.05$, $p = 0.82$; $U_{W3SuicidalIDeation} = 0.02$, $p = 0.90$].

Analyses

Data management and preliminary analyses were conducted using STATA 14 SE. Specifically, data was screened for normality and then recoded using STATA 14 SE. Preliminary analyses began with descriptive statistics (see Table 2), followed by bivariate analyses including cross tabulations, paired samples t-tests, and lastly, multivariate and logistic regressions. Descriptive statistics provided information regarding this dissertation sample. Findings from the bivariate analyses provided information regarding the relationship between various caregiver variables, childhood experiences, and substance use and suicidal thoughts among maltreated youth. Next, a cross-lagged panel model (using structural equation modeling) was conducted in order to investigate aim 1. For aim 1, two separate models were run in order to assess the longitudinal relationships between substance use (model 1: alcohol and model 2: marijuana) and suicidal ideation. The structural equation models for aim 1, research questions 1 and 2 were calculated using the following equation; parameters are organized into matrices where each entry in the matrix represents an estimated parameter with the "effect" preceding the "cause" in the subscripts:

$$\begin{bmatrix} Y_1 \\ Y_2 \\ Y_3 \\ Y_4 \end{bmatrix} = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ \beta_{31} & \beta_{32} & 0 \\ \beta_{41} & \beta_{42} & 0 \end{bmatrix} \begin{bmatrix} Y_1 \\ Y_2 \\ Y_3 \\ Y_4 \end{bmatrix} + \begin{bmatrix} \gamma_{11} & \gamma_{12} \\ \gamma_{21} & \gamma_{22} \\ 0 & 0 \\ 0 & 0 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \end{bmatrix} + \begin{bmatrix} \varsigma_1 \\ \varsigma_2 \\ \varsigma_3 \\ \varsigma_4 \end{bmatrix}$$

In this structural equation model equation, Y represents the endogenous variables; β (Beta) represents causal paths from one endogenous (Y) variable to another endogenous (Y) variable; γ (Gamma) represents causal paths from an exogenous (X) variable to an endogenous (Y) variable; and ς (Zeta) represents the residuals for endogenous variables. In model 1, the exogenous variables are Wave 1 alcohol use and

suicidal ideation while the endogenous variables are Wave 2 alcohol use and suicidal ideation and Wave 3 alcohol use and suicidal ideation. In model 2, the exogenous variables are Wave 1 marijuana use and suicidal ideation. The endogenous variables for model 2 include Wave 2 marijuana use and suicidal ideation and Wave 3 marijuana use and suicidal ideation.

After the cross-lagged panel models were completed, panel data analysis using logistic models for dichotomous variables were run in order to investigate study aim 2. Panel data analysis using logistic models for dichotomous variables was chosen as conventional logistic regressions do not take into account dependency within each participant (Rabe-Hesketh & Skrondal, 2012). More specifically, random effect models were used to test study hypotheses for aim 2, which invested the predictors for alcohol use, marijuana use, and suicidal ideation.

In the random effect model for alcohol use, the Hausman test indicated that for caregiver drug abuse, the between and within effects were different. Consequently, these effects were estimated separately in the model. For the random effect model for marijuana use, only within effects were estimated, as the Hausman test indicated no difference in within and between effects. Lastly, for the random effects model for suicidal ideation, the Hausman test indicated that the between and within effects for caregiver mental health were different. Given the difference in between and within effects for caregiver mental health, these effects were estimated separately in the suicidal ideation model. Aim 2 builds on the first aim, by including other important constructs that may influence substance use and suicidal ideation (i.e., additional individual, family, and peer variables).

Lastly, in order to test the differences between placement types, after the models were specified (from aim 2), the final models for alcohol use, marijuana use, and suicidal ideation were each run again using a subsample from that specific placement type. In other words, the final specified models were run assessing predictors of alcohol use for child welfare involved youth in 1) in-home care, 2) foster care, and 3) kinship care. Although we also have a subsample of adolescents in other out of home care settings, we did not run separate analyses for these participants, as cell sizes were too small to model the effects. The same steps were also taken to run the specified models for assessing predictors of marijuana use and for assessing predictors of suicidal ideation. A comparison of standardized coefficients and p values was conducted in order to establish the strength of predictors for alcohol use, marijuana use, and suicidal ideation based on placement type.

Chapter IV: Findings

Univariate Results

Analyses began with univariate analyses to examine the variables in this research study. From Wave 1 to Wave 3, more adolescents disclosed use of alcohol and marijuana both in terms of lifetime use, as well as past thirty-day use. Specifically, at Wave 1, 43.24% of adolescents in this study had ever tried alcohol compared with 55.77% by Wave 3. At the same time, 16.22% reported drinking in the past thirty days at Wave 1 and by Wave 3, 28.47% reported past thirty day drinking. At Wave 1, 23.01% of adolescents in this study reported having ever tried marijuana. By Wave 3, 38.69% reported using marijuana. In addition, at Wave 1, 10.13% of participants reported using marijuana in the past thirty days. By Wave 3, this number increased to 16.64%. Suicidal ideation decreased among participants across the three waves with 19.56% reporting past week suicidal ideation at Wave 1 and 12.80% reporting suicidal ideation at Wave 3. The number of youth reporting affiliation with deviant peers increased from Wave 1 (54.29%) to Wave 2 (61.62%) and then decreased by Wave 3 (22.48%). The number of youth with caregivers reporting alcohol use and substance dependence increased across the waves. Full results of descriptive statistics are presented in Table 2.

Table 2

Descriptive Statistics for Key Variables: NSCAW II Panel of Adolescents with Child Welfare Involvement (Panel selected at Wave 1, 2008-2009).

Variable	Wave 1: Baseline (N)	Wave 2: 18-Months (N)	Wave 3: 36 Months (N)
Mean Age	14.13 (1050)	15.30 (854)	17.29 (768)
Gender			
Male	44.57% (468)	44.76% (470)	43.99% (443)
Female	55.42% (582)	55.24% (580)	56.01% (564)
Substantiated			
Y	52.94% (541)		
N	47.06% (481)		
Placement			
In-Home	67.52% (709)		
Kinship Care	14.00% (147)		
Foster Care	12.38% (130)		
Other OOH Placement	6.10% (64)		
Lifetime history of Alc. use			
Y	43.24%% (435)	47.35% (393)	55.77% (401)
N	56.76% (571)	52.65% (437)	44.23% (318)
P30 Day Alc days used			
Y	16.22% (165)	20.22% (168)	28.47% (209)
N	83.78% (852)	79.78% (663)	71.53% (525)
Lifetime history of MJ Use			
Y	23.01% (231)	30.53% (254)	38.69% (277)
N	76.99% (773)	69.47% (578)	61.31% (439)
P30 Day MJ used			
Y	10.13% (103)	13.82% (115)	16.64% (122)
N	89.87% (914)	86.18% (717)	83.36% (611)
P2 week SI			
Y	19.56% (194)	17.00% (126)	12.80% (53)
N	80.44% (798)	83.00% (615)	87.20% (361)
Deviant Peer Affiliation			
Y	54.29% (570)	61.62% (647)	22.48% (236)
N	45.71% (480)	38.38% (403)	77.52% (814)
Caregiver Alcohol Use			
Y	32.86% (345)	43.43% (456)	65.81% (691)
N	67.14% (705)	56.57% (594)	34.19% (359)
Caregiver Substance Dependence			
Y	32.57% (342)	44.95% (472)	67.33% (707)
N	67.43% (708)	55.05% (578)	32.67% (343)
Caregiver Physical Health	46.44 (1,008)	45.83 (789)	45.36 (462)
Caregiver Mental Health	48.65 (1,008)	50.10 (789)	49.18 (462)

Notes: unbalanced panel

Bivariate Results

Chi square analyses were run to test associations between alcohol and marijuana use with suicidal ideation; table 3 presents chi square results. First, chi square analyses were conducted to compare the proportion of the sample that reported suicidal ideation versus no suicidal ideation on past 30-day alcohol use (Wave 1: $\chi^2 = 16.83$, $p < 0.001$; Wave 2: $\chi^2 = 6.97$, $p < 0.01$; Wave 3: $\chi^2 = 9.54$, $p < 0.01$). Across all waves, chi square analyses indicated a relationship between alcohol use and suicidal ideation. Second, chi square analyses were conducted to compare the proportion of the sample that reported suicidal ideation versus no suicidal ideation on past 30-day marijuana use (Wave 1: $\chi^2 = 6.81$, $p < 0.01$; Wave 2: $\chi^2 = 0.20$, $p = 0.652$; Wave 3: $\chi^2 = 3.54$, $p = 0.06$). All relationships were significant except for Wave 2 suicidal ideation and marijuana use, and Wave 3 suicidal ideation and marijuana use. These results indicate relationships between alcohol use and suicidal ideation at all three waves. The results also indicate a relationship between marijuana use and suicidal ideation at Wave 1. The relationship between Wave 3 suicidal ideation and marijuana use approached significance, $p = 0.060$.

Table 3.

Chi Square values for suicidal ideation related to alcohol use and marijuana use at all three waves

Variable	Chi Square	*p*
Wave 1		
Alcohol use	16.83	0.000
Marijuana Use	6.81	0.009
Wave 2		
Alcohol use	6.97	0.008
Marijuana Use	0.20	0.652
Wave 3		
Alcohol use	9.54	0.002
Marijuana Use	3.54	0.060

Path Analyses

After an examination of univariate and bivariate results, generalized structural equation modeling using path analyses for dichotomous variables was carried out on data from the sample of adolescents (N = 809) in order to understand the longitudinal relationship between 1) alcohol use and suicidal ideation; and 2) marijuana use and suicidal ideation. Both models were recursive; all causal effects were unidirectional with no feedback loops such that none of the endogenous variables were specified as both causes and effects of each other. Table 4 displays results for both models.

Table 4.
Direct Effects of the Relationship between Substance Use and Suicidal Ideation

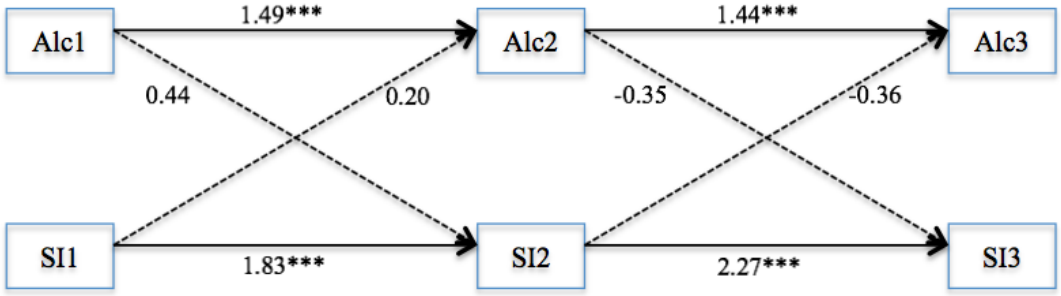
	Model 1: Alcohol Use and SI		Model 2: Marijuana Use and SI	
	Unstandardized	95% CI	Unstandardized	95% CI
Direct Effects				
X1 to Y1 (γ_{11})	1.49 (0.22)***	1.05 – 1.92	2.14 (0.27)***	1.61 – 2.58
X1 to Y2 (γ_{21})	0.44 (0.28)	-0.10 – 0.98	0.51 (0.35)	-0.19 – 1.20
X2 to Y1 (γ_{12})	0.20 (0.22)	-0.24 – 0.63	0.01 (0.27)	-0.52 – 0.55
X2 to Y2 (γ_{22})	1.83 (0.22)***	1.39 – 2.26	1.83 (0.22)***	1.40 – 2.27
Y1 to Y3 (β_{31})	1.44 (0.23)***	0.99 – 1.88	1.91 (0.29)***	1.35 – 2.48
Y1 to Y4 (β_{41})	-0.35 (0.48)	-1.30 – 0.59	-0.40 (0.68)	-1.72 – 0.92
Y2 to Y3 (β_{32})	-0.36 (0.28)	-0.90 – 0.19	-0.12 (0.33)	-0.77 – 0.53
Y2 to Y4 (β_{42})	2.27 (0.34)***	1.60 – 2.93	2.21(0.33)***	1.56 – 2.87

*** $p < .001$

Model 1: Alcohol and Suicidal Ideation

The exogenous variables for Model 1 included Wave 1 alcohol use and suicidal ideation. The endogenous variables included Wave 2 alcohol use and suicidal ideation and Wave 3 alcohol use and suicidal ideation. The paths from alcohol use at Wave 1 to Wave 2 (γ_{11}= 1.49, $p <$ 0.001), alcohol use at Wave 2 to Wave 3 (β_{31} = 1.44, $p < 0.001$), suicidal ideation from Wave 1 to Wave 2 (γ_{22}= 1.83, $p < 0.001$), and suicidal ideation from Wave 2 to Wave 3 (γ_{42}= 2.27, $p <$ 0.001) were all significant. These results indicate that earlier alcohol use predicts later alcohol use and earlier suicidal ideation predicts later suicidal ideation. However, the paths across waves between these variables, i.e., from alcohol to suicidal ideation, or from suicidal ideation to alcohol were not significant. Figure 6 displays results from Model 1 graphically.

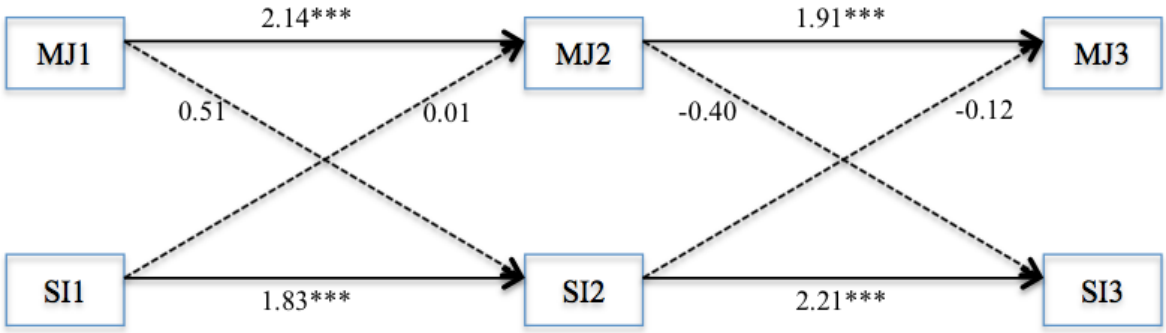
Figure 6. Cross-Lagged model of Alcohol Use and Suicidal Ideation



Model 2: Marijuana and Suicidal Ideation

The exogenous variables for Model 2 included Wave 1 marijuana use and suicidal ideation. The endogenous variables included Wave 2 marijuana use and suicidal ideation and Wave 3 marijuana use and suicidal ideation. The paths from marijuana use at Wave 1 to Wave 2 (γ_{11}= 2.14, $p < 0.001$), marijuana use at Wave 2 to Wave 3 (β_{31} = 1.91, $p < 0.001$), suicidal ideation from Wave 1 to Wave 2 (γ_{22}= 1.83, $p < 0.001$), and suicidal ideation from Wave 2 to Wave 3 (γ_{42}= 2.21, $p < 0.001$) were all significant. These results indicate that earlier marijuana use predicts later marijuana use and earlier suicidal ideation predicts later suicidal ideation. The paths across waves between these variables, i.e., from marijuana use to suicidal ideation, or from suicidal ideation to marijuana use, however, were not significant. Figure 7 displays results from Model 2 graphically.

Figure 7. Cross-Lagged model of Marijuana Use and Suicidal Ideation



Random Effect Models

Model 3: Alcohol with Covariates

The final model results that tested the predictors of alcohol use among child welfare involved youth are presented in table 5. In this model, there were 10 time variant variables, including: marijuana use (1=past 30 day use), suicidal ideation (1= past week suicidal ideation), caregiver alcohol dependence (1=hazardous drinking), both with and between effects for caregiver drug abuse (1=drug abuse), caregiver mental health, caregiver physical health, deviant peer affiliation (1 = score above the median with higher scores indicating greater affiliation with deviant peers), age, and time. There were also 4 time invariant variables. The time invariant variables included race, gender, maltreatment type, and placement at Wave 1. In this model, there were 1,402 observations within 832 subjects.

Table 5.
Random Effect Model of Alcohol Use on Marijuana Use; Suicidal Ideation; Caregiver Alcohol Dependence, Drug Dependence, Mental Health, and Physical Health; Age, Race, Gender, Maltreatment Type, Placement Type, and Time

Variable	**Coefficient**	**Odds Ratio**
Marijuana Use	3.63 (.39)***	37.62
Suicidal Ideation	0.76 (.25)**	2.13
Caregiver Alcohol Dependence	0.15 (.37)	1.16
Caregiver Drug Abuse (Between)	-1.10 (.54)***	0.33
Caregiver Drug Abuse (Within)	-0.19 (.42)	0.83
Caregiver Mental Health	-0.00 (.01)	1.00
Caregiver Physical Health	0.00 (.01)	1.00
Deviant Peer Affiliation	1.17 (.23)***	3.23
Age	0.04 (01)***	1.04
Race		
American Indian	0.09 (.34)	1.10
Asian/Hawaiian/Pacific Islander	0.08 (.52)	1.08
Black	-0.73 (.23)**	0.48
Gender	0.15 (.23)	1.16
Maltreatment Type		
Sexual Maltreatment	-0.78 (.56)	0.46
Emotional Maltreatment	-0.89 (.63)	0.41
Neglect Maltreatment	-0.52 (.42)	0.59
Other Maltreatment	-0.26 (.34)	0.77
Placement		
In-Home Care	0.09 (.34)	1.10
Foster Care	-0.05 (.47)	0.95
Kinship Care	-0.35 (.60)	0.70
Time	0.29 (.21)	1.34
Goodness of Fit		
Wald Chi^2	117.13, $p < .001$	
AIC	887.20	
BIC	1007.854	

*p<0.05; **p<0.01, ***p<0.001
Note: Standard Errors in parenthesis

The model was statistically significant (Wald $Chi^2 = 117.13$, $p < .001$), suggesting that the odds of drinking alcohol in the past 30 days can be predicted from the independent variables. In this model, marijuana use, suicidal ideation, the between effect for caregiver drug abuse, deviant peer affiliation, age, and race were statistically significantly predictive of alcohol use. The results from model 3 indicate that individual thoughts and behaviors, demographic characteristics, and family and peer characteristics are all predictive of past 30 day alcohol use.

In regards to individual thoughts and behaviors, when all other variables are controlled for, the odds of drinking alcohol, for those who use marijuana increase 3,662% when compared to those who do not use marijuana. Similarly, when all other variables are controlled for, the odds for those who present with suicidal ideation are 113% more likely to drink alcohol than for those who do not have suicidal ideation.

In regards to family and peer variables, the odds of past 30 day alcohol use for an individual with a caregiver who has drug dependence is 67% less when compared to an individual with a caregiver who does not have drug dependence (between effect) and the odds of drinking alcohol increase by 223% for adolescents whose deviant peer affiliation score is above the median, compared to those whose deviant peer affiliation score is below the median, when all other variables are controlled for.

Lastly, demographic characteristics, such as age and race, also play a role in predicting the odds of drinking alcohol use. Black youth are less likely to drink alcohol in the past 30 days when compared to their White peers. The odds of past 30 day alcohol use for Black youth is 52% lower than that for White youth, when all other variables are controlled for. Not surprisingly, older youth are more likely to report past 30 day alcohol use; for each one-month increase in age,

there is a 4% increase in the odds of drinking alcohol, when all other variables are controlled for. In summary, marijuana use, the between effect for caregiver drug abuse, deviant peer affiliation, age, and race each predict past 30 day alcohol use in this sample with adolescents who use marijuana, affiliate with deviant peers, and increasing in age being more likely to use alcohol underage while those with caregivers who abuse drugs, and those who are Black, being less likely to use alcohol underage.

Model 4: Marijuana with Covariates

The final model results testing the predictors for marijuana use among child welfare involved youth are presented in table 6. In this model, there were 9 time variant variables, including: alcohol use (1=past 30 day use), suicidal ideation (1= past week suicidal ideation), caregiver alcohol dependence (1=hazardous drinking), caregiver drug abuse (1=drug abuse), caregiver mental health, caregiver physical health, deviant peer affiliation (1 = score above the median with higher scores indicating greater affiliation with deviant peers), age, and time. There were also 4 time invariant variables. The time invariant variables included race, gender, maltreatment type, and placement at Wave 1. In this model, there were 1,360 observations within 821 subjects.

Table 6.
Random Effect Model of Marijuana Use on Alcohol Use; Suicidal Ideation; Caregiver Alcohol Dependence, Drug Dependence, Mental Health, and Physical Health; Age, Race, Gender, Maltreatment Type, Placement Type, and Time

Variable	Coefficient	Odds Ratio
Random Effect		
Alcohol Use	3.90 (.49)***	49.61
Suicidal Ideation	0.08 (.35)	1.08
Caregiver Alcohol Dependence	0.42 (.50)	1.51
Caregiver Drug Abuse	-0.86 (.56)	0.42
Caregiver Mental Health	0.00 (.01)	1.00
Caregiver Physical Health	-0.02 (.01)	0.99
Deviant Peer Affiliation	0.53 (.18)**	1.70
Age	0.03 (.01)**	1.03
Race		
American Indian	0.33 (.45)	1.39
Asian/Hawaiian/Pacific Islander	-0.28 (.80)	0.76
Black	0.17 (.36)	1.19
Gender	-0.13 (.32)	0.88
Maltreatment Type		
Sexual Maltreatment	1.21 (.63)	3.36
Emotional Maltreatment	0.78 (.73)	2.19
Neglect Maltreatment	0.25 (.53)	1.29
Other Maltreatment	-0.39 (.48)	0.68
Placement		
In-Home Care	0.32 (.45)	1.38
Foster Care	0.67 (.58)	1.96
Kinship Care	0.66 (.74)	1.94
Time	0.58 (.28)*	1.79
Goodness of Fit		
Wald Chi^2	70.57, $p < .001$	
AIC	627.13	
BIC	741.86	

*p<0.05; **p<0.01, ***p<0.001
Note: Standard Errors in parenthesis

The random effect model for marijuana use was statistically significant (Wald Chi^2 = 70.57, $p < .001$), suggesting that the odds of using marijuana in the past 30 days can be predicted from the independent variables. Alcohol use, deviant peer affiliation, age, and time were

statistically significant predictors in this model. In addition, maltreatment type, and specifically sexual maltreatment was approaching significance. Similar to the alcohol model, predictors were from a variety of levels. In this model, individual behavior, peers, and demographic characteristics are predictive of marijuana use. In addition, time is an important predictor, and maltreatment type may be important in thinking about the odds of using marijuana.

Drinking alcohol in the past 30 days, compared with not drinking alcohol in the past 30 days, presents a 4,861% increase in the odds of using marijuana, when all other variables are controlled for. In addition, youth whose deviant peer affiliation score is above the median have a 70% increase in the odds of using marijuana when compared to their peers who have lower deviant peer affiliation scores. As predicted, increases in age and time also increase the odds of using marijuana. Specifically, for each additional month in age, there is a 3% increase in the odds of using marijuana, and for each additional wave of data collection (18 months) in time, there is a 79% increase in the odds of using marijuana, when all other variables are controlled for. Lastly, although maltreatment type did not statistically significantly predict marijuana with greater than 95% confidence, it did predict marijuana use at 94.5% confidence ($p = 0.055$). Thus, we are 94.5% confident that for youth who have a history of sexual maltreatment, compared to other types of maltreatment, the odds for using marijuana increase by 235%. In summary, alcohol use, deviant peer affiliation, age, and time are significant predictors of the odds of using marijuana with those who use alcohol, those who affiliate with deviant peers, those who are older, and just simply as time goes on, being more likely to use marijuana.

Model 5: Suicidal Ideation with Covariates

The final model results testing the predictors for suicidal ideation among child welfare involved youth are presented in table 7. In this model, there were 10 time variant variables, including: alcohol use (1=past 30 day use), marijuana use (1= past 30 day use), caregiver alcohol dependence (1=hazardous drinking), caregiver drug abuse (1=drug abuse), between and within effects of caregiver mental health, caregiver physical health, deviant peer affiliation (1 = score above the median with higher scores indicating greater affiliation with deviant peers), age, and time. As with the other two models, there were 4 time invariant variables in this model. The time invariant variables included race, gender, maltreatment type, and placement at Wave 1. In this model, there were 1,360 observations within 821 subjects.

Table 7.
Random Effect Model of Suicidal Ideation on Alcohol Use; Marijuana Use; Caregiver Alcohol Dependence, Drug Dependence, Mental Health, and Physical Health; Age, Race, Gender, Maltreatment Type, Placement Type, and Time

Variable	Coefficient	Odds Ratio
Alcohol Use	0.85 (.33)*	2.34
Marijuana Use	-0.04 (.39)	0.96
Caregiver Alcohol Dependence	0.40 (.38)	1.49
Caregiver Drug Abuse	0.14 (.37)	1.15
Caregiver Mental Health (Between)	-0.03 (.01)	0.97
Caregiver Mental Health (Within)	0.01 (.02)	1.01
Caregiver Physical Health	-0.01 (.01)	0.99
Deviant Peer Affiliation	0.68 (.16)***	1.97
Age	-0.01 (.01)*	0.99
Race		
American Indian	0.39 (.39)	1.47
Asian/Hawaiian/Pacific Islander	0.41 (.56)	1.51
Black	-0.08 (.29)	0.92
Gender	0.54 (.25)*	1.71
Maltreatment Type		
Sexual Maltreatment	0.42 (.56)	1.52
Emotional Maltreatment	-0.50 (.64)	0.61
Neglect Maltreatment	-0.39 (.44)	0.68
Other Maltreatment	-0.26 (.36)	0.77
Placement		
In-Home Care	-0.41 (.39)	0.66
Foster Care	-0.19 (.50)	0.83
Kinship Care	0.11 (.62)	1.11
Time	-0.30 (.19)	0.74
Goodness of Fit		
Wald Chi^2	47.45 $p < .001$	
AIC	1232.69	
BIC	1352.64	

*p<0.05; **p<0.01, ***p<0.001
Note: Standard Errors in parenthesis

The random effect model for suicidal ideation was statistically significant (Wald Chi^2 = 47.45, $p < .001$), suggesting that the odds of endorsing suicidal ideation in the past week can be predicted from the independent variables. In this model, alcohol use, deviant peer affiliation, age,

and gender were statistically significant predictors of suicidal ideation and the between effect for caregiver mental health is approaching significance. Child welfare involved youth who drink alcohol have a 134% increase in the odds for suicidal ideation, compared to their peers who do not drink alcohol, when all other variables are controlled for. Similarly, when all other variables are controlled, youth whose deviant peer affiliation score is above the median have a 97% increase in the odds of having suicidal ideation when compared to their peers whose deviant peer affiliation score is below the median. Lastly, for each month increase in age, there is a 1% decrease in the odds of having suicidal ideation among child welfare involved youth and females have a 71% increase in the odds of having suicidal ideation when compared to males.

Random Effect Models Across Placement Type

In models three through five, the final models were specified for the predictors of 1) alcohol use, 2) marijuana use, and 3) suicidal ideation. Next, each of these models was estimated again but this time with a sub sample of the adolescents. The final alcohol model was estimated separately for youth who remained in home, youth who were placed in kinship care, and youth who were placed in foster care. Similarly, the final models for marijuana and suicidal ideation were also estimated separately for youth who remained in home, youth who were placed in kinship care, and youth who were placed in foster care.

Alcohol Use by Placement Type

The final model results testing the predictors of alcohol use among child welfare involved youth who remained in home (model 6), were placed in kinship care (model 7), or were placed in foster care (model 8) are presented in Table 8. In this model, there were 10 time variant variables, including: marijuana use (1=past 30 day use), suicidal ideation (1= past week suicidal

ideation), caregiver alcohol dependence (1=hazardous drinking), both with and between effects for caregiver drug abuse (1=drug abuse), caregiver mental health, caregiver physical health, deviant peer affiliation (1 = score above the median with higher scores indicating greater affiliation with deviant peers), age, and time. There were also 4 time invariant variables. The time invariant variables included race, gender, maltreatment type, and placement at Wave 1.

Table 8.
Random Effect Models for Alcohol Use Across Placement Types

	Model 6: In-Home Care		Model 7: Kinship Care		Model 8: Foster Care	
Variable	**Coefficient**	**OR**	**Coefficient**	**OR**	**Coefficient**	**OR**
Marijuana Use	3.40 (.43)***	30.06	6.18 (2.14)**	484.60	6.96 (4.57)	1056.30
Suicidal Ideation	0.75 (.29)**	2.13	1.50 (.95)	4.47	1.65 (2.19)	5.22
Caregiver Alcohol Dependence	0.11 (.43)	1.11	0.43 (1.95)	1.53	1.98 (3.44)	7.21
Caregiver Drug Abuse (Between)	-1.12 (.65)	0.33	-2.49 (2.25)	0.08	-8.94 (7.36)	0.00
Caregiver Drug Abuse (Within)	-0.40 (.52)	0.67	0.70 (1.95)	2.01	-2.35 (3.42)	0.09
Caregiver Mental Health	0.00 (.01)	1.00	0.01 (.04)	1.01	-0.21 (.17)	0.81
Caregiver Physical Health	0.01 (.01)	1.01	-0.03(.03)	0.97	0.04 (0.10)	1.04
Deviant Peer Affiliation	1.38 (.28)***	3.99	1.64 (.88)	5.17	0.05 (1.44)	1.05
Age	0.04 (.01)***	1.04	0.03 (.22)	1.03	0.07 (0.06)	1.07
Race						
American Indian	0.08 (.38)	1.08	-0.49 (1.51)	0.61	-3.78 (3.45)	0.02
Asian/Hawaiian/Pacific Islander	0.42 (.54)	1.52	--	--	--	--
Black	-0.86 (.34)	0.43	-0.03 (.85)	0.97	-3.20 (2.95)	0.04
Gender	0.38 (.27)	1.47	-0.38 (.90)	0.68	-2.01 (2.46)	0.13
Maltreatment Type						
Sexual Maltreatment	-0.79 (.71)	0.45	-0.20 (1.80)	0.82	-2.96 (3.57)	0.05
Emotional Maltreatment	-0.88 (.80)	0.41	-1.71 (2.10)	0.18	-1.14 (3.12)	0.32
Neglect Maltreatment	-0.48 (.49)	0.62	-1.47 (1.66)	0.23	-0.68 (2.19)	0.51
Other Maltreatment	-0.05 (.38)	0.95	-1.10 (1.31)	0.33	-0.67 (2.48)	0.51
Time	0.38 (.25)	1.47	1.12 (.77)	3.07	0.73 (1.50)	2.07
Goodness of Fit						
Wald Chi^2	95.25, $p < .001$		12.31, $p = 0.78$		3.33, $p = 1.00$	
AIC	616.83		138.01		113.67	
BIC	714.85		201.05		167.86	
Person-Time Observations	993		204		128	
Person Observations	581		120		79	

*p<0.05; **p<0.01, ***p<0.001
Note: Standard Errors in parenthesis

Model 6: In-home: Alcohol Use

In model 6, which estimated the predictors of alcohol use for youth in in-home care, there were 993 observations within 581 participants. This random effect model was statistically significant (Wald $Chi^2 = 95.25$, $p < .001$), suggesting that the odds of using alcohol in the past 30 days can be predicted from the independent variables for this sub sample of child welfare involved adolescents. In this model, marijuana use, suicidal ideation, deviant peer affiliation, and age were statistically significantly predictive of the odds of using alcohol. For youth who remain in in-home care, when all other variables are controlled for using marijuana increases the odds of using alcohol by 2906 percentage points and having suicidal ideation increases the odds of using alcohol by 113%, when compared to youth who did not use marijuana or who did not have suicidal ideation. Similarly, for youth whose deviant peer affiliation score is above the median, they have a 299% increase in the odds of using alcohol, when compared to their peers whose deviant peer affiliation score is below the median. Lastly, when all other variables are controlled for, each 1-month increase in age results in a 4% increase in the odds of using alcohol.

Model 7: Kinship Care: Alcohol Use

In model 7, which estimated the predictors of alcohol use for youth in kinship care, there were 128 observations within 79 participants. This random effect model was not statistically significant (Wald $Chi^2 = 3.33$, $p = 1.00$). These results suggest that the odds of using alcohol in the past 30 days cannot be predicted from the independent variables for this subsample of child welfare involved adolescents.

Model 8: Foster Care: Alcohol Use

In model 8, which estimated the predictors of alcohol use for youth in foster care, there were 204 observations within 120 participants. This random effect model was not statistically significant (Wald $Chi^2 = 12.31$, $p = .78$). These results suggest that the odds of using alcohol in the past 30 days cannot be predicted from the independent variables for this sub sample of child welfare involved adolescents.

Marijuana Use by Placement Type

The final model results testing the predictors for marijuana use among child welfare involved youth who remained in home (model 9), were placed in kinship care (model 10), or were placed in foster care (model 11) are presented in Table 9. In these models, there were 9 time variant variables, including: alcohol use (1=past 30 day use), suicidal ideation (1= past week suicidal ideation), caregiver alcohol dependence (1=hazardous drinking), caregiver drug abuse (1=drug abuse), caregiver mental health, caregiver physical health, deviant peer affiliation (1 = score above the median with higher scores indicating greater affiliation with deviant peers), age, and time. There were also 4 time invariant variables. The time invariant variables included race, gender, maltreatment type, and placement at Wave 1.

Table 9.
Random Effect Models for Marijuana Use Across Placement Types

Variable	Model 9: In-Home Care Coefficient	OR	Model 10: Kinship Care Coefficient	OR	Model 11: Foster Care Coefficient	OR
Alcohol Use	3.71 (.53)***	40.69	21.52 (4.86)***	--	4.68 (3.88)	108.10
Suicidal Ideation	0.89 (.40)	1.09	-5.16 (4.87)	0.01	-0.34 (2.24)	0.71
Caregiver Alcohol Dependence	0.30 (.57)	1.35	3.82 (6.63)	45.69	0.47 (3.18)	1.60
Caregiver Drug Abuse	-1.03 (.74)	0.36	-0.52 (5.87)	0.60	-0.38 (2.97)	0.69
Caregiver Mental Health	0.01 (.02)	1.01	-0.23 (.16)	0.80	-0.03 (.12)	0.97
Caregiver Physical Health	-0.02 (.01)	0.98	0.01 (.15)	1.01	-0.14 (.12)	0.87
Deviant Peer Affiliation	0.54 (.22)*	1.72	-1.99 (1.82)	0.14	1.27 (.90)	3.56
Age	0.03 (.01)	1.03	0.10 (0.08)	1.11	0.04 (.04)	1.04
Race						
American Indian	0.30 (.52)	1.34	-11.20 (7.20)	0.00	4.06 (3.52)	57.98
Asian/Hawaiian/Pacific Islander	-0.11 (.82)	0.90	--	--	--	--
Black	-0.11 (.46)	0.89	-4.38 (3.97)	0.01	1.83 (1.95)	6.23
Gender	0.11 (.37)	1.12	-4.61 (4.27)	0.01	-1.26 (1.47)	0.28
Maltreatment Type						
Sexual Maltreatment	0.52 (.85)	1.68	10.13 (6.09)	25061.12	3.62 (2.97)	37.44
Emotional Maltreatment	-0.16 (1.07)	0.85	3.16 (7.64)	23.65	3.80 (2.74)	44.83
Neglect Maltreatment	0.38 (.61)	1.46	-2.44 (6.99)	0.09	0.81 (2.15)	2.24
Other Maltreatment	-0.71 (.60)	0.49	-4.79 (4.74)	0.01	-1.37 (2.81)	0.25
Time	0.65 (.34)	1.92	-1.53 (2.45)	0.22	0.77 (1.17)	2.15
Goodness of Fit						
Wald Chi^2	55.29, $p < .001$		36.98, $p < .01$		5.07, $p = 1.00$	
AIC	425.99		101.35		93.61	
BIC	518.54		160.27		144.66	
Person-Time Observations	964		195		126	
Person Observations	573		118		79	

*p<0.05; **p<0.01, ***p<0.001
Note: Standard Errors in parenthesis

Model 9: In-home: Marijuana Use

In model 9, which estimated the predictors of marijuana use for youth in in-home care, there were 964 observations within 573 participants. This random effect model was statistically significant (Wald $Chi^2 = 55.29$, $p < .001$), suggesting that the odds of using marijuana in the past 30 days can be predicted from the independent variables for this sub sample of child welfare involved adolescents. In this sub sample of youth who remained in home, adolescents who use alcohol have a 3969 percentage point increase in the odds of using marijuana, when compared to their non drinking peers and when all other variables are controlled for. Moreover, the odds for youth whose deviant peer affiliation score is above the median is 72% higher when compared to their peers whose deviant peer affiliation score is below the median, and when all other variables are controlled for.

Model 10: Kinship Care: Marijuana Use

In model 10, which estimated the predictors of marijuana use for youth in kinship care, there were 195 observations within 118 participants. This random effect model was not statistically significant (Wald $Chi^2 = 36.98$, $p < .01$). These results suggest that the odds of using marijuana in the past 30 days cannot be predicted from the independent variables for this sub sample of child welfare involved adolescents. The only statistically significant predictor of marijuana use among adolescents placed in kinship care, in this sample, is the use of alcohol.

Model 11: Foster Care: Marijuana Use

In model 11, which estimated the predictors of marijuana use for youth in foster care, there were 129 observations within 79 participants. This random effect model was not statistically significant (Wald $Chi^2 = 5.08$, $p = 1.00$). These results suggest that the odds of using

marijuana in the past 30 days cannot be predicted from the independent variables for this sub sample of child welfare involved adolescents.

Suicidal Ideation by Placement Type

The final model results testing the predictors for suicidal ideation among child welfare involved youth who remained in home (model 12), were placed in kinship care (model 13), or were placed in foster care (model 14) are presented in Table 9. In this model, there were 10 time variant variables, including: alcohol use (1=past 30 day use), marijuana use (1= past 30 day use), caregiver alcohol dependence (1=hazardous drinking), caregiver drug abuse (1=drug abuse), between and within effects of caregiver mental health, caregiver physical health, deviant peer affiliation (1 = score above the median with higher scores indicating greater affiliation with deviant peers), age, and time. As with the other two models, there were 4 time invariant variables in this model. The time invariant variables included race, gender, maltreatment type, and placement at Wave 1.

Table 10.
Random Effect Models for Suicidal Ideation Across Placement Types

	In-Home Care		Kinship Care		Foster Care	
Variable	**Coefficient**	**OR**	**Coefficient**	**OR**	**Coefficient**	**OR**
Alcohol Use	0.92 (.40)*	2.25	0.96 (.72)	2.61	-0.81 (1.67)	4.74
Marijuana Use	-0.01 (.47)	0.99	-0.73 (.98)	0.48	1.56 (1.66)	0.44
Caregiver Alcohol Dependence	0.31 (.45)	1.36	2.65 (1.22)*	14.12	2.54 (3.26)	12.73
Caregiver Drug Abuse	0.40 (.44)	1.49	-2.41 (1.23)*	0.09	-0.24 (3.04)	0.79
Caregiver Mental Health (Between)	-0.02 (.02)	0.98	-0.04 (.04)	0.96	-0.06 (.14)	0.94
Caregiver Mental Health (Within)	0.01 (.02)	1.01	0.00 (.03)	1.00	-0.01 (.11)	1.00
Caregiver Physical Health	-0.02 (.01)	0.98	-0.01 (.02)	0.99	0.06 (.08)	1.07
Deviant Peer Affiliation	0.69 (.19)***	1.99	0.57 (.33)	1.77	0.31 (.68)	1.36
Age	-0.01 (.01)	0.99	-0.02 (.01)	0.98	-0.04 (.03)	0.96
Race						
American Indian	0.65 (.45)	1.92	-0.37 (.81)	0.69	0.64 (1.88)	1.90
Asian/Hawaiian/Pacific Islander	0.21 (.69)	1.23	0.52 (1.09)	1.68	2.73 (2.27)	15.34
Black	0.10 (.36)	1.11	-0.29 (.52)	0.75	-0.41 (1.28)	0.66
Gender	0.72 (.31)*	2.05	1.41 (.50)**	4.11	-1.54 (1.34)	0.21
Maltreatment Type						
Sexual Maltreatment	0.47 (.77)	1.60	-0.42 (1.00)	0.66	1.32 (1.91)	3.75
Emotional Maltreatment	-0.49 (.83)	0.62	-1.01 (1.19)	0.36	1.50 (2.19)	4.89
Neglect Maltreatment	-0.77 (.59)	0.46	0.70 (.71)	2.00	-0.22 (1.56)	0.81
Other Maltreatment	-0.12 (.44)	0.88	-1.12 (.75)	0.33	-0.11 (1.60)	0.90
Time	-0.30 (.23)	0.74	-0.48 (.45)	0.62	-0.51 (.81)	0.60
Goodness of Fit						
Wald Chi^2	36.23, p <.01		20.91, p = 0.28		4.83, p = 1.0	
AIC	890.62		182.03		147.51	
BIC	988.04		248.00		205.76	
Person-Time Observations	964		200		136	
Person Observations	573		121		85	

*p<0.05; **p<0.01, ***p<0.001
Note: Standard Errors in parenthesis

Model 12: In-home: Suicidal Ideation

In model 12, which estimated the predictors of suicidal ideation for youth in in-home care, there were 964 observations within 573 participants. This random effect model was statistically significant (Wald $Chi^2 = 36.23$, $p < .01$), suggesting that the odds of having suicidal ideation in the past week can be predicted from the independent variables for this sub sample of child welfare involved adolescents. In this sub sample of youth who remained in home, alcohol use, deviant peer affiliation, and gender are statistically significant predictors of the odds for having suicidal ideation. Specifically, for youth who drank alcohol in the past 30 days, they have a 60% increase in the odds for suicidal ideation, when compared to their peers who did not drink alcohol, when all other variables are controlled. In addition, youth whose deviant peer affiliation score is above the median are 9.9 times more likely to have suicidal ideation, when compared to their peers whose deviant peer affiliation score is below the mean, when all other variables are controlled for. Lastly, the odds for females to have suicidal ideation increase by 105% when compared to males, when all other variables are controlled for.

Model 13: Kinship Care: Suicidal Ideation

In model 13, which estimated the predictors of suicidal ideation for youth in kinship care, there were 200 observations within 121 participants. This random effect model was not statistically significant (Wald $Chi^2 = 20.91$, $p = 0.28$), suggesting that the odds of having suicidal ideation in the past week cannot be predicted from the independent variables for this sub sample of child welfare involved adolescents. Of note, caregiver alcohol dependence, caregiver drug abuse, were significant predictors in the model, despite the overall model lacking statistical significance.

Model 14: Foster Care: Suicidal Ideation

In model 14, which estimated the predictors of suicidal ideation for youth in kinship care, there were 136 observations within 85 participants. This random effect model was not statistically significant (Wald $Chi^2 = 4.83$, $p = 1.0$), suggesting that the odds of having suicidal ideation in the past week cannot be predicted from the independent variables for this sub sample of child welfare involved youth.

Chapter V: Discussion

Discussion

Chapter four presented research findings on the relationship between 1) alcohol use and suicidal ideation and 2) marijuana use and suicidal ideation. Chapter four also presented research findings on the ways in which individual, family, and peer variables confer risk for alcohol use, marijuana use, and suicidal ideation among youth involved with the child welfare system, and how these factors vary based on the youths' living arrangements. Research findings from this study partially supported hypotheses under Aim 1: Alcohol Use at earlier waves predicted alcohol use at later waves, and marijuana use at earlier waves predicted marijuana use at later waves. However, the hypothesis that alcohol use at Wave 1 would predict suicidal ideation at Wave 2, which would consequently predict alcohol use at Wave 3 was not supported. The same was true for marijuana use. Research findings from this study supported hypotheses under Aim 2. Marijuana use, caregiver drug abuse, deviant peer affiliation, age, and race were significant predictors of alcohol use over time; alcohol use, deviant peer affiliation, age, and time predicted marijuana use over time; and alcohol use, deviant peer affiliation, age, and gender predicted suicidal ideation over time. Given the small sample size and loss of power, hypotheses under Aim 3, testing if the predictors of alcohol use, marijuana use, and suicidal ideation over time differed based on the youth's living arrangement, were neither supported nor refuted.

Bivariate results indicated significant differences in suicidal ideation based on alcohol use (at all three waves) and marijuana use (at Wave one only). However, when testing the relationship between alcohol use and suicidal ideation longitudinally (Aim 1,

Research Question 1), alcohol use did not predict suicidal ideation and suicidal ideation did not predict alcohol use over time. Alcohol use at earlier time periods did predict alcohol use at later periods, suggesting that those who drink alcohol at one period are more likely to also drink at later periods. Similar findings for marijuana use were found (Aim 1, Research Question 2). Specifically, marijuana use did not predict suicidal ideation and suicidal ideation did not predict marijuana use over time. Marijuana use at younger ages did predict marijuana use at later ages, suggesting that those who used marijuana at earlier time points are likely to continue using marijuana.

The random effect models (Aim 2, Research Questions 1, 2, and 3) demonstrated how individual, family, and peer factors affect alcohol use, marijuana use, and suicidal ideation among youth involved in the child welfare system. The present chapter provides a discussion of these findings with a specific focus on the relationship between alcohol and marijuana use and suicidal ideation, strengths and limitations of this dissertation, and implications for policy, practice, and future research.

According to the 2016 Monitoring the Future Study; a national study of adolescents, college students, and adult high school graduates in the United States, 41.9% of youth report having ever drunk alcohol and 28.6% report having ever used marijuana. This same study found that 19.8% of teens reported drinking in the past 30 days and 13.7% reported using marijuana in the past 30 days (Johnston, O'Malley, Miech, Bachman, & Schulenberg, 2016). In the present study, by Wave 3 of data collection 55.8% of participants had endorsed drinking alcohol, 28.5% of whom drank in the past 30 days. Moreover, 38.7% of participants reported using marijuana in their lifetime and 16.64% had used marijuana in the past 30 days. These numbers indicate a 13.9%

difference in alcohol use prevalence rates between the school-attending adolescent and young adult population and child welfare involved youth. Similarly, there is a 10.1% difference in marijuana use between the school-attending adolescent and young adult population and those involved in the child welfare system, with child welfare involved youth having the higher rate.

Similarly, the prevalence rate of suicidal ideation among the child welfare sample in this dissertation is higher relative to the general public of adolescents. According to the Youth Risk Behavior Survey; a national study of high school students in grades 9-12, 17.7% of students had considered attempting suicide in the *previous 12 months before the survey* (Kann et al., 2016). In this dissertation, 19.56% of participants reported *past 2 week* suicidal ideation at Wave 1 and 12.80% reported suicidal ideation in the past 2 weeks by Wave 3. These findings are consistent with previous studies that demonstrate the rates of alcohol use, marijuana use, and suicidal ideation are higher among child welfare involved youth (Heneghan et al., 2013). These numbers represent a significant number of youth who are at risk of continued alcohol use, marijuana use, and suicidal ideation.

We know that racial minority families, and in particular African American families, are overrepresented in both investigations from child protective services (Fluke, Yuan, Hedderson, & Curtis, 2003), as well as in foster care settings (US Department of Health and Human Services, 2001). Minority stress theory (Meyer, 2003) posits that individuals who are a part of minority groups can be exposed to frequent, harmful stressors which can lead to greater mental health problems such as substance use and suicidal thoughts. Given the disproportionality of racial minority children in the child

welfare system, it is possible that that these families experience greater prejudice, oppression, and discrimination which could enhance their level of stress. With the addition of child protective service investigations, these increased stressors may be an explanation for the higher rates of underage alcohol use, marijuana use, and increased suicidal ideation among this population.

Alcohol Use

In this dissertation, marijuana use, suicidal ideation, caregiver drug abuse, deviant peer affiliation, age, and race were significant predictors of alcohol use over time (Aim 2, Research Question 1). As was expected, marijuana use, suicidal ideation, and deviant peer affiliation were particularly potent risk factors for alcohol use. When youth use marijuana, experience suicidal ideation, and/or spend time with deviant peers, they are at an increased risk of using alcohol. In this sample, however, having a caregiver with drug abuse (other than alcohol) served as a protective factor. Specifically, when comparing individuals with caregivers who had drug abuse to individuals with caregivers without drug abuse, those who had a caregiver with drug abuse were at a decreased risk of using alcohol. These results are contrary to other studies, which suggest caregiver drug abuse is a risk factor for alcohol use among adolescents (Hawkins, Catalano, & Miller, 1992; Kilpatrick et al., 2000). One potential explanation for this surprising finding, is that because this is a sample of youth involved with the child welfare system, these families are closely monitored which may lend itself to the provision of additional supports and services. For example, over the past two decades, researchers and clinicians have developed and identified effective strategies and services to support child welfare involved parents and their children when a parent has a substance abuse problem

(Children's Bureau, 2014). Some of these strategies include, the promotion of protective factors (i.e., social connections & parenting knowledge), early identification of at-risk families, priority and timely access to substance abuse treatment, gender-sensitive substance abuse treatment and support, family-centered treatment services (including inpatient treatment for caregivers where children remain with them), recovery coaches and mentoring, and shared family care (where the family with parental substance abuse struggles and child maltreatment is matched with another family for additional support) (Children's Bureau, 2014). In addition, the Child Welfare League of America recommends that caseworkers provide additional services for children of parents with substance use issues who are involved with the child welfare system (Children's Bureau, 2014).

Marijuana Use

Alcohol use, deviant peer affiliation, age, and time predicted marijuana use over time (Aim 2, Research Question 1) in this research study. When youth use alcohol, affiliate with deviant peers, and get older, they are at an increased risk for using marijuana. Surprisingly, caregiver health, including their physical health, mental health, alcohol dependence, or substance abuse had no significant effect on the odds of using marijuana for this sample. These findings may be related to adolescents spending more time with peers and less time with caregivers as they transition from childhood to adolescence (Steinberg, 2014). At the same time, adolescence is a time of exploration and experimentation and many youth begin to experiment with alcohol during their adolescence (Steinberg, 2014), which may be a gateway into the use of marijuana.

Suicidal Ideation

In this research study, alcohol use, deviant peer affiliation, age, and gender predicted suicidal ideation over time (Aim 2, Research Question 2). Both alcohol use and deviant peer affiliation are risk factors for suicidal ideation among child welfare involved youth. When youth use alcohol or affiliate with deviant peers, they are at an increased risk for suicidal ideation. Research has suggested that being surrounded by a deviant peer group can amplify suicide risk, including increasing suicidal thoughts (Winterrowd & Canetto, 2013). One mechanism through which this may occur is through the proliferation of low emotional and behavioral regulation skills that ultimately contribute to increased suicidal ideation (He, Fulginiti, & Finno-Velasquez, 2015).

Consistent with previous research, the results from this study also suggest that throughout adolescence, as youth get older, they are less likely to endorse suicidal ideation. This is consistent with findings from the Youth Risk Behavior Survey (Kann et. al. 2015) that demonstrated decreases in the proportion of youth endorsing suicidal ideation from grade 9 to grade 12. As youth age they may learn and develop adaptive coping skills that serve to mitigate their suicidal thoughts. Research has suggested that early adolescents lack in their capacity for adaptive coping (Hampel & Petermann, 2005). Moreover, research has suggested that it is not uncommon for younger adolescents to experience some suicidal ideation given the hormonal and developmental changes that occur including the onset of puberty and increased peer and school pressures, but that the majority of youth do not continue to have suicidal ideation over time, it is only a small sub group of adolescents that continue on to develop persistent suicidal ideation (Stoep, McCauley, Flynn, & Stone, 2009).

In addition, the results from this dissertation suggest that females are more likely to have suicidal ideation when compared to males. It is important to note, however, that given gender roles and expectations, males may under report suicidal thoughts (Krysinska, 2014). Research has suggested that men, in particular, struggle with their decision to disclose mental health struggles based on conventional values towards masculinity. Specifically, previous research identified that men often do not disclose due to fear of appearing weak, vulnerable, or un-masculine (McKenzie, Gabrielle, & Sunny, 2016).

In order to identify the probabilistic nature of a behavior, such as substance use, social cognitive theory (Bandura, 1986) suggests that there are five basic cognitive capabilities common to individuals (symbolizing, forethought, vicarious, self-regulatory, and self-reflective). The degree to which individuals utilize these capabilities can help to predict how probable it is that the individual will engage in any given behavior. Thus, social cognitive theory provides a framework that predicts the likelihood of adolescent alcohol use and marijuana use once the influence of themselves, their caregivers, and their peers are considered. Specifically, adolescents who have strong relationships with parents who disapprove of alcohol use may be less likely to engage in the behavior of underage alcohol use. This may be because of the individual's capacity for symbolizing and the meaning that the individual makes out of his or her parents disapproval of alcohol use. Moreover, given the cognitive capability of the self-regulatory process (Bandura, 1986), adolescents have the ability to monitor their thoughts and ideas to predict what will happen if they engage in certain behaviors. Therefore, if the adolescent has parents with alcohol dependency or substance abuse, the adolescent can predict that they may

behave in similar ways as their parents when under the influence of alcohol or drugs, they can also see the effects that alcohol and drugs have had on their parents (i.e., a potential child welfare investigation) and thus decrease the probability that the adolescents will engage in underage alcohol or marijuana use. Findings from this dissertation support social cognitive theory in that having a caregiver with drug abuse did appear to influence their decision to engage in alcohol use.

Similarly, affiliating with peers who engage in deviant behaviors did confer risk for alcohol and marijuana use. The theory posits that if an adolescent's peers engage in deviant behavior, such as alcohol or marijuana use, the adolescent can use their cognitive capabilities such as symbolizing, vicarious, and self-regulatory processes to create an internal model of alcohol and marijuana use and then utilize that symbolic meaning making to guide their own behavior. They can also develop expectancies about alcohol and marijuana use from their peers. For example, among adolescents with little to no previous alcohol use, exposure to peer drinking leads to alcohol expectancies specific to enhanced social behaviors, tension reduction, and cognitive/behavioral deterioration. In other words, adolescents believe that drinking will help make them friendly, more relaxed, but also more likely to think or behave in dangerous ways (Ting, Chen, Liu, Lin, & Chen, 2015). Consequently, affiliation with deviant peers (i.e., peers who drink alcohol or use marijuana) effects youth's expectancies around alcohol (and other drugs), and thus, may indirectly influences their decision to use. Adolescents are particularly influenced by peers, and thus these findings align with both social cognitive theory and developmental theory.

Lastly, social cognitive theory posits a reciprocal relationship between cognitive,

behavioral, and physiological processes. Although the path models did not reveal a bidirectional relationship between alcohol use and suicidal ideation, the bivariate analyses, as well as the longitudinal analyses indicated a relationship between alcohol use and suicidal ideation among child welfare involved youth such that alcohol use predicted suicidal ideation and suicidal ideation predicted alcohol use. These results are consistent with previous literature supporting the relationship between alcohol use and suicidal ideation among clinical populations (Bagge & Sher, 2008; Nock et al., 2013). Youth in the child welfare system may use alcohol to cope with distress (Khantzian, 1997), and at the same time, alcohol use may exacerbate distress (Marschall-Lévesque et al., 2017), suggesting a bidirectional relationship between alcohol and suicidal ideation. These results should be interpreted with caution because the path models did not align with the bivariate analyses and the longitudinal analyses. It is possible that the model fit for the path analyses was poor, as a result of poor model specification, which led to insignificant findings. Despite the non-significant path model, the bivariate and longitudinal analyses present with strong empirical support for a potential bidirectional relationship between alcohol use and suicidal ideation among child welfare involved youth.

Limitations

While this study contributes to the knowledge base on substance use and suicidal thoughts among child welfare involved youth, it has several limitations. One of the most prominent limitations is that the data utilized come from 2008-2010, making this data set approximately 9-10 years old. However, the NSCAW II is the most recent national level study with data on suicidal ideation and substance use, specific to a child welfare involved population. This limitation has many implications in how individuals should

interpret the findings of this dissertation. First, this research study did not find a relationship between marijuana use and suicidal ideation. However, marijuana policies and potency continue to change and evolve. Specifically, by 2008, 12 states had legalized medical marijuana and zero states had legalized recreational marijuana. Fast-forward to 2017, and 29 states now have legalized medical marijuana with 8 states having legalized recreational marijuana ("29 Legal Medical Marijuana States and DC - Medical Marijuana - ProCon.org," 2017; Marijuana Policy Project (MPP), 2017). In addition, there has been, and continues to be, an increase in the potency of marijuana use in the United States (ElSohly et al., 2016). Specifically, the potency of marijuana has increased from approximately 4% in 1995 to approximately 12% in 2014 (ElSohly et al., 2016). Given the change in marijuana policies and potency over the past ten years, it is possible that the effect marijuana has on suicidal ideation has changed. It is possible, that with increased legalization and potency, marijuana may now have an effect on suicidal ideation among child welfare involved youth.

A second limitation is that this study utilized a relatively small sample size limiting the ability to fully explore Aim 3 of this dissertation or include additional variables that may have an impact on suicidal ideation, alcohol use, or marijuana use. Specifically, the small number of youth in kinship care, foster care, and other out of home living arrangements in this sample, made the analyses for Aim 3 lose statistical power that would enable estimating stable models. In addition, the inclusion of additional variables would decrease the number of youth in each cell, making analyses not possible. With increased sample sizes, more nuanced analyses can be conducted in order to more fully understand these relationships. Similarly, this study had a high level of attrition and

despite being a national study, was not nationally representative of youth in the child welfare system. Consequently, results from this dissertation are not generalizable to the full population of children involved with the child welfare system in the United States.

Lastly, the NSCAW II collects limited data on suicidal thoughts and behaviors. Understanding all elements of suicidal thoughts and behavior are important in understanding the relationship between substance use and suicide, as well as in identifying implications for policy, practice, and research. Only measuring suicidal ideation (as opposed to also including suicide attempts, suicide plans, and non suicidal self-injury) limits our ability to further understand these nuanced relationships. In addition, measuring gender as a binary construct without allowing for other gender presentations (such as transgender) limits our ability to understand the effects of gender on suicide, especially when research has demonstrated that transgender youth are at an increased risk for suicide (Veale, Watson, Peter, & Saewyc, 2017). Thus, these limitations should be considered while interpreting the findings from this dissertation.

Implications for Policy and Practice

Findings from this dissertation offer evidence of the complex challenges youth involved with the child welfare system experience: underage substance use and suicidal ideation. Substance use and suicide among youth are pervasive public health problems that clinicians and policy makers must recognize and consider in order to implement and develop appropriate interventions. Findings from this study provide evidence of a bidirectional relationship between alcohol and suicidal ideation among youth involved with the child welfare system. Previous studies have demonstrated that restrictive alcohol policies work to both reduce underage alcohol use, and also indirectly reduce suicide

among the general population (Xuan et al., 2016). Restrictive alcohol policies may indirectly reduce suicide given the effect alcohol has in reducing disinhibition and increasing the likelihood of acting on suicidal thoughts. Consequently, restrictive alcohol policies are advocated for as they may assist in reducing both underage drinking and suicide among child welfare involved youth.

Although substance use and suicidal thoughts are problems among adolescents in general, this dissertation demonstrated that the proportion of youth experiencing substance use and suicidal thoughts is substantially higher among youth involved with the child welfare system. There are a variety of evidence-based treatments for both substance use and suicidal thoughts among adolescents. Researchers have suggested family skills training, parent education and training, and individual skills training for particularly efficacious treatment for youth suicidal thoughts and behaviors (Glenn, Franklin, & Nock, 2015) and motivational interviewing for both suicidal thoughts and behaviors and substance use (McManama O'Brien, Aguinaldo, White, Sellers, & Spirito, 2016). Moreover, brief interventions for substance use and suicidal ideation are gaining popularity among clinicians. Brief interventions are often short, efficient, and cost-effective. Brief interventions are particularly appropriate for adolescents as content can be developmentally appropriate and many adolescents who use substances do not need intensive, long-term treatment. At the same time, many brief interventions have non-confrontational and client-centered approaches which are particularly appealing to youth (Winters, 2016). These strategies may be particularly important for youth in the child welfare system as research has demonstrated youth involved with the child welfare system and youth with a history of child welfare involvement tend to experience greater

mobility and placement instability when compared to their peers in the general population (Courtney, Hook, & Lee, 2010; Havlicek, 2010).

This research study also revealed the potency with which peers play a role in both substance use and suicidal thoughts among child welfare involved youth. Consequently, clinicians should be aware of the developmental trajectories of youth and the role peers play in these problems. In order to utilize peers in a positive way, adults should train peers to recognize warning signs of problematic substance use and signs of suicidal thoughts. Sources of Strength (Wyman et al., 2010) is one effective intervention aimed at utilizing peer leaders in schools to conduct school wide messaging and connect students with suicidal thoughts and behaviors to adults for additional support and assistance. Wyman and colleagues (2010) found that peer leaders trained in Sources for Strength were 4 times more likely to refer a peer with suicidal thoughts or behaviors to an adult when in need of help when compared to their non trained peers. Child welfare case workers can utilize similar approaches with child welfare involved youth. In addition, Child welfare case workers could encourage youth involved with the child welfare system to spend time with other youth who engage in pro social behaviors in order protect against substance use and suicidal thoughts.

Despite the need for targeted brief interventions focused on alcohol use, marijuana use, and suicidal ideation for child welfare involved youth and the potential benefits of utilizing peers to promote pro social behavior, many social workers and child welfare workers are not trained in how to address these problems. Findings from this research study highlight the need for additional training for social workers and child welfare workers. To be specific, educators in schools of social work need to integrate

more targeted curriculum on the child welfare system and the complex experiences of youth in care. Educators should integrate training in brief interventions for substance use and suicide among youth in general, and more specifically, recognizing the high risk group of youth involved with the child welfare system. Educators need to train social workers to think about ways to integrate peers into existing therapeutic approaches. However, training does not end while in school. This research demonstrates the need for ongoing training and professional development for child welfare workers in the field as new interventions are developed and tested for this group.

In addition, this dissertation highlighted the bidirectional relationship between alcohol use and suicidal thinking among this sub population of youth. Research and theory have posited a complex relationship between thoughts and behaviors, with changes in one area leading to changes in another (Hollon & Beck, 1994). In addition, the standard of care is that youth receiving treatment for alcohol use or suicidal ideation, often do so separately, despite the strong connection. As such, clinicians should consider developing accessible interventions for youth in care by either integrating substance use and suicidal ideation treatment, or by targeting a reduction in underage alcohol use as a way to indirectly target suicidal thoughts. Such integrated interventions have been developed for youth with suicidal thoughts and behaviors and substance use, yet these have not been tested with youth involved with the child welfare system. For example, Esposito-Smythers, Spirito, Kahler, Hunt, and Monti (2011), developed an integrated cognitive–behavioral treatment protocol, with a motivational interview, for adolescents with co-occurring alcohol use disorders and suicidality. They found that those who participated in their protocol had reduced drinking and substance use as well as reduced

suicide attempts. Similar protocols have been developed for youth in inpatient psychiatric settings. For example, O'Brien and colleagues (2017) developed a brief motivational intervention for alcohol use suicidal adolescents in inpatient psychiatric settings which aims to reduce both alcohol use, and suicidal thoughts and behaviors among adolescents. Testing these interventions with youth in care, and/or developing similar therapeutic interventions specific to youth in care, can help to ameliorate the pervasive problems of substance use and suicidal thoughts in adolescents involved with the child welfare system.

Lastly, findings from this research study suggest that more research is needed on substance use and suicide among youth involved with the child welfare system. States and agencies should consider utilizing child welfare case workers to assess substance use and suicidal thoughts and behaviors among youth in care. Longitudinal data on this topic is limited and if states and agencies were able to have this data readily available, additional insights can be gleaned which would help agencies and states to improve their practices and services, which would ultimately improve outcomes for families involved with the child welfare system.

Future Research

Social work researchers are uniquely positioned to understand and ameliorate complex social problems such as adolescent alcohol and marijuana use and suicidal thoughts and behaviors. Although this dissertation gleaned new information regarding a bidirectional relationship between alcohol use and suicidal thoughts, future research should examine this relationship with more complex and nuanced experiences related to suicide. Specifically, suicidal thoughts and behaviors are distinct constructs (Silverman et

al., 2007) and research should examine not only ideation, but also suicide plans, attempts, and non-suicidal self-injury. Each of these experiences is unique for individuals and their relationship to alcohol and other drugs may differ for youth involved with the child welfare system. Similarly, although this dissertation focused on alcohol and marijuana use, adolescents experiment with many other substances, and some develop substance misuse and related problems. Consequently, it is important to understand these relationships with other substances such as cocaine, opioids, cigarettes, and vaping (which has become increasingly popular). By understanding these complex relationships more fully, policy and intervention development can be targeted more specifically. A third area of future research is to look more closely at placement changes as it relates to substance use and suicide. Research has demonstrated that a variety of placement changes can result in poorer outcomes for youth in the child welfare system (Rubin, O'Reilly, Luan, & Localio, 2007). This is particularly important as key concepts such as parental monitoring and parental knowledge become less feasible with increasing moves. As such, future research should consider examining the effects of placement changes on adolescent alcohol use, marijuana use, and suicidal thoughts and behaviors. Lastly, a major limitation of this dissertation was the use of older data given the changes in policy over the last ten years. Future research should replicate these findings with more recent data to establish if the same relationships emerged.

Conclusions

Substance use and suicide among adolescents are two pervasive problems for youth in the United States. Suicide is the second leading cause of death for adolescents, resulting in more than one in ten deaths among adolescents and over 5,000 youth are

estimated to die each year from alcohol related incidents. Research has demonstrated that a history of childhood abuse is a strong risk factor for suicidal ideation and alcohol misuse and related problems. This dissertation provides support that individual, family, and peer factors all play a role in alcohol use, marijuana use, and suicidal ideation among youth involved with the child welfare system. Specifically, this dissertation gleaned the important role that peers play in all three outcomes and suggested a bidirectional relationship between alcohol use and suicidal ideation.

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