ALCOHOL USE TRAJECTORIES & THE TRANSITION FROM ADOLESCENCE INTO YOUNG ADULTHOOD:
AN EXAMINATION OF CRIME, SEX, AND GENDER

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ALCOHOL USE TRAJECTORIES & THE TRANSITION FROM ADOLESCENCE INTO YOUNG ADULTHOOD: AN EXAMINATION OF CRIME, SEX, AND GENDER

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Dissertation

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ABSTRACT

The transition into young adulthood is an important period of change for adolescents during which young individuals enter into adult roles that impact their future trajectories (Arnett 2000). It is also during this developmental period that involvement in alcohol use and crime/delinquency reach their peak (Casswell, Pledger & Pratap 2002; Gottfredson & Hirschi 1990; Hirschi & Gottfredson 1983; Johnston et al. 2013; Lauritsen 1998; SAMHSA 2012) and have been found to be associated with one another (Barnwell, Borders & Earlywine 2006; Bonomo et al. 2001; Felson et al. 2008; Ford 2005; Parker & McCaffree 2013; Schulenberg et al. 1996; Wechsler et al. 1994). Alcohol use and its covariates are often studied cross-sectionally and have yet to be studied over time with a focus on the emerging adulthood period. Thus, the patterning of heavy alcohol use in connection with its covariates is yet to be fully understood. Here, Sampson and Laub’s Life Course Theory of Crime (Laub & Sampson 2003; Sampson & Laub 1993) and the life course perspective are used as a lens to examine the relationship between alcohol use and its covariates during emerging adulthood. This dissertation addresses major gaps in the literature by examining violence, non-violent crime and delinquency, sex and gender role orientation, social support, and life transitions in conjunction with heavy alcohol use during the transition from adolescence into young adulthood. Life course theoretical perspectives of alcohol use are expanded by incorporating sex and gender orientation parameters which have largely been absent from Sampson and Laub’s theory. Alcohol use trajectories were estimated with group-based trajectory modeling in

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secondary analysis using four waves of the public-use National Longitudinal of Adolescent Health (Add Health) data. Four distinct alcohol use trajectory groups were identified: infrequent heavy drinkers, increasing seldom heavy drinkers, seldom heavy drinkers, and increasing occasional heavy drinkers. Analyses reveal that violence and non-violent crime/delinquency are each associated with increases in heavy episodic drinking for the four alcohol use trajectory groups over time. Social support is found to be a protective factor against belonging to a higher alcohol use trajectory group in comparison to belonging to the lowest alcohol use trajectory group. Life transitions, marriage/cohabitation and parenthood specifically, are found to decrease heavy episodic drinking behaviors for all alcohol use trajectory groups. In addition, results indicate that there are gender role orientation as well as sex differences in heavy alcohol use during the transition to young adulthood. Sex specific analyses indicate that males and females exhibit different heavy alcohol use patterns during the transition into young adulthood. Additionally, those who adhere to a traditionally masculine gender role orientation and males have a higher likelihood of belonging to a higher heavy episodic drinking trajectory group. Support for several major facets of Sampson and Laub’s Life Course Theory of Crime is found. Results from the analyses suggest that social support and life course transitions/events are important in lessening engagement in negative behaviors such as heavy episodic drinking. Lastly, Sampson and Laub’s theory and the life course perspective in general are expanded to include sex and gender role orientation as major substantive variables rather than control variables.
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CHAPTER I
INTRODUCTION

The purpose of this dissertation is to examine alcohol use trajectories during the transitional period from adolescence to young adulthood. Specifically, this dissertation aims to explore alcohol use trajectories as well as to investigate the covariates of heavy episodic drinking during emerging adulthood (Arnett 2000). The covariates taken into consideration include: violence, non-violent crime/delinquency, sex and gender role orientation, social support (parental and school connectedness), and life transitions/events (education, employment, marriage/cohabitation, and parenthood). To examine the important transitional developmental period preceding adulthood, this dissertation is informed by Sampson and Laub’s Life Course Theory of Crime (Laub & Sampson 2003; Sampson & Laub 1993) and the life course perspective in general.

To date, there have only been a few published articles that examine the relationship between alcohol use and its covariates, especially criminological covariates, over multiple time points (Frech 2012; Maldonado-Molina, Reingle & Jennings 2011; White, Brick & Hansell 1993). Even fewer articles are focused on the critical developmental period of emerging adulthood. Emerging adulthood refers to the later years of adolescence that are often characterized and marked by change as adolescents make their way into young adulthood (Arnett 2000; Newcomb & Bentler 1987; Petersen 1993; Schulenberg et al. 1996; Schulenberg & Maggs 2002; Sherrod, Haggerty &
Featherman 1993; White et al. 2006). It is during this period that patterns of behavior tend to be laid and, thus, imperative to examine in order to more fully understand heavy alcohol use patterns over time.

Additionally, this dissertation aims to examine both sex and gender as major substantive variables. A serious consideration of sex and gender has largely been absent from the criminological and alcohol use literature. Instead, the majority of analyses that include sex or gender consider them as control variables or as a means of comparison (i.e., male versus female differences). Moreover, the transition from adolescence into young adulthood is marked by changes that are gendered with the adoption of roles that carry gendered meanings (Katsurda & Sugihara 2002; Thompson & Walker 1989; Sanchez & Thompson 1997; Szinovacz & Harpster 1993). There has yet to be an analyses that takes both sex and gender role orientation into serious consideration while examining alcohol use, crime/delinquency, and covariates important to Sampson and Laub’s Life Course Theory of Crime during the transition from adolescence into young adulthood.

**Theoretical Framework: Sampson & Laub’s Life Course Theory of Crime and the Life Course Perspective**

The life course perspective provides a broad framework for studying the lives of individuals over time. A life course approach takes an individual’s entire life history and social circumstances as well as historical contexts into consideration (Elder 1985; Elder 1998). According to the life course approach, events that occur earlier in the lifespan and throughout the life course have the potential to significantly shape what occurs later in life (Cullen & Agnew 2011; Elder 1985; Elder the 1998). The life course perspective
informs the foundation of Sampson and Laub’s Life Course Theory of Crime which takes a criminological focus on the life course.

To examine the critical developmental period of emerging adulthood, this dissertation is informed by Sampson and Laub’s Life Course Theory of Crime (Laub & Sampson 2003; Sampson & Laub 1993) as well as the life course perspective. The main objective is to examine heavy episodic drinking trajectories and to identify theoretically relevant correlates and predictors (covariates) during the transition from adolescence into young adulthood when both alcohol use and criminal and delinquent behavior tend to be at their highest levels (FBI 2012; Johnston et al. 2003; SAMHSA 2012). To accomplish this objective, I take insights from Sampson and Laub’s Life Course Theory of Crime and the life course perspective to identify important aspects of emerging adulthood including adolescent social bonds and/or social support (parental and school connectedness) and life transitions/events (education, employment, marriage/cohabitation, and parenthood).

Sampson and Laub’s Life Course Theory of Crime is an integration of several theories including social bonds, self-control, differential association/social learning, the labeling perspective, and the life course perspective (Farrington 2008; Sampson & Laub 1993). The core tenet of their theory is that informal social control explains the “onset of offending, continuity in offending, and changes in offending throughout the life course” (Laub, Sampson & Sweeten 2008:313). Two types of social bonds important to Sampson and Laub’s Life Course Theory of Crime considered in this dissertation include social support and life transitions.

The strength of social support and social bonds to family and education are hypothesized to lay the foundation for later behavior patterns. Sampson and Laub
suggested that the strength of social bonds depends on attachment to parents, schools, (delinquent) friends and siblings, and parenting strategies (discipline and supervision) (Farrington 2008; Sampson and Laub 1993). Those who develop stronger positive bonds to parents or school will be less likely to engage in criminal or delinquent behavior later in life. In this dissertation, I examine parental and school connectedness.

Adult social bonds in the form of making life transitions or experiencing events that alter the life course are predictive of engaging in criminal or delinquent behavior (Farrington 2008; Sampson and Laub 1993). Specifically, those who form positive adult social bonds are less likely to be involved in criminal and delinquent behaviors. A defining aspect of Sampson and Laub’s theory is that social bonding can and does occur and form beyond childhood (Sampson & Laub 1993). The majority of criminological theories that include childhood development (e.g., social bonds theories and self-control theories) do not take adult-formed social bonds into account. In this dissertation I examine education, employment, marriage/cohabitation, and parenthood.

*The Transition into Young Adulthood: Emerging Adulthood*

The transition to young adulthood, also termed emerging adulthood, is the period between the ages of (roughly) 18-25 (Arnett 2000; White et al. 2006). It is a period when individuals are no longer adolescents or children (legally) nor are they usually considered to be fully indoctrinated into adulthood. The transition from adolescence into young adulthood is a period marked by profound individual level change and socio-structural based expectations for change (Arnett 2000; Sherrod, Haggerty & Featherman 1993). Arnett (2000) argues that emerging adulthood is a time when many different life directions are possible and the exploration of potential life pathways often occurs.
It is during the transition to young adulthood that involvement with heavy alcohol use and involvement with crime and delinquency tend to be at their highest (Caswell, Pledger & Pratap 2002; Gottfredson & Hirschi 1990; Hirschi & Gottfredson 1983; Johnston et al. 2013; SAMHSA 2012). Thus, examining alcohol use trajectories and their covariates during emerging adulthood is essential in order to more fully understand the long term patterning of alcohol use. Interestingly, an examination of emerging adulthood in conjunction with heavy episodic drinking and/or crime/delinquency is largely missing from the literature. This is curious given the substantial literature on the transition into young adulthood.

*Outcome Variable: Heavy Episodic Drinking*

Alcohol use is one of the most widely used substances for both adolescents and adults according to the latest Monitoring the Future (MTF) survey and National Survey on Drug Use and Health (NSDUH) (Johnston et al. 2013; SAMHSA 2012). Of utmost concern is binge drinking or heavy episodic drinking practices because it is related to engaging in a wide variety of negative behaviors including crime and delinquency (Schulenberg & Maggs 2002). In fact, the vast majority of studies concerning alcohol use find that alcohol use, especially heavy episodic or binge drinking, is linked to numerous adverse outcomes such as health problems, academic problems, and co-occurring disorders with other substances and/or mental health problems, and fatalities related to alcohol use (Jennison 2004; NIAAA 2012c; NIAAA 2012d; Wechsler et al. 1994).

Examining alcohol use trajectories has mainly been the subject of psychological and public health studies. Until relatively recently, the singular focus of these studies was on determining the trajectory pattern of alcohol use over time (Casswell, Pledger &
Researchers have begun to examine other factors that may have an impact on or alter alcohol use trajectories. This dissertation aims to not only explore trajectories of heavy episodic drinking but to also provide insight into potential covariates of heavy episodic drinking including violent and non-violent crime/delinquency, sex, gender role orientation, social support, and life transitions/events.

Alcohol use and its correlates and predictors are often studied cross-sectionally and the vast majority of research has shown that there is a relationship between alcohol use and crime and delinquency (Barnwell, Borders & Earlywine 2006; Bonomo et al. 2001; Felson et al. 2008; Ford 2005; Parker & McCaffree 2013; Schulenberg et al. 1996; Wechsler et al. 1994). The lack of empirical investigations that utilize longitudinal data to examine alcohol use across time highlights the need for more research in order to better understand the patterning of heavy episodic drinking and what factors may contribute to either engaging in or abstaining from problematic heavy episodic drinking patterns. Currently, the cross-sectional research provides the base knowledge for understanding heavy episodic drinking, but a longitudinal approach will provide a larger view of what contributes to heavy episodic drinking patterns that may change throughout the transition into young adulthood.

Covariates of Heavy Episodic Drinking: Violence & Non-Violent Crime/Delinquency

Alcohol use and its potential covariates have yet to be adequately studied over time (Maggs & Schulenberg 2004/2005; Muthen & Muthen 2000). Alcohol use and specifically heavy episodic drinking in conjunction with crime, delinquency, and variables important to Sampson and Laub’s Life Course Theory of Crime (social support
and life transitions) have not been sufficiently studied especially during on the transitional period into young adulthood. Currently, the association between alcohol use and various covariates has been studied using a singular time-point with data often being gleaned from convenience college-based samples. Thus, there is a need to examine alcohol use and its predictors and correlates more thoroughly and via non-college based samples.

Alcohol related violent and non-violent crime/delinquency have each been the subject of numerous studies often spanning many different fields of study. Generally, research concerning alcohol and crime finds a positive association between alcohol consumption and involvement in crime and/or delinquency (Barnwell, Borders & Earlywine 2006; Bonomo et al. 2001; Felson et al. 2008; Ford 2005; Parker & McCaffree 2013). Official data sources, data from the National Incident-Based Reporting System (NIBRS) and other official sources, show that alcohol is the most often cited factor in violent and non-violent crime (drug offenses, public order offense, and property offense) arrests according to both police officers and jail inmates (Rand et al. 2010; Survey of Inmates in Local Jails 2002). Criminological and sociological studies confirm that alcohol use is a major factor in crime/delinquency commission, especially violence and interpersonal violence (Brewer & Swahn 2005; Forsyth & Lennox 2010; Maldonado-Molina, Reingle & Jennings 2011; Peralta & Cruz 2006; Pihl & Sutton 2009; Xue, Zimmerman & Cunningham 2009).

**Overview of Data & Analytic Technique**

I use all four waves of The National Longitudinal Study of Adolescent Health (Add Health) to explore and examine developmental trajectories of heavy episodic
drinking behaviors from adolescence into young adulthood. The data used in this
dissertation come from the public use data from the Add Health project (1994-2008).
This unique nationally representative data allows me to identify alcohol use trajectories
and to assess their covariates over four waves of data. I utilize group-based trajectory
models to examine heavy episodic drinking trajectories over time. Group-based trajectory
models are used to identify clusters of individuals who follow similar progressions of
heavy episodic drinking behaviors over time (Jones, Nagin & Roeder 2001; Jones &
Nagin 2007; Nagin 2005).

Additionally, covariates of heavy episodic drinking (violence, non-violent
crime/delinquency, sex, gender role orientation, social support, and life
transitions/events) and their potential impact on trajectory group membership and/or how
developmental trajectories are altered over the course of time are able to be assessed
using group-based trajectory modeling. Group-based trajectory modeling allows for the
inclusion of both time-stable and time-varying covariates of alcohol use. In this
dissertation, the time-stable covariates include the measures of social support (parental
and school connectedness), sex, and gender role orientation. The time-varying covariates
of alcohol use include the measures of violence, non-violent crime/delinquency, and the
life transitions/events which consist of education, employment, marriage/cohabitation,
and parenthood.

Significance of the Dissertation

This dissertation is significant and contributes to our knowledge of alcohol use
and criminology in several ways. First, I expand and examine portions of Sampson and
theory by including sex and accounting for gender role orientation. I do this by analyzing males and females and their alcohol use trajectories together and separately. I also examine gender role orientation\(^1\) (e.g., masculinity and femininity) using the Bem Sex Role Inventory (BSRI) to expand the empirical and theoretical literature beyond the study of sex differences (i.e., male versus female differences). As written, sex and gender are both missing from Sampson and Laub’s theory. This is partly due to the fact that their theory is based on male-only data. In addition, sex and gender are rarely used as theoretical determinants in criminological studies, if included at all, because males tend to engage in criminal or deviant more frequently than females (Forsyth & Lennox 2010; Gussler-Burkhardt & Giancola 2005; Peralta & Cruz 2006).

I examine two major aspects of Sampson and Laub’s theory: social support (parental and school connectedness) and significant life transitions/events (education, employment, marriage/cohabitation, and parenthood). A full test of their theory has not been conducted given the data requirement for examining a large portion of the life course. Although previous studies find that there is support for the social support and life transition aspects of the theory, additional support using longitudinal data is essential for theory testing. This dissertation is a longitudinal examination, whereas the evidence for social support and life transitions is often gleaned from the original data on which the theory is based or from cross-sectional studies that may not accurately represent a test Sampson and Laub’s Life Course Theory of Crime.

\(^1\) I use the term gender role orientation throughout this dissertation. In the literature, measures of gender using the Bem Sex Role Inventory have been referred to this as sex role orientation, gender identity, androgyny, or simply gender (Bem 1974, 1979 & 1981; Hoffman & Borders 2001; Holt & Ellis 1998). For consistency within the dissertation, I use the term gender role orientation.
Second, I illustrate why and how both sex and gender role orientation are important to consider as essential substantive variables that have utility in criminological studies and theories concerning both alcohol use and crime/delinquency. I do this by expanding Sampson and Laub’s Life theory to include and account for sex and gender role orientation, and by giving serious theoretical and empirical attention to both sex and gender role orientation. Such an approach not only broadens our understanding of sex and gender, but it helps to disentangle sex from gender role orientation in order to better understand how these important socio-behavioral characteristics are associated with alcohol use behavior and crime/delinquency. Focusing on sex, gender role orientation, and gender role orientation within sex category in conjunction with alcohol use trajectories and their covariates is largely absent from the literature.

Third, I not only examine alcohol use trajectories, I also utilize alcohol use trajectories more fully in order to examine covariates of heavy episodic drinking. Using insights from the life course perspective and Sampson and Laub’s Life Course Theory of Crime, I identify key covariates of heavy episodic drinking that are important to examine during the transition from adolescence into young adulthood. In addition, I employ a unique and innovative methodological approach that allows me to examine both alcohol use trajectories and covariates of heavy episodic drinking alcohol use trajectories. Group-based trajectory modeling will add to the criminological and sociological literatures because it can differentiate distinct patterns of behavior(s) that occur over time.

Lastly, I enhance our knowledge of alcohol use and the potential correlates and predictors of alcohol use. This dissertation moves beyond only the examination of alcohol use developmental trajectories themselves, which are important to study alone, to
include covariates which may help to explain why individuals engage in heavy episodic drinking practices, especially during the emerging adulthood period when behavior patterns and tendencies are being formed for later life. Additionally, this dissertation is focused on heavy episodic drinking which is the most potentially problematic drinking practice in terms of health and social effects and outcomes.

Overview of the Dissertation and Overarching Research Questions

This dissertation is separated into five chapters. The first chapter introduces the topic of the dissertation generally and concludes with overarching research questions that guide the content of this dissertation. Chapter II presents and discusses the theoretical framework and literature relevant to alcohol use and violence and non-violent crime/delinquency. Further, the covariates of alcohol use including sex, gender role orientation, social support, and life transitions/events and their relationship with alcohol use are also discussed. Chapter II concludes with the hypotheses to be tested in my analyses. Chapter III details the research sample, measures utilized, and statistical methodologies employed in analyzing alcohol use trajectories and their correlates and predictors from adolescence into early adulthood. Chapter IV presents the results from the analyses described in Chapter III and concludes with a discussion of support for the hypotheses. Chapter V provides discussion and conclusions based on the analyses presented in chapter IV and the dissertation concludes with policy implications stemming from this research. Below are the overarching research questions that guide this dissertation:
1. What are the trajectories of heavy episodic drinking during the transition from adolescence into young adulthood?

2. Do heavy episodic drinking trajectories vary by sex?

3. What are the covariates of heavy episodic drinking trajectories?
   a. Is gender role orientation a predictor of trajectory group membership?
   b. Do violence and non-violent crime/delinquency alter trajectories?
   c. Is social support a predictor of trajectory group membership?
   d. Do life transitions/events alter alcohol use trajectories?

4. Do the covariates of heavy episodic drinking vary by sex?

5. What implications does including sex and gender role orientation have for Sampson and Laub’s Life Course Theory of Crime and criminological theory?

6. How is Sampson and Laub’s Life Course Theory of Crime impacted by examining social support and life transitions during the transition from adolescence into young adulthood?
CHAPTER II
LITERATURE REVIEW

In this chapter, literature relevant to alcohol use and crime/deviance is reviewed in relation to a particular and important life course period: the transition from adolescence into young adulthood. Further, literature concerning the additional covariates of sex, gender role orientation, social support, and life transitions/events and their relationship with alcohol use and crime/delinquency is also discussed. The theoretical framework informing this dissertation is the life course perspective.

I first begin by outlining the major goals of this dissertation in general then I review and discuss the research that has already been conducted concerning alcohol use and its covariates. I also identify gaps in the literature that this dissertation aims to address. I then provide an overview of the life course perspective and I review life course theory as it has been used in the field of criminology. I conclude my theoretical discussion by specifying a particular period in the life course: the transition from adolescence into young adulthood. In the context of my theoretical framework, I next review the research concerning alcohol use, alcohol use trajectories, and alcohol-related criminal/delinquent behaviors (violence and non-violence).

The importance of the transition to young adulthood in the relationship between alcohol use and engaging in violence and/or non-violent delinquency/criminal activities has been relatively under-researched and is often overlooked by criminologists with some
noted exceptions\(^2\) (Cullen & Agnew 2011). In addition, insights from the life course perspective have also been underutilized in examining alcohol use and its correlates over time (Sampson & Laub 1993; Cullen & Agnew 2011). Oftentimes, the relationship between alcohol use and engaging in a variety of risk behaviors, including alcohol use, violence, and non-violent criminal and deviant behaviors, is studied using a single data collection point, which tends to limit the examination of transitional periods and the application of the life course perspective in criminological studies. Thus, our knowledge concerning alcohol use and crime/delinquency is limited because the long term patterning of behaviors is not able to be examined.

To date, only a handful of published articles examine the relationship between alcohol use and crime/deviance over multiple time points. One study conducted by White, Brick and Hansell (1993) focused on adolescents—data were collected at ages 12, 15, and 18. Importantly, this prospective longitudinal study produced several preliminary and significant findings. The authors found that aggressive behaviors in adolescence contributed to increases in alcohol use and alcohol-related aggression at later data collection points. Another, more recent study, conducted by Maldonado-Molina and colleagues (2011) also found that alcohol use was related to serious physical violence, but found that physical violence does not predict alcohol use. This dissertation contributes to the literature with a specific focus on the transition from adolescence to young adulthood.

\(^2\) Researchers in the fields of demography, psychology, and sociology have contributed to the life course perspective by examining alcohol use (Newcomb & Bentler 1987; Pearlin et al. 2005; Schulenberg et al. 1996). In addition, there are several criminologists who examine the life course such as Sampson & Laub (1993 & 2003), Moffit (1993), Nagin (1993), Hagan (1999 & 2003) and others.
by linking sociological, psychological, and criminological literatures with the life course perspective.

Overall, in my dissertation, I first address why and how the life course perspective and the transition from adolescence into young adulthood is important to take into consideration when studying alcohol use and its behavioral correlates and predictors by examining and expanding Sampson and Laub’s Life Course Theory of Crime. Second, I examine alcohol use trajectories more fully using insights from several key theoretical frameworks (life course, Sampson & Laub’s Life Course Theory of Crime, and the transition to young adulthood which is often termed “emerging adulthood” (Arnett 2000)) while considering traditional criminological variables (i.e., crime and delinquency). Third, I illustrate how and why gender role orientation (i.e., masculinity and femininity) and sex are important in exploring alcohol use trajectories. Last, I expand and enhance our knowledge of the covariates of alcohol use and advance of knowledge of what covariates contribute to engaging in heavy episodic drinking during the transition into young adulthood. In this chapter, I review the pertinent research that informs the basis of my dissertation and conclude with hypotheses that upon testing, will contribute to the fields of criminology, sociology, the life course perspective, and the substantive area of alcohol use research.

The Life Course Perspective

The life course perspective provides a broad framework for studying the lives of individuals over time. Psychologists have long understood the importance of the developmental and socialization process that begins at birth (Cullen & Agnew 2011:451). Studies of child development began in the 1920s and 1930s and changed the course of
study in the fields of psychology and sociology during the 1960s and 1970s (Elder 1998; Leigh & Loewen 1987). These early studies and subsequent studies which followed individuals well into adulthood, highlighted the importance of socio-cultural contexts, life pathways, and individual development as vessels of behavioral outcomes that consider continuity and change over time (Elder 1998:1). Elder (1998) argues that pathways are one of the most important areas to explore because they have such profound impacts on the trajectories of individuals. He states that pathways “…refer to the social trajectories of education, work, and family that are followed by individuals and groups through society” (Elder 1998:1). Pathways or social trajectories are shaped by historical contexts and influence development and behavior (Elder 1985; Elder 1998).

Personality characteristics and behavioral patterns emerge with psycho-social development; events that occur early in life and throughout the life course have the potential to significantly shape what occurs later in life, including involvement in criminal activity and deviance (Cullen & Agnew 2011:451). Until relatively recently, criminologists did not take the insights of the life course perspective into serious or continuous consideration when studying crime (Cullen & Agnew 2011; Sampson & Laub 1990 & 1993). A majority of criminologists have been concerned with social contexts which contribute to criminality or deviance rather than examining how individuals develop and change over time (Cullen & Agnew 2011). The “developmental” or “life course perspective” focuses on the individual and how that individual’s life changes or stays the same as he or she encounters different developmentally important contexts.
Although criminologists have tended to overlook the importance of childhood and associated developmental processes, there are several theories that consider early developmental or “critical” periods such as Hirschi’s (1969) social bond theory or Gottfredson and Hirschi’s *A General Theory of Crime* (1990) (self-control theory). Hirschi’s (1969) social bond theory focuses on social bonds which consist of four dimensions: attachment, commitment, involvement, and belief. Social Bond theory suggests that the stronger the bonds to societal institutions (e.g., work, family, education), the less likely individuals are to deviate from societal norms. Those who have weaker bonds are more likely to engage in deviant behavior including alcohol use and delinquent or criminal activities. Bonds, especially attachment to parents, are developed during childhood and have repercussions for later behaviors. In contrast to social bonds theory, Gottfredson and Hirschi’s (1990) General Theory of Crime focuses on the instilment of self-control from parents using “direct control” to monitor and punish bad behaviors of their children during childhood. Those who do not develop self-control during childhood (by age 8) are more likely to engage in criminal activities and deviance. As Gottfredson and Hirschi explain, the child “will tend to be impulsive, insensitive, physical (as opposed to mental), risk-taking, short-sighted, and nonverbal” when self-control is not instilled by parental socialization (1990:90).

Each of these theories acknowledges the importance of childhood and development but does not focus on important aspects pertinent to the life course as a means to interpret involvement in criminal activity and deviance such as adult social bonds (e.g., parenthood or marriage). Thus, these criminological theories have failed to
view development as a dynamic process that is subject to change over time. For both social bonds theory and self-control theory, it is assumed that one has attained these characteristics by a certain point, usually in childhood. In addition, a more expansive consideration of gender, and sex for that matter, are largely absent, if mentioned at all, in many criminological theories. This dissertation addresses this gap in criminological theory by examining development as a dynamic process that carries on past childhood and continues into young adulthood and also takes sex and gender role orientation into consideration.

Criminologists have seemingly neglected using the life course perspective to explore deviant behavior trajectories as behaviors that are influenced by life course factors. In addition, criminologists have not examined involvement in crime as a developmental process until relatively recently. There are a variety of reasons including consistent research findings concerning crime involvement and the nature of criminological research in general for this apparent oversight. First, in regard to the well-established age-crime curve, involvement in crime tends to peak at about age 17. The age-crime curve is a social fact that criminologists generally agree upon.

The basic premise – in which most criminologists concur – is the stable finding that criminal offending rates tend to peak during adolescence with rates of offending declining rapidly thereafter (Gottfredson & Hirschi 1990; Hirschi & Gottfredson 1983; Lauritsen 1998). Because of this consistent finding, criminologists tended to assume that adult criminality can be adequately explained using adolescents; therefore, there was not a need to employ the life course perspective in criminological studies. Instead, criminologists focused their attention on the ages when individuals are most likely to be
involved in criminal and deviant behaviors: adolescence. According to social control and self-control theories, by adolescence elements of social control and self-control should be in place and those who have high levels of either should be less likely to engage in criminal and deviant behaviors from adolescence into adulthood.

Second, focusing on a single time point, often during adolescence when crime involvement is at its peak, on face value appears to be a practical or obvious choice for researchers. Because the majority of offenders are juveniles, it makes empirical sense to study juveniles instead of children and adults. In addition, it is convenient, cost, and time effective to conduct studies and to test theories using younger populations because youth are more accessible in comparison to other segments of the population including hidden populations (Cullen & Agnew 2011; Peralta and Ross 2009).

Researchers can administer surveys in a school context (including grade/middle schools, high schools, and colleges) where student participants are usually available and willing to fill out questionnaires. Researchers then have data collected from a sample in a relatively short amount of time. In addition, the ease and cost effectiveness of youth based research has probably contributed to the majority of alcohol use studies being focused on school age or college age samples which limits our knowledge of alcohol use and risk factors. Studying these younger samples tends to limit our knowledge of older populations. Work utilizing cross-sectional samples is important in that it yields insight concerning important relationships between variables. Cross-sectional analyses also provide a snapshot of the potential outcomes of alcohol use and what contributes to

3 Convenient in the sense that data can be readily collected in schools and efficiently via survey methods. Collecting data from youth, however, (especially school age minors) is potentially more difficult because human subject protections are more stringent for minors.
involvement in risky drinking or other risk behaviors including violent and non-violent crime and delinquency. However, longitudinal data can yield important trend data and can demonstrate causality in that the time-order relationship can be more reliably assessed across the life course.

Eventually, criminologists began to employ longitudinal designs that relied on the life course perspective to study criminal and deviant behavior over time (Cullen & Agnew 2011). One of the first longitudinal criminological studies was conducted by Sheldon and Eleanor Glueck: data collection began in 1949 (the study spanned 1949-1963 with follow ups at age 25 and 32). Data were collected from institutionalized delinquent boys and a matched sample of non-delinquent (or rather, non-institutionalized) boys from the community (Glueck & Glueck 1950; Sampson & Laub 1993). The Gluecks’ work was critiqued by other criminologists for lacking theory testing and not highlighting the importance of sociological factors such as social bonds or background structural information; their original focus was on biological and psychological causes of crime (Cullen & Agnew 2011:453). This resulted in the neglect and rejection of the Gluecks’ work in subsequent years as sociological theories came to dominate criminology. In 1985, John Laub discovered the Gluecks’ data in boxes in the basement of the Harvard Law Library, and together with Robert Sampson a renewed interest in using the life course perspective in studying crime was born (Cullen & Agnew 2011:457-458; Laub & Sampson 1993).

Sampson & Laub’s Life Course Theory of Crime

Using the original Glueck data and eventually collecting follow up data from the delinquent boys as older adults (until age 70) Sampson and Laub developed their Life-
Course Theory of Crime and published the theory in two books. Sampson and Laub’s Life Course Theory of Crime is an integration of several theories including social bonds, self-control, differential association/social learning, the labeling perspective, and the life course perspective (Farrington 2008; Sampson & Laub 1993). Their theory suggests that “age-graded” informal social control explains the “onset of offending, continuity in offending, and changes in offending throughout the life course” (Laub, Sampson & Sweeten 2008:313). Age-graded, as discussed by Elder (1985), Sampson and Laub (1993), and Hagan and Parker (1999), refers to social roles and transitions that are socially and culturally defined in various periods in the life course. The strength of social bonds to family, peers, and education (i.e., school (age graded roles in adolescence or youth), and eventually adult social institutions (marriage/family, employment, military service) (age graded roles in adulthood) were found to be predictive of one’s involvement with crime across the life course.

Similar to Hirschi’s (1969) social bond theory, Sampson and Laub suggested that the strength of social bonds depended on attachment to parents, schools, (delinquent) friends and siblings, and parenting strategies (discipline and supervision) (Farrington 2008; Sampson and Laub 1993). Structural background factors and individual differences such as social class, race and ethnicity, family size, parental criminality, disrupted/broken family structure, and conduct disorders were proposed to have indirect relationships with crime through their effects on informal social controls (i.e., mediation and/or moderation). In their initial theorizing, an emphasis was placed on the importance of a life course perspective that explores both continuity and changes in behavior over time and throughout psycho-social development.
In their first book, *Crime in the Making: Pathways and Turning Points through Life* (1993), Sampson and Laub lay the foundation for their age-graded theory and focused on the development of crime involvement and desistance throughout the life course. Before discussing the theory, I will define several concepts taken from Sampson and Laub’s life course perspective and previous research that utilizes the life course perspective. Trajectories are important to the paradigm. “Trajectories,” are defined as pathways or lines of development spanning the life course which include long-term patterns of behaviors and are marked by “transitions” (Cullen & Agnew 2011; Elder 1985; Sampson & Laub 1993:8). The term “transitions” refers to life events (i.e., marriage, parenthood, employment) or changes in life (i.e., dropping out of school, entering an educational program) that are “embedded in trajectories” (Sampson & Laub 1990:610; Sampson & Laub 1993:8). Lastly, “turning points” (included in the title of their first book) are important to psycho-social development research: turning points refer to “a change in the life course” or an adaptation to life events or transitions (Sampson & Laub 1993:8). However, Rutter (1996) argues that, “For the most part, turning points do not apply to universal age-indexed life transitions; the majority concern only sub-segments of the population; and they derive from major qualitative alterations in experience and not just life stage transition” (1996:622). Sampson and Laub (1993) and Laub and Sampson (2003) adhere to this definition of turning points and utilize qualitative data to study turning points.

For this dissertation, I do not have supplemental qualitative data; therefore, I cannot adequately assess turning points that may occur during the transition from adolescence to young adulthood. Sampson and Laub and many other researchers (Rutter
1996; Teruya & Hser 2010; Uggen 2000; Warr 1998) point to various research findings which show that many criminal offenders experience points at which they desist in their involvement with crime. *Crime in the Making* was focused on explaining what creates continuity in following along with criminal pathways or trajectories and what creates change at key transitions in life (Cullen & Agnew 2011:458).

Sampson and Laub have three major foci in their theoretical framework presented in *Crime in the Making* (1993:243). First, structural context influences informal controls (family and school) and this is what explains childhood and adolescent delinquency/criminal activity. Second, there is strong continuity in antisocial behavior from childhood through adulthood. Third, informal social capital in adulthood, in the form of bonding to adult institutions, explains changes in criminal behaviors across the life course, “regardless of prior individual differences in criminal propensity” (Sampson & Laub 1993:243). Of utmost importance is Sampson and Laub’s assertion that childhood pathways to crime and conformity over time are influenced by adult social bonds. In other words, unlike social bonds and self-control theories, Sampson and Laub assert that social bonding can and does occur and form beyond childhood. Adult bonds in the form of adherence to adult institutions have an effect on involvement in criminal and deviant behavior. A defining and unique aspect of Sampson & Laub’s theory is that both stability and change in criminal behavior over the life course are considered in conjunction with examining life transitions that influence the patterning of criminal behavior.

In their second book, *Shared Beginnings, Divergent Lives: Delinquent Boys at Age 70* (2003), Laub and Sampson collect additional follow up data from the participants
in the Glueck study until age 70 and expand their original Life Course Theory of Crime. In their updated theory, structural life transitions (marriage/family obligations, employment, and military service) having an influence on informal social control that works to nurture desistence from crime are still emphasized. The theory is expanded to explore the process of desistence more fully (Sampson & Laub 2005; Laub & Sampson 2003). In addition, Laub and Sampson aimed to connect qualitative data and quantitative data in their book because the data collected from the “old” delinquent boys mainly consisted of qualitative social history interviews. The connection between qualitative and quantitative data provided a broader scope for studying crime across the life course especially when offenders did not make a smooth, one time transition from offender status to conventional behavior status.

Laub and Sampson (2003) identify four aspects or features in the process of desistence during adulthood. First, the offender experiences a life transition: For example this can include marriage (or a new relationship), getting a job, or entering military service. Sampson and Laub (2005:17-18) described this as “new situations that “knife off” the past from the present.” Second, because of this transition, the offender is subjected to an increase in the number and intensity of informal social controls: during and subsequent to the transition, individuals are supervised or monitored to a greater extent and may experience increased social support and hence psycho-social development due to this life transition. Third, the routine activities of the offender are changed and restructured. Last, the new situations provide the opportunity for transformation into a new life without crime or deviance involvement.
The process of desistence is not inevitable and is not a fixed process (Blumstein et al. 1986; Cullen & Agnew 2011; Nagin & Land 1993). Offenders may go through this process in a linear fashion, others may “zigzag” through the process entering and leaving the offending lifestyle numerous times, and others may never fully desist from criminal offending (Laub & Sampson 2003: 196). Individuals, throughout life, are able to exercise human agency; choices are “situated” in current life circumstances meaning that individuals play an active role in creating their pathways. Life circumstances (or situational contexts) can have a major effect on the path individuals choose to pursue be it criminal or conventional. Laub and Sampson refer to the interaction between agency and life circumstances as “situated choice” which is the interplay of agency and social structure. Here, the emphasis is on the interaction between social control(s), situational contexts and human agency in producing changes in offending across the life course (Laub & Sampson 1993:281).

**Empirical support for Sampson & Laub’s theory**

A full empirical test of Sampson & Laub’s Life Course Theory of Crime has yet to be conducted other than the support the authors provide in their numerous publications (Laub & Sampson 2003; Sampson & Laub 1993) which relied on data from the Glueck study. The original theory proposed in Sampson and Laub’s (1993) first book (*Crime in the Making*) had several testable hypotheses that have been individually empirically tested using data from other studies. Two propositions from the theory that have been tested by other researchers include the following suppositions: (1) bonds to family and school influence delinquency and structural factors indirectly influence delinquency
through these bonds; (2) those who develop strong adult social bonds will be less likely to offend in adulthood (Laub, Sampson & Sweeten 2008:318).

The proposition that bonds to family and school influence delinquency has been supported by a great deal of research (Laub, Sampson & Sweeten 2008). In particular, Hirschi’s (1969) social bond/social control theory is one of the most tested theories in criminology and the evidence suggests that attachments to parents and school are related to involvement in delinquency (Akers and Sellers 2012; Chapple, McQuillian & Berdahl 2005; Kempf 1993; Larzelere & Patterson 1990). In a review over 70 studies on social bonds/control theory, Kempf (1993) found that attachment to parents was the most consistently supported element of social bonds whereby parental attachment reduced offending probability. Attachment to school also had a consistently negative impact on involvement in delinquency meaning that it reduced involvement in delinquency. The second half of the first proposition is that structural factors indirectly influence delinquency through informal social bonds and is also supported by research (Laub, Sampson & Sweeten 2008). For example, Larzelere and Patterson (1990) found that the relationship between socioeconomic status and delinquency was influenced (mediated) by parental variables including “monitoring” and “discipline”.

The second proposition is that those who develop strong adult social bonds will be less likely to offend in adulthood. Sampson and Laub’s Life Course Theory of Crime suggests that this change in behavior is a result of important life transitions or events (e.g., social bonds that result from the transition to gaining stable employment or marriage for example). Numerous studies have documented that important life transitions have an inverse relationship with involvement in crime and deviance (Craig & Foster
2013; Devers 2011; Laub, Sampson & Sweeten 2008). In particular, transitions that produce positive resources are the most influential in reducing involvement in crime and delinquency. Transitions such as job loss, divorce, or widowhood tend to promote involvement in deviance and negative health behaviors (i.e., increasing drinking behaviors after a divorce) (Dooley, Fielding & Levi 1996; Pearlin et al. 2005).

One major life transition that has gained empirical support for decreasing involvement in crime is marriage. Those who are married are less likely to commit criminal offenses in comparison to those who are not married (Bersani, Laub & Nieuwbeerta 2009; Craig & Foster 2013; Devers 2011; Laub & Sampson 2003; Sampson, Laub & Wimer 2006). This trend is even present when the study sample is comprised of high-risk offenders (Farrington & West 1995; Laub & Sampson 2003; Sampson, Laub & Wimer 2006).

In addition, there is support for the supposition that it is the bond between significant others which is important in reducing criminality and not just the state of being married or in a serious relationship (Farrington & West 1995; Warr 1998). Warr (1998) found that the transition into marriage or cohabitation has a major effect on restructuring routine activities, as is predicted by Sampson and Laub’s (1993) theory. Specifically, exposure to and time spent with delinquent or criminal peers is reduced when individuals enter into a serious relationship or marriage which leads offenders to alter their behaviors and limit involvement with delinquency or crime. In addition, marriage is found to significantly reduce alcohol use. Miller-Tutzauer, Leonard, and Windle (1991) describe this finding as “maturing out,” which suggests that marriage has an effect on restructuring behaviors via age and changes in responsibility.
A second life transition that Sampson and Laub (1993) predicted would have an influence on decreasing crime involvement is employment. According to Sampson and Laub, having steady employment, and entering marriage for that matter, reinforces social conformity because there is an “extensive set of obligations, expectations, and interdependent social networks” that one cannot ignore once they make a successful life transition into having a job or being in a relationship (Sampson & Laub 1993:141). This has also been conceptualized as “investment in human (social) capital” by Hagan and Parker (1999) where individuals are committed to adhering to culturally defined acceptable behaviors.

Although not as frequently studied as the relationship between marriage and crime, a small body of research concerning the relationship between employment and crime has shown that there is an association between the two (McMorris & Uggen 2000; Wright & Cullen 1998; Uggen 2000). Wright and Cullen (1998) find that employment has an effect on criminality because peer networks are restructured after finding and keeping steady employment. They state, “It appears, then, that employment potentially reshuffles or eliminates previous delinquency peer networks in favor of new, sometimes prosocial networks” (Wright & Cullen 1998:198).

Importantly, Wright and Cullen suggest that the positive relationship between employment and crime is only lessened (i.e., drinking behaviors are reduced) when coworkers reject being involved with crime. Another study by Tripodi, Kim, and Bender (2010) examined the relationship between employment and recidivism among parolees. They found that employment increases the time spent out of prison in comparison to those parolees who did not have a job. The authors suggest that this finding shows that
the increase in time spent out of the criminal justice system is an indicator that behaviors are being changed in a positive way. An example of employment contributing to a reduction in alcohol use is exemplified by a study conducted by McMorris and Uggen (2000). Using longitudinal data, the authors find that working long hours in adolescence (during early high school) is predictive of engaging in drinking practices, but this effect disappears as adolescents enter into young adulthood. The authors suggest that working in early adolescence provides independence from parents, thus weakening familial bonds, and provides the context for deviant behaviors to occur. In this case, working provides the freedom for adolescents to engage in drinking and other deviant behaviors.

Each of these findings from the literature suggests that Sampson & Laub’s Life Course Theory of Crime is supported by research. A full empirical test of Sampson and Laub’s theory, however, has yet to be conducted (Laub, Sampson & Sweeten 2008). Instead, researchers have been focused on only a few aspects of the theory. For example, Warr (1998) focused on marriage and Wright and Cullen (2004) focused on stable employment as important life transitions rather than examining multiple life transitions. Laub, Sampson, and Sweeten (2008) submit that a full test is missing from the literature because there is a need for researchers to “operationalize key constructs and formulate critical tests of central hypotheses” (2008:324).

There is also a need for longitudinal data that includes each of the elements of Sampson & Laub’s theory. In this dissertation, I am not able to focus on the entirety of the life course due to data limitations. Instead, I place my focus on the transition from adolescence into young adulthood because it is an important period of development where adolescents are experiencing new responsibilities and freedoms. In addition, the
transition to adulthood is marked by many potential changes, such as leaving home and going to college or entering the workforce, which are important to explore. Moreover, these changes are gendered (work (Szinovacz & Harpster 1993; Thompson & Walker 1989), marriage and cohabitation (Katsurada & Sugihara 2002; Thompson & Walker 1989), and parenthood (Sanchez & Thompson 1997; Thompson & Walker 1989). Specifically, there are traditional and historical societal expectations for entering marriage, parenthood, employment, and education programs (Gentry, Commuri & Jun 2003). For example, there is often an expectation that women stay at home and take care of children while men continue to work outside the home. This change or restructuring of behaviors can have a major impact on involvement in alcohol use and/or crime delinquency, especially for women who often carry the majority of the burden for childrearing.

I utilize Sampson & Laub’s Life Course Theory of Crime and the life course perspective as a means to inform my dissertation because there is an emphasis on the importance of social support and life transitions/events that have the potential to influence criminal and deviant behavior trajectories including heavy episodic drinking practices and violent and non-violent crime/delinquent behavior. Below, I turn my attention to literature which is concentrated exclusively on the transition adolescent-to-adult transition.

*The Transition from Adolescence into Young Adulthood*

The period between being an adolescent and being an adult is often referred to as a “critical period” of development and a “critical developmental transition” (Arnett 2000; Newcomb & Bentler 1987; Petersen 1993; Schulenberg et al. 1996:289). This period is
also referred to as “emerging adulthood” and “prolonged adolescence” (Arnett 2000; Erickson 1968). In particular, Sherrod, Haggerty, and Featherman (1993) argue that studying later adolescence into young adulthood, a period that is characterized by profound change, is of utmost importance. They state, “…change is inherent to this age period. Change carries vulnerability, but also the potential for growth” (Sherrod, Haggerty & Featherman 1993:221). Change comes in many forms during this transitional period and it is important that we better understanding how change relates to alcohol use and crime/deviant behavior. According to Peterson (1993), research has shown that adolescence is not necessarily a period of the life course that is marked by “storm and stress,” out of control hormones, and destroyed parent-child relationships (1993:2). Rather, adolescence is an important developmental period where the foundation for young adulthood trajectories are laid (Petersen 1993; Schulenberg et al. 1996).

Arnett (2000), among many other researchers, argues that the period between the ages of roughly 18-25 is a period that is neither adolescence nor adulthood. More generally, emerging adulthood begins after high school and concludes with the adoption of adult roles (marriage, parenthood, finishing education, and career/full-time employment) (Arnett 2000; White et al. 2006). In this stage of the life course, individuals have not yet entered the lasting responsibilities that accompany adulthood and engagement in adult institutions. Arnett states, “Emerging adulthood is a time of life when many different directions remain possible, when little about the future has been decided for certain, when the scope of independent exploration of life’s possibilities is greater for most people than it will be at any other period of the life course” (2000:469).
In addition, during this period of time, there is much heterogeneity in the population regarding “demographic status” (Arnett 2000:471). Arnett maintains that demographic diversity (i.e., being married, being a parent, being a student, etc.) within this age group is a reflection of the changing and explorative nature of this developmental period; therefore, it is very difficult to predict demographic status given an individual’s age. It is during this period that many choices will be made that have an influence on developmental behavioral trajectories.

For example, Newcomb and Bentler (1987) contend that changes in social environment and role responsibility are dynamic during this period of development. Of particular interest is the transition from high school to college, employment, and/or marriage and the associated roles of college student, co-worker, spouse/partner, and parent as well as being more independent from parents (Frech 2012; Newcomb & Bentler 1987:221; Schulenberg et al. 1996; Schulenberg & Maggs 2002; White et al. 2006). During the transition to young adulthood, adolescents tend to be exposed to new experiences, including the beginning of independence from parental social control and entering a college environment or the work force.

This relative independence from parents provides young people with freedom from social control (Arnett 2000; White et al. 2006). Specifically, the lack of parental monitoring and the increasing importance of peer relationships can set the stage for engaging in deviant and risky behaviors including increased alcohol use and violent and non-violent crime/delinquency (Borsari & Carey 2001; Brewer & Swahn 2005; Ford 2005; Huang, Murphy & Hser 2012; Maldonado-Molina, Reingle & Jennings 2011; White et al. 2006). In fact, the majority of studies find that there is an increase in alcohol
use and other deviant or criminal behaviors during this time frame (Frech 2012; White et al. 1993; White, Labouvie & Papadaratsakis 2005; White et al. 2006).

In addition, there is an increase in engaging in unhealthy behaviors during the transition from adolescence into young adulthood. Using longitudinal data from the Add Health project (Waves I-III), Frech (2012) found that healthy behaviors (adequate sleep, not smoking, eating breakfast, exercise, maintaining a healthy weight, not engaging in binge drinking) significantly decreased during the transition to young adulthood. Frech contends that social support from parents and peers are associated with continued involvement in healthy behaviors during the transition into adulthood. This suggests that early social support and continued positive social support from peers is a protective factor, but early social support from parents does not necessarily have a cumulative or long lasting protective effect.

The transition from adolescence into young adulthood is marked by change and moving into adulthood by adopting adult social roles that are arguably gendered (Katsurda & Sugihara 2002; Thompson & Walker 1989; Sanchez & Thompson 1997; Szinovacz & Harpster 1993). Currently, focusing on the transition from adolescence into young adulthood has not been the center of concern for criminologists studying alcohol use in conjunction with taking involvement with violent and non-violent delinquency and crime into account. Insights from the life course perspective, Sampson & Laub’s Life Course Theory of Crime, and the literature concerning the transition to young adulthood have much utility in examining alcohol use trajectories over time.

Research, which I will review next, shows that the association between alcohol use and violence and non-violent crime and delinquency is dynamic and varies in
different situations. Until relatively recently, there has been a lack of attention given to the life course perspective by criminologists potentially due to the wide use of more accessible, cost effective cross-sectional data that is commonly used to examine alcohol use and criminal/deviant behaviors.

Studying multiple time points in individuals’ lives will help better describe and explain the patterning of alcohol use and crime/deviance over time focusing on the transition to young adulthood. Researchers have yet to adequately understand the long term associations between alcohol use and crime/deviance due to the lack of longitudinal data. This dissertation addresses a major gap in the literature by exploring the long term patterning of alcohol use and related violent and non-violent criminal and deviant behaviors as well as gender role orientation during the transition period into young adulthood. This is accomplished by examining gender role orientation, adolescent social control, and significant life transitions which occur during early adulthood that have the potential to impact and alter behavioral trajectories.

**Alcohol Use**

The focus of this dissertation is on heavy alcohol consumption. There are several terms that have been utilized by researchers who study this phenomenon including “binge drinking”, “heavy episodic drinking”, and “dangerous drinking” (Herring, Berridge & Thom 2008; Jennison 2004; Lederman et al. 2003; Wechsler et al. 1994 & 1995). The most commonly used term for heavy alcohol consumption is binge drinking as defined by Wechsler and colleagues (1994 & 1995): consuming five or more drinks in a row for males and four or more drinks in a row for females during a single occasion. This term also appears frequently in the literature as well as surveys concerning alcohol use such as
the National Survey on Drug Use and Health (NSDUH) and the Monitoring the Future (MTF) survey which focuses on youth (Johnston et al. 2013; SAMHSA 2012).

The term binge drinking has undergone criticism from the alcohol research community in recent years (Cranford, Esteban & Boyd 2006; Epstein et al. 2004; Herring, Berridge & Thom 2008; Lederman et al. 2003; NIAAA 2003). Binge drinking implies that the substance user does not regularly partake in heavy drinking and that the “binge” behavior only lasts a short time (Epstein et al. 2004). Binge drinking is most often used to describe a “single drinking session leading to intoxication” and does not denote and describe an ongoing pattern (Herring, Berridge & Thom 2008: 476). This conceptualization of heavy alcohol consumption may not capture the long-term negative effects that stem from a continued pattern of participating in heavy drinking practices.

Many have suggested that “binge drinking” should be replaced by the more specific term “heavy episodic drinking” for research that focuses on heavy drinking patterns of adolescents and adults (Cranford, Esteban & Boyd 2006; Dawson et al. 2004; LaBrie, Pederson & Tawalbeh 2007; McAlaney & McMahon 2007; Presley & Pimentel 2006). The operationalization of heavy episodic drinking (HED) is identical to that of binge drinking, but the term heavy episodic drinking exemplifies the seriousness of a continuous pattern of heavy drinking over a period of time. Many researchers have already adopted this term and the concept heavy episodic drinking is now commonplace in many publications (Cranford, Esteban & Boyd 2006; McAlaney & McMahon 2007; Peralta et al. 2011). In accordance with other researchers and to more accurately discuss and assess heavy alcohol consumption, the term that will be used in this dissertation is heavy episodic drinking.
Alcohol use, health, and behavioral outcomes

Heavy episodic drinking is problematic on numerous fronts. It has been linked to many adverse outcomes, among adolescents both underage and college age, such as academic problems (missing class, lower grades, and school failure), alcohol poisoning, alcohol dependence in later life, co-occurring disorders with other substances and/or mental health problems, and fatality (Jennison 2004; NIAAA 2012c; NIAAA 2012d; Wechsler et al. 1994).

Secondary social effects of HED include alcohol-related aggression, sexual assaults, trouble with the police (i.e., involvement with delinquency or criminal behaviors), and engaging in risky sexual behaviors (Ford 2005; Huang, Murphy & Hser 2012; Jennison 2004; Wechsler et al. 1994). The National Institute on Alcohol Abuse and Alcoholism (NIAAA) reports that an estimated 1,825 college students die from alcohol related unintentional injuries; nearly 600,000 are unintentionally injured while under the influence of alcohol; 696,000 are assaulted by another person who is drinking; 97,000 students are victims of alcohol-related sexual assault; and an estimated 3.36 million students drive while under the influence of alcohol (Hingson, Zha & Weitzman 2009; NIAAA 2012d).

Wechsler and colleagues (1994) found that the frequency of engaging in heavy episodic drinking was strongly and positively related to alcohol-related health problems and other problems reported by respondents. Alcohol-related health problems and other problems reported by respondents included having a hangover, doing something they later regretted, missing classes, forgetting what they did or where they were, getting behind in school work, arguing with friends, engaged in unplanned sexual activity,
getting hurt or injured, damaged property, not using protection during sex, getting into
trouble with police, and requiring medical attention for alcohol overdose (Wechsler et al.
1994:1675). Alcohol use is, thus, not only a sociological issue, but also a criminological
one. These staggering figures put the problematic nature into perspective as to how
important it is to study alcohol use and especially alcohol use during the transition period
from adolescence into adulthood when alcohol use and heavy alcohol use patterns are
highest.

In addition, alcohol abuse has significant health effects: it can damage organs,
have a negative impact on the immune system, contribute to multiple forms of cancers,
and play a role in brain development problems. The National Institute on Alcohol Abuse
and Alcoholism (NIAAA), warns that drinking “too much” on a single occasion or over
time can have a serious negative impact on health (NIAAA 2012a; NIAAA 2012b).
Organs that are effected by alcohol use include the brain (alcohol has been shown to
shrink and damage brain tissue), the heart (long term heavy drinking weakens the heart),
the liver (alcohol use damages the liver which plays a role in detoxification of the body),
and the pancreas (alcohol use damages the pancreas and can lead to pancreatitis)
(NIAAA 2012b). The immune system is suppressed by drinking alcohol. The NIAAA
argues that chronic drinkers are more likely to contract both pneumonia and tuberculosis
in comparison to those who do not drink often (NIAAA 2012a). In addition, excessive
drinking on one occasion can limit the body’s ability to fight off infections (NIAAA
2012a).

In regard to increasing the risk of cancer, The National Cancer Institute
recognizes alcohol as a risk factor for developing mouth, esophagus, pharynx, liver, and
breast cancer (NIAAA 2012b:17). Last, the brain continues to develop well into one’s twenties. Excessive alcohol use has been shown to affect this development and can lead to learning and cognitive disabilities and leave the brain more vulnerable to alcohol dependence in adulthood (NIAAA 2012a; NIAAA 2012c). Each of these potential outcomes of alcohol use are of interest because they speak to the intersecting areas of criminology, sociology, and public health.

Epidemiology of adolescent and young adult alcohol use

Alcohol is one of the most widely used substances by both adults and adolescents (Johnston et al. 2013; SAMHSA 2012). According to the Monitoring the Future survey, which has examined alcohol and drug use by youth since 1975, heavy episodic drinking rates for adolescents increased significantly among 12th graders from 2011 to 2012. In 2011, 22% of high school seniors reported engaging in heavy episodic drinking and 24% reported HED in 2012. Additionally, 8.6% of 8th graders, 28.2% of 10th graders, and 45% of 12th graders reported to have been drunk in the past year. More alarmingly, 69% have consumed alcohol (more than a few sips) by the end of high school.

As for adult involvement in drinking, results from the 2011 the National Survey on Drug Use and Health (NSDUH) indicate that heavy episodic drinking rates among adults, ages 18-25, remain steady (SAMHSA 2012). In 2011, 39.8% of young adults (ages 18-25) reported engaging in heavy episodic drinking at least one day in the past month. Heavy alcohol use, conceptualized as five or more drinks on the same occasion on 5 or more days in the past 30 days in this particular survey, by adults ages 18-25 decreased slightly, although this finding is not statistically significant different from the
previous year. Approximately 12% of adults 18-25 reported engaging in heavy episodic drinking on at least 5 days in the previous month in 2011.

In terms of who is at greater risk for heavy episodic drinking, previous research has shown that males engage in heavy drinking more frequently and drink greater quantities of alcohol compared to females (Hope & Ham 2003; Wechsler 1995). I will discuss sex and gender differences in alcohol use more fully in the next section. For race/ethnicity, Whites are more likely to drink than any other racial or ethnic group (SAMHSA 2012). Results from the 2011 NSDUH indicate that 56.8% of those who classified themselves as White reported being current drinkers. For other racial/ethnic groups, the percentage who reported being current drinkers were: 46.9% of people reporting two or more races, 44.7% of American Indians or Alaska Natives, 42.5% of Hispanics, 42.1% of African Americans/Blacks, and 40% of Asians. For heavy episodic drinking, 24.3% of American Indians or Alaska Natives, 23.9% of Whites, 23.4% of Hispanics, 19.4% of African American/Blacks, 18.6% of those reporting two or more races, and 11.6% of Asians reporting engaging in heavy episodic drinking at least one day in the previous month. Of central concern here is to understand what criminological factors might be related to heavy episodic drinking among adolescents and individuals transitioning into young adulthood.

Alcohol use and sex differences

Many early and current studies of alcohol use suggest men are more at risk for alcohol use and alcohol-related problems (Huselid & Cooper 1992; SAMHSA 2012; White & Huselid 1997). During the 1970s, data suggested that the sex differences in alcohol use were disappearing or converging and thus significant sex differences between
male and female drinking patterns would soon disappear (Keyes, Grant & Hasin 2008; White & Huselid 1997; Wechsler & McFadden 1976). This convergence in drinking patterns by sex was assumed to stem from changes in gender roles originating from the women’s liberation movement. It was hypothesized that movement toward gender equality would relax norms against female drug and alcohol use (White & Huselid 1997:176).

The most recent data on the amount of alcohol use by males and females seem to somewhat partially support the convergence hypothesis and the closing sex gap in alcohol use. Prevalence rates of alcohol use for the United States indicate that males and females are similar to one another. Findings from the 2011 National Survey on Drug Use and Health (NSDUH), for example, show that 56.8% of males and 47.1% of females aged 12 or older were current drinkers, meaning that they had at least one drink in the past 30 days (SAMHSA 2012). In terms of underage drinking, prevalence rates seem to suggest a movement toward convergence (ages 12-20), 25.6% of males and 24.6% of females reported being current drinker. For adults aged 18-25, 58.1% of females and 63.3% of males reported current drinking in 2011 (SAMHSA 2012).

However, the convergence hypothesis is only partially supported in that absolute convergence between male and female drinking has not yet occurred with men continuing to drink more often and in greater quantities compared to women across the life span (Christie-Mizell & Peralta 2009; Mahalik et al. 2013; White & Huselid 1997). Differences in drinking between men and women have deep historical roots of which the legacy of this history continues to be felt. Contemporary expressions of gender appear to continue to in part hinge on drinking behavior – that is, how much alcohol is consumed,
Alcohol use and gender

One potential reason that sex differences remain in alcohol consumption patterns relates to gender role expectations that continue to persevere despite the women’s liberation movement’s role in challenging and changing traditional gender roles and hence substance use patterns (Christie-Mizell & Peralta 2009; Huselid & Cooper 1992; White & Huselid 1997). Gender roles and gender role orientation may contribute to adherence to traditionally masculine and feminine “ideals.” In fact, researchers have argued that internalized gender roles, gender orientation, and/or gender ideology measures may better predict drinking patterns and behaviors more accurately than biological sex alone (Bobrova et al. 2010; Chomak & Collins 1987; Huselid & Cooper 1992; Iwamoto & Smiler 2013; John et al. 2008; Young et al. 2005).

It is important to note that this does not mean that biological sex is not a useful variable when studying differences between males and females. Sex is often shown to be a critical variable in studying alcohol use because it is consistently shown that males drinking more alcohol and engage in heavy drinking more often than females (SAMSHA 2012). However, while biological sex remains a critical variable of interest in many studies, gender is often used interchangeably with sex. Indeed “gender” research in the alcohol field predominantly relies on sex-difference analysis where sex is often used as a proxy-measure for gender. Sociologically, it is problematic to conflate the two concepts. I
discuss this critique more fully in the “Gender-based critique of alcohol use and criminological literature” section below.

Among the relative few researchers who attempted to differentiate sex from gender were Huselid and Cooper (1992). Huselid and Cooper developed a theoretical model based on gender (aside from sex) which attempted to explain sex differences. Using the conventionality framework, they examined the association between gender role orientation (or gender attributes) and alcohol use. The conventionality model encompasses two theoretical explanations – congruence and deviance (White & Huselid 1997). Congruence models propose that individuals who adhere to conventional gender roles will be more likely to conform to cultural gender norms for behavior (Bem 1974; Huselid & Cooper 1992; White & Huselid 1997). This includes norms for engaging alcohol use, and conventional cultural gender norms are more tolerant of males who drink alcohol to excess and discourage females in drinking to excess (White & Huselid 1997).

Deviance models propose a converse explanation in that rejecting traditional gender role characteristics leads individuals to take on behaviors more typical among the opposite sex as a form of rebellion against conventional gender norms for behavior (White & Huselid 1997; Wilsnack & Wilsnack 1978). As White and Huselid explain, “…females who have adopted masculine attributes would be expected to drink more, and males who have adopted feminine attributes to drink less, than their conventionally sex-typed counterparts” (1997:183). Although the congruence and deviance models appear to be in opposition, they are actually quite similar in that both predict the same empirical pattern of alcohol use when gender roles are taken into empirical consideration: those who adhere to traditionally masculine gender roles, orientations, or ideologies are more
likely to engage in alcohol use and those who adhere to traditionally feminine gender roles, orientations, or ideologies are less likely to engaging in alcohol use.

Research using conventionality models find that individuals who self-report masculine traits engage in greater alcohol use (in terms of frequency and quantity) and those who self-report feminine traits engage in less alcohol use (Chomak & Collins 1987; Huselid & Cooper 1992; Nolen-Hoeksema 2004). Evidence suggests that individuals adhering to traditionally feminine traits such as nurturance, warmth, and concern are less likely to consume alcohol in terms of both quantity and frequency (Huselid & Cooper 1992; Nolen-Hoeksema 2004; Peralta et al. 2011; White & Huselid 1997). On the other side of the gender role continuum, evidence suggests that individuals who exhibit more traditionally masculine attributes such as instrumentality and aggressiveness tend to engage in more alcohol consumption in terms of both quantity and frequency (Huselid & Cooper 1992; White & Huselid 1997). Christie-Mizell and Peralta (2009) did not find that adherence to traditional gender role attitudes increased alcohol consumption for both men and women. However, Christie-Mizell and Peralta (2009) only accounted for attitudes toward gender roles and did not examine gender identity or gendered traits that respondents attribute to themselves.

Furthermore, data suggest that the movement toward convergence in alcohol use patterns between males and females only pertain to lifetime and annual prevalence rates. Importantly, there is less evidence for the convergence of specific forms of drinking behavior (i.e. quantity and frequency), alcohol abuse or dependency categorization, and alcohol expectancies between women and men (White & Huselid 1997:177). Instead, sex differences continue to persist for specific aspects of alcohol use behavior (Forsyth &
Lennox 2010; Nolen-Hoeksema 2004; Huselid & Cooper 1992; Iwamoto & Smiler 2013; White & Huselid 1997). In fact, research has consistently documented that males tend to engage in more alcohol use more frequently and in greater quantities and suffer health and social problems related to alcohol use more so than their female counterparts (Hope & Ham 2003; Wechsler 1995; Wechsler et al. 2002; White & Huselid 1997).

*Gender-based critique of alcohol use and criminological literature*

The literature concerning alcohol use and gender is something that many researchers have critiqued (Bobrova et al. 2010; Chomak & Collins 1987; John et al. 2008; Peralta 2008; Peralta et al. 2011; White & Huselid 1997). The majority of research concerning alcohol use and violent and non-violent crime/delinquency focuses on sex, rather than gender, although there are several studies which do examine gender which are discussed above (Forsyth & Lennox 2010; Gussler-Burkhardt & Giancola 2005; Huselid & Cooper 1992; Nolen-Hoeksema 2004; Peralta et al. 2011; White & Huselid 1997).

Despite these few studies that do examine gender, many researchers have used and continue to use the terms sex and gender interchangeably.

As Peralta and colleagues (2011) point out, gender is sometimes used in titles of papers where gender is never analyzed; rather, sex differences are being examined. Using sex and gender interchangeably is something that appears to be common in the literature, especially in quantitative studies. It is imperative that researchers are cognizant that there is a difference between examining sex, which most often refers to biological sex, and gender, which most often refers to measurements of traditional gender attitudes or gender orientations.
Studies which utilize both measurements of sex and gender may help to disentangle the complexities of the relationship between alcohol use, gender, sex, and deviance/crime. Chomak and Collins (1987) used both sex and gender measurements in their study using biological sex and the Sex Role Behavior Scale-2 (SRBS-2) which consists of 240 items that describe a variety of behaviors, activities, and interests that include sex-valued and sex-specific items (Chomak & Collins 1987:195; Beere 1990:171). They found that for women and men, adherence to feminine attributes was related to consuming fewer alcoholic drinks. In addition, adherence to masculine attributes was related to consuming more alcoholic drinks for men only. Interestingly, stereotypical sex-role behavior variables accounted for more of the variance in alcohol consumption for both men and women, with the exception of wine. Wine was the only alcoholic beverage that was consumed in greater quantities by females and sex accounted for more variance in wine consumption than the gender measures. One explanation the authors gave for this finding was that drinking wine is the most consistent with a feminine sex-role orientation; therefore, males do not often engage in the consumption of wine because it is often considered to be a more feminine drink.

More recently, Mahalik, Lagan, and Morrison (2006) found that masculinity (measured using the Conformity to Masculinity Norms Inventory) was related to engaging in a variety of negative health risk behaviors, including drinking more than two alcoholic drinks a day. In addition, Mahalik, Burns, and Syzdek (2007) found that masculinity and the perceived normativeness of health behavior predicted engaging in risk behaviors which included alcohol abuse. Last, John et al. (2008) used the Bem Sex Role Inventory (BSRI) (Bem 1974) and biological sex to examine sex-role orientation as
a predictor of “socially focused treatment” outcomes (John et al. 2008:2179). They found that levels of psychological masculinity or femininity were more important than biological sex in predicting treatment outcomes with feminine individuals having greater changes in alcohol use and benefited more from the psychological treatment than masculine individuals.

Each of these studies provides evidence that collecting both sex and gender data from study participants is beneficial and assists in better understanding the complex relationship between alcohol use, sex, and gender. Researchers have begun to use measures of both sex and gender in the relationship between alcohol use and risky behaviors. The most prominent line of research using gender measurements is the relationship between alcohol use, violence, and the role of masculinity (Iwamoto & Smiler 2013; Mahalik, Lagan & Morrison 2006; Mahalik, Burns & Syzdek 2007; Mahalik et al. 2013; Peralta & Cruz 2006; Peralta, Tuttle & Steele 2010; Peralta et al. 2011). A preponderance of research shows that the construction of masculinity plays a prominent role in the relationship between alcohol use and violence. For example, Peralta, Tuttle, and Steele (2010), found that violence against intimate partners and against strangers was often used to construct masculinity in their mixed method study. Interestingly, the authors found that violence is often used as a means to maintain dominance and to gain control especially in situations where “legitimate resources” for establishing or maintaining dominance (i.e., having a steady job) are absent. This study provides evidence that gender orientation and ideology continues to be an important aspect of alcohol use behavior.
The relationship between gender, sex, and alcohol use is complex. It is important for researchers to continue to examine both sex and gender in alcohol use in order to further disentangle and understand what contributes to engaging in heavy episodic drinking behaviors. Researchers have debated whether gender equality brought on by the women’s liberation movement would have a convergence effect and narrow the gap between males’ and females’ alcohol use patterns and why sex and gender matters in alcohol use. No studies have supported the convergence hypothesis completely, but recent research suggests that both males and females decrease drinking as they enter into adult roles – yet the decrease is far more pronounced among women compared to men (i.e. employment, marriage, parenthood), suggesting that gender needs to be explored more fully especially in emerging adulthood (Christie-Mizell & Peralta 2009).

Studying the relationship and potential interactions between gender, alcohol, and risky behaviors is a major goal of this dissertation because a study including measurements of both gender and sex has yet to be conducted using the life course perspective. In sum, using both sex and gender measurements will help to strengthen studies and may help shed light on why and how gender roles and gender orientation are important for understanding drinking behavior and the relationship between alcohol use and criminological or deviant behaviors. This dissertation contributes to the study of alcohol use and gender by examining the potential impact gender may have on heavy episodic alcohol use trajectories.

*Alcohol Use Trajectories*

Alcohol use trajectories have been examined by a variety of researchers in several fields of study. In particular, psychologists and public health researchers have conducted
the majority of research concerning the patterning of alcohol use across time (Casswell, Pledger & Pratap 2002; Cranford et al. 2002; Kandel & Logan 1984; Maggs & Schulenberg 2004/2005; Schulenberg et al. 1996; White, Labouvie, Papadaratsakis 2005; Yamaguchi & Kandel 1984;). Numerous studies have documented the finding that drinking practices tend to peak during the transition from adolescence into young adulthood and steadily drop off in adulthood (Casswell, Pledger & Pratap 2002).

Currently, the majority of this body of research has been focused on identifying developmental trajectories of drinking behaviors (Casswell, Pledger & Pratap 2002; Colder et al. 2002; Newcomb & Bentler 1987). Various methodological approaches have been utilized in order to identify trajectories of drinking behaviors (Maggs & Schulenberg 2004/2005) including, but not limited to: constructing drinking trajectory groups based on theory (Schulenberg et al. 1996), latent growth curve analysis (White, Labouvie & Papadaratsakis 2005), latent growth mixture models (Colder et al. 2002; Tucker, Orlando & Ellickson 2003), latent class mixture models (Casswell, Pledger & Pratap 2002), group based trajectory modeling (Toumbourou et al. 2003), and multivariate hierarchal regression (Muthen & Muthen 2000; White et al. 2006). Each of these approaches is statistically different, yet yield similar results.

In general, research on alcohol use trajectories finds that alcohol use peaks during the emerging adulthood period, approximately ages 18-25 years old. There is a difference from study to study as to the number of identified trajectory groups. Toumbourou and colleagues (2003) identify five categories (non-drinkers, infrequent drinkers, low weekly consumption, moderate weekly consumption, and high weekly consumption); Colder and

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4 Using this methodology is assuming distinctive trajectory groups ad hoc rather than identifying groups using statistical procedures (Nagin 1999).
colleagues (2002) identify five categories (occasional very light drinkers, escalators, occasional heavy drinkers, rapid escalators, and heavy drinkers with declining frequency); and Casswell, Pledger, and Pratap (2002) identify three alcohol use trajectory categories. Despite the varying numbers of trajectory groups, there is a consensus that there are distinct groups of drinkers that can be identified both using theory and various statistical procedures and methodologies.

Relatively recently, researchers have begun to examine other factors that may impact alcohol use developmental trajectories rather than solely identifying trajectory groups without more substantive predictors. Some of these factors include the age of alcohol use onset, dropping out of school, and being in college and leaving the home environment. I will discuss each of these factors and the associated research on alcohol use trajectories below.

The age of alcohol use onset has been a concern in alcohol use research (Kandel & Logan 1984; Muthen & Muthen 2000). The general finding, often obtained from cross-sectional studies, is that those who initiate alcohol use earlier in adolescence and possibly childhood are more prone to engaging in heavy drinking practices later in life (Casswell, Pledger & Pratap 2002; NIAAA 2012c; Pitkanen, Lyyra & Pulkkinen 2005; Wechsler & McFadden 1976). The National Institute on Alcohol Abuse and Alcoholism (NIAAA) reports that those who start drinking before the age of 15 are four times more likely to be alcohol dependent at some point in their life (NIAAA 2012c). In addition, early age of onset of alcohol use is associated with involvement in other risky behavioral practices such as being involved with a variety of delinquent and criminal behaviors (Huang, Murphy & Hser 2012; Stueve & O’Donnell 2005). One longitudinal study by Pitkanen,
Lyyra and Pulkkinen (2005) found that risk for heavy drinking in adulthood was associated with early initiation of alcohol use. Specifically, the authors found that risk for adult heavy drinking was highest for both men and women when drinking was initiated at less than 16 years old.

Dropping out of high school is also a risk factor for engaging in drinking behaviors during the transition to adulthood (SAMHSA 2013). Dropping out or not finishing high school is usually viewed as having a negative impact on alcohol use and alcohol-related problems. Results from The National Survey of Drug Use and Health (combined data from 2002-2010) show that those who dropped out of high school were more likely to engage in alcohol use and heavy episodic drinking in comparison to their same age peers who were currently in high school (SAMHSA 2013). However, there are somewhat conflicting results from studies concerning dropping out of school and alcohol use trajectories. For example, Muthen and Muthen (2000) found that dropping out of high school had no effect on alcohol-related problems for those in their twenties, but high school dropout status significantly increased alcohol-related problems for those in their thirties. These seemingly conflicting findings suggests that dropping out of high school has lasting effects and warrants further investigation.

An area within the alcohol use trajectory literature concentrating on the transition into adulthood that has received quite of bit a research attention is attending college and leaving the home environment. As reviewed in the literature above, the college context has an influence on alcohol use. Results from the 2011 National Survey on Drug Use and

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5 Unfortunately, the data utilized in this dissertation will not warrant an investigation of dropping out of high school because there are so few dropouts in the sample. This may be due the fact that the Add Health sample was originally recruited from a school sample that was followed into young adulthood thus far.
Health (NSDUH), full-time college students are more likely than their same age peers not enrolled in full time institutions of education to report heavy drinking, binge drinking (heavy episodic drinking), and drinking within the past month. This has been a consistent trend observed since 2002 (Gfroerer et al. 1997; SAMSHA 2012). Thus college students are an at risk group for alcohol use, other substance use, as well as alcohol-related violence.

The college environment is often an important aspect of the transition from adolescence into young adulthood because adolescents are not monitored by their parents and are entering new social roles (Schulenberg & Maggs 2002; White et al. 2006). Using two waves of data collection, White and colleagues (2006) found that exiting the home to attend college was significantly related to an increase in both alcohol use and frequent heavy episodic drinking. In addition, White, Labouvie and Papadaratsakis (2005) found that college student status was related to lower levels of problematic alcohol use at age 18, but was related to greater increases in alcohol use at ages 18-21 and ages 21-30. Each of these findings suggests that being in college has a profound effect on engaging in problematic drinking practices that may not disappear directly after graduating from college and entering adult roles.

Numerous studies have been conducted in order to examine alcohol use trajectories, but the majority of studies have focused on young populations (12-17 years old) (Colder et al. 2002; Fuzhong, Duncan & Hops 2001; Toumbourou et al. 2003). Relatively recently, researchers have begun to examine the age span many have identified as a critical period of development: the transition from adolescence to young adulthood (Caswell, Pledger & Pratap 2002; Schulenberg et al. 1996; Tucker, Orlando & Ellickson
The examination of alcohol use trajectories in conjunction with crime and delinquency is largely missing from this body of literature. As stated in the beginning of this chapter, there was only one preliminary study which addressed this topic. In addition, it is also imperative that more problematic alcohol use patterns, such as heavy episodic drinking, be examined because of the detrimental health and behavioral outcomes of prolonged excessive alcohol use across time. This dissertation aims to fill this gap in the literature by focusing on heavy episodic drinking and crime/delinquency during the transition from adolescence to young adulthood when patterns of later (adult) behavior are often being established.

Alcohol Use and Alcohol-Related Behaviors

The relationship between alcohol use and alcohol-related criminal and/or deviant behaviors has been the subject matter of many sociological, psychological, medical, and public health research studies. Specifically, this dissertation analyzes two areas of crime and/or deviance and their association with alcohol use trajectories in the transition from adolescence into young adulthood: violence and non-violent crime and delinquency. In general, researchers find that there is a positive association between alcohol use and engaging in violence (Barnwell, Borders & Earlywine 2006; Bonomo et al. 2001; Parker & McCaffree 2013), and non-violent crime and delinquency (Felson et al. 2008; Ford 2005). However, each of these areas tends to be studied separately and the literature contains different yet somewhat theoretical explanations for the role of alcohol use and its associated risk factors for engaging in each of the aforementioned categories of behaviors.
Data on arrests for violent crimes that potentially involve alcohol are collected through the use of several different official sources. The data collected using the National Incident-Based Reporting System (NIBRS) indicates that alcohol is a factor in 18.3% of violent incidents where a female was an offender and in 76.7% of violent incidents where a male was an offender (Rand et al. 2010). It should be noted that the data collected through the NIBRS is collected via the arresting police officer’s assessment of the situation: alcohol or drug use may not be reported completely accurately. As for first-hand self-report information on alcohol use and committing a criminal offense, information collected from jail inmates revealed that 22.4% of inmates arrested for drug offenses, 26.2% of those arrested for a public order offense (not including DWI/DUI offenses), 28.5% of inmates arrested for a property offense, and 37.6% of those arrested for a violent offense reported alcohol use at the time of the criminal offense (Survey of Inmates in Local Jails 2002). I will briefly discuss the relevant theoretical explanations as well as the pertinent empirical, sociological focused research concerning alcohol use and alcohol-related behaviors (violence and non-violent crime and delinquency) below.

*Alcohol-related violence*

Studies spanning numerous different fields of study including sociology, psychology, medicine, and public health have linked alcohol consumption with violence and aggression (Barnwell, Borders & Earlywine 2006; Bonomo et al. 2001; Graham, West & Wells 2000; Gussler-Burkhardt & Giancola 2005; McMurran 2009; Mitchell et al. 2009; Parker & McCaffree 2013; Pernanen 1991; Wells 2006; Wells & Graham 2003; Wells et al. 2005; Wells et al. 2006). As in alcohol use, significant sex and gender differences in violence perpetration exist with men being far more likely than women to
engage in a spectrum of aggressive acts during the transition to adulthood and across the
life span (Forsyth & Lennox 2010; Gussler-Burkhardt & Giancola 2005; Peralta & Cruz
2006). The majority of studies find that there is a correlation between alcohol use and
violence which does not necessarily mean that there is a causal relationship. Currently,
there are at least four competing theoretical explanations offered to explain the
relationship between alcohol use and violence (Moldonado, Reingle & Jennings 2011;
Xue, Zimmerman & Cunningham 2009).

The first two theoretical offerings suppose a direct, one way causal link between
alcohol use and violence. The first proposed theoretical explanation of the alcohol-
violence nexus, often referred to as disinhibition theory or the pharmacological
explanation, is that the pharmacological effects or intoxicating effects of alcohol causes
people to be violent (Goldstein 1985; Moldonado-Molina, Reingle & Jennings 2011).
This theory is often examined in laboratory settings where experimental designs are
employed. The pharmacological theoretical proposition suggests that the alcohol itself
plays a causal role in contributing to violent behavior. According to this line of logic and
research, (Ito, Miller & Pollock 1996; Pernanen 1991; Taylor & Chermack 1993), when
individuals consume alcohol it decreases the number of cues a person is able to attend to
and the most dominant cues are most likely to be acted upon. Oftentimes, these dominant
cues are those that may initiate aggression and violence (Taylor & Chermack 1993).

Studying the relationship between alcohol use and violence using laboratory
experiments is difficult because of ethical concerns (i.e. potential to harm human
subjects) involved with giving participants alcohol and observing the potential for
violence or actual violent acts being committed. To address ethical concerns, researchers
typically study the alcohol-violence relationship using a measure of aggression as the dependent variable rather than actual incidences of outright violent behavior. Measures of aggression include: verbal-active-direct (recording participant comments), verbal-active-indirect (using questionnaires), and physical-active-direct (teacher-learner tasks or reaction time tasks) (Bushman & Cooper 1990:342). The majority of the experimental studies find that alcohol increases aggressive responses in males but not females (Fillmore & Weafer 2004; Gussler-Burkhardt & Giancola 2005).

The second theoretical explanation suggests that the relationship between alcohol use and violence is causal in the sense that individuals prone to aggression and violence put themselves into situations that promote alcohol use. Stated another way, potentially violent individuals are more likely to self-select into social settings where heavy alcohol use is encouraged (Johnston, O’Malley & Eveland 1987; Maldonado-Molina, Reingle & Jennings 2011). Studies focusing on the pharmacological effects of alcohol in explaining the alcohol-violence relationship show that the intoxicating effects of alcohol are a contributing factor, but are not the sole explanation of why there is a correlation between drinking alcohol and violence/aggression. Observational studies and experimental studies suggest that the context and drinking situation are important to explore. In studies which focus on the drinking context and situation, alcohol is often cited as an “excuse” for violence or engaging in other deviant behaviors, but it is also the context that is important to examine (Kantor & Straus 1987; Peralta 2008; Peralta, Tuttle & Steele 2010). Homel, Tomsen, and Thommeney (1992) argue that alcohol related violence is concentrated in specific places and at specific times. From their observational study, they find that violence is concentrated in public bar environments where there is a complex interaction
between “aspects of patron mix, levels of comfort, boredom, and intoxication, and the behavior of bouncers” (1992:679).

Additionally, a study conducted by Wells and colleagues (2005) demonstrated the potential for obscuring the alcohol-violence relationship. The authors conducted a cross-sectional analysis using a sample of adolescents from the US National Longitudinal Survey of Youth and found that frequency of drinking and drinking volume confounded the association between heavy episodic drinking (HED) and fighting that occurred after drinking. For example, the researchers suggest that there is a “likelihood that certain types of drinkers and usual drinking contexts were associated with alcohol-related aggression but do not necessarily reflect a causal role of alcohol” (2005:940). They found that potential mediators and moderators including exploring gender and contextual information such as drinking location need to be explored further. The authors also suggest that longitudinal analyses that examine the alcohol-violence relationship may help to disentangle the alcohol-violence association more completely rather than complicating the supposed connection.

The third and fourth theoretical frameworks do not suggest a direct, one way causal relationship. The third explanation, which I will call the “reciprocal theory,” suggests that the relationship between alcohol and violence is reciprocal meaning that the causal “arrow” may point in either direction or both directions (White et al. 1999; White et al. 2002). This theoretical model can be thought of as a combination of the first two theoretical frameworks in that alcohol use causes violence and violence causes alcohol use because alcohol use and violence reinforce one another (Xue, Zimmerman & Cunningham 2009).
White and colleagues (2002) demonstrated that the relationship between alcohol use and violence is complex and the “causal” mechanism can point in a variety of directions. For example, in their study they found that one single model did not precisely explain the alcohol-violence nexus. The authors suggest that for some individuals, alcohol use alone increases the likelihood for engaging in violence; for others, having peer groups who engage in alcohol use and violence or other deviant behaviors has more of an effect on behavior than the pharmacological effects of alcohol or other drugs; last, intrapersonal and environmental can increase the likelihood of involvement in many different types of criminal and deviant behaviors including both alcohol use and violence (White et al. 2002:149).

The fourth and final theoretical offering postulates that the relationship between alcohol use and violence is spurious (Felson et al. 2008; Felson, Teasdale & Burchfield 2008; Gottfredson & Hirschi 1990). Arguably, this theoretical offering is not so much a theory, but an argument against violence causality models. One study done by Felson, Teasdale, and Burchfield (2008) found that drinkers were more likely to engage in violence while sober in comparison to non-drinkers which suggests that spuriousness is a potential problem when exploring the relationship between alcohol use and violence. Competing explanations such as a “more general problem behavior syndrome” or other contributing factors, which I will discuss below, may more accurately explain the alcohol-violence connection (Maldonado-Molina, Reingle & Jennings 2011:100; White, Brick & Hansell 1993).

The relationship between alcohol use and violence is complex. Drinking alcohol is neither necessary nor sufficient for explaining all violence, but it is important to study
the relationship between the two given the large percentage of offenses where alcohol is cited as a factor in the incident (Rand et al. 2010; Survey of Inmates in Local Jails 2002) in addition to the epidemiological data which clearly suggests an association between alcohol use and criminal and deviant behaviors (Mahalik et al. 2013). The majority of sociological and criminological literature is focused on the assumption that there is not a direct causal alcohol use-violent behavior relationship (with the recent exception of Parker & McCaffree 2013). The interaction of psycho-social and contextual elements have been studied as contributing factors to the alcohol-violence relationship (Felson, Teasdale & Burchfield 2008; Moldonado-Molina, Reingle & Jennings 2011; Taylor & Chermack 1993). The amount and frequency of alcohol consumption (Bye & Rossow 2008; Wells & Graham 2003; Wells et al. 2005), characteristics of those consuming the alcohol (Chomack & Collins 1987; Hope & Mongan 2011), drinking expectations (Martens et al. 2006; Parker, Harford & Rosenstock 1994; Leigh 1990), and the drinking context and situation (Forsyth & Lennox 2010) have each been found to be important factors in the alcohol-violence nexus.

To examine the connection between alcohol use and violence, I discuss literature related to the contributing factors in the alcohol-violence relationship. I will discuss the sociological and criminological literature which focuses on the bi-directional and spurious relationship between alcohol use and violence (reciprocal theory and spuriousness theory). The more sociologically focused lines of research that attempts to disentangle the relationship between alcohol use and violence focuses on socio-structural characteristics of those consuming the alcohol. Specifically, the characteristics include, although not limited to, gender, sex, age, and race. Oftentimes, these characteristics are
included as control variables, but have also been studied as more important features or independent (or potentially moderating or mediating) variables in the alcohol-violence nexus.

First, gender and/or sex differences have been explored by researchers using various types of methodologies that span many different fields of study including laboratory experiments, interviews, and surveys. The experimental literature exploring sex differences between males and females often produces inconclusive results regarding the alcohol and aggression relationship. For example, a study done by Hoaken and Pihl (2000) found that under high provocation, men and women in both groups (intoxicated and non-intoxicated) were aggressive: it should be noted that intoxicated males showed the most aggression in comparison to all other groups. Whereas in an experiment (Fillmore and Weafer 2004) men reported more “subjective stimulation” from alcohol and women reported more sedation from the alcohol. The experimental literature is dominated by a psychological focus. Moreover, sex, not gender (in the sociological sense) is largely if not exclusively focused upon in this body of research.

Two studies that take a more sociological view regarding the alcohol-violence relationship by exploring gender differences come from Peralta and Cruz (2006) and Forsyth and Lennox (2010). Through the use of qualitative interviews, Peralta and Cruz (2006) explore how meaning is attached to alcohol-related violence. The majority of the participants (88%) believed that alcohol caused violence and that gender was an important factor. Specifically, “macho” behavior was cited as a reason that males tended to engage in alcohol-related violence. The social construction of masculinity and the meanings attached to being male or female have a powerful influence on how alcohol-
related violence is interpreted. An observational study by Forsyth and Lennox (2010) took a similar approach to exploring gender in the alcohol-violence relationship in the sense that masculinity is a contributing factor in male-to-male alcohol-related violence. Interestingly, the researchers also explored female-to-female alcohol-related violence which is often overlooked or underexplored in most studies. They found that female-to-female alcohol-related violence was similar to that of male-to-male violence in the sense that traditionally masculine characteristics of alcohol-related violence such as “engaging in challenges to fight” and “describing their fighting prowess” contributed to violence incidents (2010:84). Female-to-female alcohol-related violence was also different than male-to-male alcohol-related violence because sexual jealousy was often cited as a factor that contributed to conflicts which was not present in male-to-male violence incidents.

Age is also a characteristic that is important to examine in the alcohol-violence relationship. The majority of studies find that both alcohol use and violence tend to occur in late adolescence to early adulthood (Brewer & Swahn 2005; Maldonado-Molina, Reingle & Jennings 2011; Pihl & Sutton 2009; Xue, Zimmerman & Cunningham 2009). It is then not surprising that these two phenomena tend to intersect. A recent study by Maldonado-Molina, Reingle and Jennings (2011) examined the relationship between alcohol-use and violence longitudinally and found that consistently high alcohol use during adolescence predicts serious violence among young adults. Yet, engaging in violence during adolescence did not predict high alcohol use in young adulthood. This suggests that age, alcohol use, and violence do not have a simple linear relationship and need to be explored further.
The literature concerning the relationship between alcohol use and violence spans many different fields of study and numerous factors have been shown to play a role in the relationship. The relationship is not simple and easy to disentangle, but the various theoretical propositions and differing methodologies used to study the relationship help to shed light on if and why there is an association between alcohol use and violence. From the literature reviewed above, it is evident that there are most likely multiple, conditional, and interactive factors which contribute to the alcohol-violence nexus. One way that researchers have suggested to further unravel the relationship between alcohol use and violence is to observe and examine alcohol use and violence perpetration at various time points with an emphasis on the period when alcohol use and violence rates tend to be at their highest which is during the transition from adolescence into young adulthood.

*Alcohol-related non-violent crime and delinquency*

Research concerning the potential association between alcohol use and delinquency or criminal activity has mainly been focused on violent behaviors as the primary delinquent or criminal behavior\(^6\). As is evident from the above discussion concerning alcohol use and violence, there is a long line of prior research which has established that there is most likely an association between alcohol use and violence. Comparatively, relatively little attention has been given to the relationship between alcohol use and non-violent delinquency or criminal offenses (Felson et al. 2008; Ford 2005).

\(^6\) I use both terms (crime and delinquency) because delinquency is often used for adolescents who commit an illegal offense or engage in status offenses and crime is used for adults who commit an illegal offense.
Similar to research on alcohol use and violence, there is often an assumption that a relationship exists between alcohol use and non-violent delinquency or criminal offending (Fergusson, Lynskey & Horwood 1996). The theoretical explanations as to why there may be an association between alcohol use and delinquency/criminal behaviors are also similar to those offered to explain the relationship between alcohol use and violence. This may be because violence is often considered to be a delinquent or criminal act, but violence is often examined separately because of its potential severity and the commonsense belief that alcohol use causes violence (Felson 2008; Fergusson, Lynskey & Horwood 1996; Ford 2005).

The first theoretical proposition suggests that alcohol causes delinquency because of the pharmacological effects of alcohol. These pharmacological effects include disinhibition, cognitive-perceptual distortions, reduced intellectual functioning and self-awareness, and inaccurate assessments of risks (Fergusson, Lynskey & Horwood 1996; Ford 2005). Similar to the alcohol-violence literature, the research suggests that alcohol lowers inhibitions and enables individuals to more readily engage in delinquent or criminal behaviors because they may not be able to accurately gauge the amount of risk associated with the behaviors they engage in or perhaps they feel less obligation to conform to social norms and choose to partake in behaviors that are considered to be delinquent or criminal (Fergusson, Lynskey & Horwood 1996; Ford 2005). For example, White and colleagues (2002), using data from the Pittsburgh Youth Study, found that a variety of offenses that youths committed were done so under the influence of alcohol and/or other drugs. For example, 28.8% of adolescents (N=454) reported that they
committed thefts of greater than $100 under the influence and violent offenses were more likely to be committed under the influence of alcohol than other drugs such as marijuana.

The second theoretical paradigm suggests that delinquent behavior is the cause of alcohol use. This line of reasoning proposes that involvement in delinquent and/or criminal behavior precedes alcohol use (Ford 2005; White et al. 2002). This suggests that individuals may use alcohol or other substances in order to cope with, explain, or facilitate their delinquent or criminal behavior which may help them excuse their involvement in behaviors that do not conform to law-abiding norms. In addition, involvement in delinquent or criminal behavior often provides the context for engaging in additional delinquent or criminal behaviors such as using alcohol or other substances (Ford 2005).

The third theoretical explanation argues that the relationship between alcohol use and delinquency/criminal activity is spurious. Ford (2005) suggests two major reasons for the potential spurious relationship between alcohol use and delinquency. First, alcohol use by adolescents or young adults (under the age of 21) is a delinquent or criminal act; therefore, we are attempting to explain one delinquent activity with another. Second, alcohol use and delinquency or criminal behavior may be caused by the same risk factors (Felson et al. 2008; Ford 2005). For example, Hirschi and Gottfredson (1990) suggest that delinquent or criminal behavior, including both alcohol use by minors and other delinquent or criminal activities, may be the result of low self-control. One way that researchers have attempted to tease out the possible spurious relationship between alcohol use and delinquency is to employ longitudinal data analysis. Several researchers have attempted to use this method, but most focus on the relationship between alcohol
use and violence, rather than on general delinquent or criminal behaviors (Felson et al. 2008). This is an important gap in the literature that this dissertation, by employing the life course perspective, will directly address.

The relationship between alcohol use and delinquency or criminal activity is multifaceted. The majority of research focuses on alcohol use and violent behaviors, rather than delinquency or criminal activities in general (i.e., non-violent offenses), and there is a need to further examine the potential relationship between the two. From the three theoretical explanations for the association between alcohol use and delinquency, the theories of spuriousness, reciprocity, and/or bi-directionality have spurred researchers to explore various contributing factors to the alcohol-delinquency/criminal activity nexus. Two of these factors include peer associations and social bonds.

Peer associations and affiliations have been a part of studying crime since Sutherland and Cressey’s proposed the theory of differential association. In their theory, they argue that criminal behavior is learned through interaction with others, especially peer groups, and by adopting definitions favorable to crime. Sutherland and Cressey state, “A person becomes delinquent because of an excess of definitions favorable to law violation over definitions unfavorable to violation of the law” (2011 [1947]:127).

Several studies have shown that peer associations are a possible explanation for the relationship between alcohol use and delinquency/criminal activity (Barnes et al. 2006; Barnes et al. 2007; Fergusson & Horwood 1996; Fergusson, Lynskey & Horwood 1996). Fergusson and Horwood (1996) found that peer associations during adolescence have the ability to reinforce or change behavioral tendencies which can include involvement in delinquent or criminal activities. Next, Fergusson, Lynskey and Horwood
(1996) found that affiliations with delinquent peers significantly influenced rates of both violent and property offenses across time. In addition, using longitudinal data collected over six data points, Barnes and colleagues (2006) found that peer deviance predicted initial levels of problem behaviors and the rates of increases in problem behaviors across time. Each of these findings suggests that peer affiliations play an important role in shaping behaviors of those who associate with each other. Further, examining how peer influences change or effect behaviors across time may help to shed light on why peer associations are important and if these associations persist across the life course.

Social bonds are also a potential explanation for the relationship between alcohol use and delinquency or criminal behavior. According to Hirschi (1969), social bonds consist of four dimensions: attachment, commitment, involvement, and belief. The stronger the bonds to society, the less likely individuals are to deviate from societal norms. Those who have weaker bonds are more likely to engage in deviant behavior including alcohol use and delinquent or criminal activities. To examine the relationship between social bonds, alcohol use, and delinquency, Ford (2005) used data from the National Youth Survey (NYS), a longitudinal study containing five data collection points from 1976-1980. His analysis suggests that there is a reciprocal relationship between alcohol and delinquency and this reciprocal relationship may be due to the negative impact that these behaviors have on social bonds. This suggests that social bonds are important to examine further, especially examining how social bonds change and influence behavior over the life course.

The literature which is focused on the relationship between alcohol use and delinquency or criminal activity closely mirrors the research concerning the association
between alcohol use and violence. Factors that contribute to the alcohol-violence nexus also play a part in the alcohol-delinquency nexus, most likely due the fact that violence is a delinquent or criminal behavior. From the literature reviewed above, it is likely that the associations between alcohol use and delinquency/criminal activity are multiple, conditional, and interactive; therefore, research is needed to further disentangle the relationship between alcohol use and delinquency/criminal activity while giving special attention to the transition from adolescence to young adulthood.

Summary and Hypotheses

The purpose of this dissertation is to examine alcohol use trajectories during a critical developmental stage: the transition from adolescence into young adulthood. I aim to examine if and how violent and non-violent crime and delinquency impacts alcohol use trajectories. I then focus on how both sex and gender role orientation may be a risk or protective factor in alcohol use trajectory group membership. Last, I examine several important variables discussed in Sampson & Laub’s Life Course Theory of Crime: social support and life transitions/events and determine if these also impact alcohol use trajectories. Modeling change across time using group-based trajectory modeling allows for a more in depth understanding of the complexity of heavy episodic alcohol use trajectories while exploring potential covariates using multiple waves of data. Specifically, group-based trajectory models are able to identify clusters of individuals who follow similar “progressions” of heavy episodic drinking over time (Jones & Nagin 2007).
Below, I list my specific hypotheses that I will test in this dissertation:

H1. Sex will have an impact on trajectory group membership. Males will have a higher probability of being in higher heavy episodic drinking trajectory groups in comparison to women.

H2. Gender role orientation will have an impact on trajectory group membership. Those who have a more masculine gender role orientation will have a higher probability of being in higher heavy episodic drinking trajectory groups compared to those with a more feminine gender role orientation.

a. Gender role orientation will have an impact on trajectory group membership regardless of sex category. Within sex category, those with a more masculine gender role orientation will have a higher probability of being in a higher heavy episodic drinking trajectory group.

H3. Involvement in violence throughout the transition from adolescence into young adulthood will have an impact on alcohol use trajectories. Specifically, violence will be associated with higher levels of heavy episodic drinking for each alcohol use trajectory group over time.

H4. Involvement in non-violent crime and/or delinquency throughout the transition from adolescence into young adulthood will have an impact on alcohol use trajectories. Specifically, non-violent crime/delinquency will be associated with higher levels of heavy episodic drinking for each alcohol use trajectory group over time.
H5. Social support (parental and school connectedness) in adolescence will have an impact on trajectory group membership. Those who have higher levels of social support will have a higher probability of belonging to lower heavy episodic drinking trajectory group in comparison to those with lower levels of social support.

H6. Life transitions/events (education, employment, marriage/cohabitation, and parenthood) will have an impact on alcohol use trajectories. Transitions/events will be associated with lower levels of heavy episodic drinking for each trajectory group over time.
CHAPTER III
DATA AND METHODS

In this chapter, I will describe the sample, measures utilized, and statistical methodologies employed in analyzing alcohol use trajectories and their potential covariates during adolescence into early adulthood. Heavy episodic drinking is measured over four data collection points as well as the major time varying covariates including violent and non-violent crime/delinquency and life transitions/events. Next, I discuss my measurement of gender role orientation. I will then describe the covariates that are related to the transition from adolescence into young adulthood as identified in Sampson & Laub’s Life Course Theory of Crime and the life course perspective in general. These variables include: social support (parental and school connectedness) and significant life transitions (education/student status, parenthood, marriage/cohabitation, and employment). Finally, I detail the additional demographic variables that are used in the analyses (race, sex, and age). This chapter begins with a detailed description of the data that will be utilized in my analyses. Next, I describe the variables that are used in this dissertation. Last, the statistical techniques and strategy used and the justification for their use conclude the chapter.
Data and Sample

The data that will be utilized in this dissertation come from The National Study of Adolescent Health (Add Health). The purpose of the Health Add Study and data collection project is to explore the influences of individuals’ attributes and environmental influences on health and health related behaviors and is the largest comprehensive longitudinal study of adolescents to date (Harris et al. 2009; NICHD 2012). Add Health is a longitudinal school-based study of a nationally representative sample of adolescents that was initiated during the 1994-1995 school year with the latest round of data collection done in 2008. A sample of 80 high schools and 52 middle schools in the United States were selected to be a part of the project (Harris et al. 2009). The schools and students selected for participation are representative of schools and adolescents in the United States in terms of region, urbanicity, school size and type, and ethnicity because unequal probability of selection methods were employed in order to select participants representative of the population (Harris et al. 2009).

In order to correct for potential design effects and unequal probability of selection of respondents, survey weights were created. Only cases which have survey weights are utilized in the analyses for this dissertation. Using the survey weights and only including cases which have been assigned weights in analyses helps to ensure that analysis results are unbiased and nationally representative (Chantala 2006; Chantala & Tabor 2010; Tourangeau & Shin 1999).

The Add Health data set currently includes four waves of data collected during various time points from 1994 to 2008: Each of these waves will be utilized in this
dissertation. The retention rate for the overall study is 80.3 percent\(^7\). The public use data includes over 6,000 participants and contains variables that span a variety of topics including data on respondents’ “social, economic, psychological and physical well-being with contextual data on the family, neighborhood, community, school, friendships, peer groups, and romantic relationships” (Harris et al. 2009). Wave I was collected during the 1994-1995 school year when adolescents were in grades 7-12. In addition, Wave I data was collected via in-school and in-home questionnaires, a parent questionnaire, and a vocabulary test. Wave II was collected one year later in 1996. Wave III was collected between 2001 and 2002 when adolescents were between 18 and 26 years old. Last, wave IV was collected in 2007 and 2008 when participants were between 24 and 32 years old. Wave II, III, and IV data were obtained via in-home questionnaire with additional data on relationships and pregnancies collected in Waves III and IV. Only data obtained through the in-home questionnaires will be used in this dissertation because there is more consistency in these measures which were used across all four waves of data.

The Add Health data is available in public and private use forms. The private use data is more extensive and is only available by contractual agreement with researchers who need and are committed to having limited access to the data (i.e. there is little need for exploring the data comprehensively) (Harris et al. 2009). The private use data contains additional cases and information, mainly the inclusion of sibling information (brother/sister and twins), an oversampling of African Americans with college educated parents, and geographical data. The variables of interest for this dissertation are available in the public use data. Thus, this dissertation does not require the additional cases and/or

\(^7\) Response rate for wave I is 79%, wave II is 88.6%, wave III is 77.4%, and wave IV is 80.3% (Harris et al. 2009).
geographical data. The public use data is sufficient to examine the overarching research questions and hypotheses laid out in chapters 1 and 2.

Measures

The measures of heavy episodic drinking, violent crime/delinquency, non-violent crime/delinquency, and each of the potential correlates and predictors were obtained via self-report in each wave of data collection in the participants’ homes using a combination of Computer-Assisted Personal Interview (CAPI) and Audio Computer Self Interviewing (ACASI). Evidence suggests that the ACASI method of data collection increases the validity of reporting on sensitive topics including involvement in alcohol use, violence, non-violent crime/delinquency or other deviant or criminal behaviors (de Leeuw, Hox & Kef 2003; Mahalik et al 2013). Audio Computer Self Interviewing (ACASI) is performed by providing the participant with a computer where the participant then listens to the questions read by a computer-digitized voice over a headset. Simultaneously, the question being read by the computerized voice is also displayed on the screen. This method of data collection helps to ensure privacy for responses to sensitive questions (de Leeuw, Hox & Kef 2003).

The instruments used in the Add Health project were developed using a variety of resources and were revised and modified during the course of the four waves of data collection in an effort to improve the measures of interest. Modifying and changing questions presents potential methodological problems especially when conducting longitudinal data analyses (Udry 2001). Only measures that were asked in an identical or nearly identical manner were included to maintain precision in the measurements of

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Questions on the Add Health instrument were revised and modified in response to pilot test results.
variables across time. The resources used to develop the Add Health instrument include utilizing items from the Youth Risk Behavior Surveillance Survey (Grunbaum et al. 2004; Kann et al. 1993), recommendations from the National Institute on Alcohol Abuse and Alcoholism (NIAAA) (NIAA 2003), and numerous studies that guided questionnaire development concerning substantive topics of interest for the overall goals of the Add Health project (Mahalik 2013; Udry 2001). The outside resources were also consulted as a way to enable greater measurement reliability and validity, and researchers are encouraged to continually assess reliability and validity of the measured used in the Add Health instruments (Udry 2001). For example, previous surveys that have been assessed for reliability and validity of measures were also utilized in the Add Health instruments such as the Youth Risk Behavior Surveillance Survey, the National Health Interview Survey, and Monitoring the Future (Udry 2001).

**Alcohol Use: Heavy Episodic Drinking**

The key variable in this dissertation is alcohol use. More specifically, the focus is on heavy alcohol use or heavy episodic drinking practices from adolescence into adulthood. As discussed in chapter 2, the term binge drinking is often used to describe heavy alcohol use, but is no longer considered to be the most accurate term to describe patterns of heavy drinking patterns that last for an extended period of time (Epstein et al. 2004; Herring, Berridge & Thom 2008; NIAAA 2003). Below, I describe and discuss the key variable of alcohol use in this dissertation.

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9 Nearly identical meaning that possible questions responses provided to respondents were different across waves or the questions were presented in a different section of the instrument. The potential responses to survey items are detailed with each variable operationalization later in this chapter.
Measurement of alcohol use

There are several measures of alcohol use available in the Add Health data. For this dissertation, I utilize a measurement of alcohol use that addresses both quantity and frequency of heavy alcohol use in the past year. Heavy alcohol use is treated as a time-varying covariate and is measured at each wave of data collection. First, respondents were informed that a drink is a glass of wine, a can of beer, a wine cooler, a shot of liquor, or a mixed drink. Respondents were then asked, “Over the past 12 months, on how many days did you drink five or more drinks in a row?” Seven potential responses were offered: every day or almost every day, 3 to 5 days a week, 1 or 2 days a week, 2 or 3 days a month, once a month or less (3-12 times in the past year), 1 or 2 days in the past 12 months, or never. In addition, I include those who answered “no” to an alcohol use screening question “Have you ever had a drink of beer, wine, or liquor—not just a sip or a taste of someone else’s drink more than 2 or 3 times in your life?” in the abstainer category for each wave of data collection. I code this variable so that 0 represents those who have never drank more than 2 or 3 times in their life and 7 represents those who consume 5 or more drinks every day. I do not collapse the response categories for this variable so that I can better capture nuances in heavy episodic drinking practices given the wide variety of response options available in the data set. This is also the measure employed by several other researchers who utilize the Add Health data including Needham (2007), Guilamo-Ramos and colleagues (2005), and Resnick and co-authors (1997).

There are a broad set of accepted measures for alcohol use behavior in the literature. Choosing the appropriate measurement of alcohol use behavior depends on
what aspect of alcohol consumption one is interested in exploring (Dowdall & Wechsler 2002). Measures of alcohol involvement include, but are not limited to: quantity of alcohol use, frequency of alcohol use, and alcohol-related consequences (such as dependence, substance use disorders, or acts committed under the influence of alcohol), and each is appropriate to different research situations (Dowdall & Wechsler 2000; NIAAA 2003). One of the most commonly employed measures of alcohol use is binge drinking or - more accurately heavy episodic drinking (HED) - as defined by Wechsler and colleagues (1995) and defended by Dowdall and Wechsler (2002). Wechsler and colleagues (1995) defined heavy episodic drinking, with sex specific considerations - as drinking five or more drinks in a row or at a single sitting for men, and four or more drinks for females over the previous 30 days (Dowdall & Wechsler 2002; Wechsler et al. 1995). Heavy episodic drinking as defined by Wechsler and colleagues (1995) serves as the basis for the measure of heavy alcohol use in this dissertation with the exception of accounting for sex-based distinctions10.

*Alcohol use reference period*

When studying alcohol use, it is common for researchers to use different time reference points. For example, Wechsler and colleagues (2005) utilize a 30 day time frame as do other national surveys such as The National Survey on Drug Use and Health (NSDUH). Some surveys, Monitoring the Future (MTF) for example, employ multiple time frames. Monitoring the Future uses both past month and past year involvement with alcohol use (Johnston et al. 2013). The 12 month reference period for recalling drinking

10 I cannot utilize the sex specific measure of heavy episodic drinking in this dissertation because respondents were only asked about consuming 5 or more drinks without special consideration for sex.
practices may seem like an expansive amount of time for respondents to recollect their involvement in alcohol use. However, The National Institute on Alcohol Abuse and Alcoholism (NIAAA) suggests that the year reference time frame is the best choice and was the consensus of the task force who recommended alcohol use questions for researchers who wish to include alcohol use measures in their survey instruments (NIAAA 2003). In addition, the recommendations from the NIAAA were the driving force that informed the Add Health project investigators in their creation of the alcohol use questions used in the survey instruments utilized across all four waves of data collection (Udry 2001). A 12 month reference period takes into account recall problems and addresses infrequent drinkers (Dawson 2003; NIAAA 2003). The NIAAA task force argues that using a shorter time frame, infrequent drinkers would be missed and potentially counted as non-drinkers or abstainers (Dawson 2003; NIAAA 2003).

It is important to note, however, that the NIAAA suggest that when samples are comprised of younger participants (i.e., college students or those under 21) it is acceptable to use a shorter time reference period. The report states, “Due to the more sporadic, or opportunistic, nature of alcohol consumption among youth, and the possibility of generalizing from recent drinking episodes, a 30-day time window is frequently used for underage subjects” (NIAAA 2003). I use the 12 month reference period for two reasons: (1) I am interested in measuring patterns of alcohol use that extends into adulthood (i.e., the trajectory of adult drinking patterns) and (2) the 12 month reference period is the only timeframe used in the Add Health data. Thus, I in part follow the standards set by NIAAA by relying on a 12 month time frame for both theoretical and data limitation purposes.
**Covariates of Heavy Episodic Drinking**

In this dissertation I concentrate on two arenas of crime and/or delinquency: violence and non-violent crime/delinquency. These are measured at each wave of data collection. In addition, to these covariates I also explore gender, the age of onset of using alcohol, social support (school and parental), and several critical life transitions (employment, parenthood, and marriage/cohabitation) as potential correlates and predictors of alcohol use trajectory group membership. Below, I detail how each of the variables are operationalized from questions asked to participants in the Add Health project. Then, I provide justification for the measurement of variables.

**Violence**

Violence in this dissertation is measured using questions concerning violence perpetration behavior asked of participants over four data collection points. My violence measure is based on responses to five items that asked respondents if they, in the past year, had: (1) taken part in a fight involving a group of friends against another group of youth; (2) pulled a knife or gun on someone; (3) shot or stabbed someone; (4) deliberately damaged property that didn’t belong to the participant; and (5) used or threatened to use a weapon to get something from someone. The possible responses for these items were not consistent across waves of data collection, which presented a methodological problem. In Waves I and II, these questions included the responses: Never, once, more than once, refused, don’t know, or NA. In waves III and IV, the violence questions pertaining to items 1, 4, and 5 include the responses: Never; 1 or 2 times; 3 or 4 times; 5 or more times; refused; and don’t know. The possible responses for
items 2 and 3 include the responses yes, no, refused, and don’t know. Due to these variations in potential response options, I code violence as an index variable.

Researchers employ various measures of violence. Some researchers study a single type of violence such as physical assault because it is the most common form of violence perpetrated and reported by adolescents and adults (FBI 2012). According to the FBI’s Uniform Crime Report for 2011, aggravated assault accounted for 62.4% of all violent crimes reported to law enforcement. Other researchers utilize count variables which include multiple forms of violence (FBI 2012; Lightowlers 2011; Truman & Planty 2012; Xue et al. 2009). By only including a single measurement, much is learned about a particular type of violence, but information concerning other types of violence perpetration is missing. The use of an index or count variable to measure violence perpetration gives a more holistic picture of violent behavior in comparison to focusing on a single type of violent behavior (Dahlberg et al. 2005). In addition, relying on self-report data for engaging in serious violent offenses typically result in conservative estimates – thus, incorporating multiple forms of violence enhances the overall measure of violence perpetration by rendering the variable more inclusive of violence (Mahalik et al. 2013).

Non-violent crime/delinquency

In this dissertation, my measurement of non-violent delinquency and/or non-violent criminal activity includes only the questions that were asked to participants in all four waves of data collection. This limits the variable because status offenses and delinquency measures that are traditionally related to young adolescents such as running away, lying to parents, vandalism, driving someone’s car without permission, and being
rowdy in public places are not asked at Waves III and IV when respondents are adults. My measure of non-violent delinquency and/or non-violent criminal activity is based on responses to five items that asked respondents if they, in the past year, had: (1) taken something from a store without paying for it; (2) stolen something worth more than $50; (3) stolen something worth less than $50; (4) gone into a house or building to steal something; and (5) sold marijuana or other drugs. The possible responses to these questions include: never; 1 or 2 times; 3 or 4 times; 5 or more times; refused; don’t know; and NA. Similar to the violence variable and for consistency across measures, I code non-violent delinquency and/or non-violent criminal activity as an index variable.

Similar to violence, there are a variety of ways to measure involvement in non-violent delinquency or criminal activity. A majority of researchers utilize count or index measures of delinquency that encompass a variety of offenses because many different behaviors are considered to be delinquent or criminal (Fergusson, Lynskey & Horwood 1996; Ford 2005; White et al. 2002). In addition, in studies of non-violent delinquent or criminal behavior, the focus is usually placed on delinquent or criminal behavioral patterns rather than studying a single offense. For this reason, multiple measures are traditionally utilized to estimate as accurately as possible the extent of delinquent and criminal activity.

*Gender role orientation*

Gender role orientation is assessed using the short form (30 item) version of the Bem Sex Role Inventory (BSRI) measured at wave III when respondents are 18-26 years old. The BSRI was developed by Bem in 1974 and measures masculinity, femininity, and androgyny by asking individuals to evaluate statements that are “the most desirable
characteristics of a given sex” (Bem 1981; Beere 1990). The short form BSRI was introduced in 1979 and is the gender measurement used in this dissertation. Add Health participants were asked, “How often is each of the following statements true of you?” and possible responses included: never or almost never, usually not true, sometimes but infrequently true, occasionally true, often true, usually true, and always or almost always true. Respondents were asked to evaluate the following thirty statements: (1) I defend my own beliefs; (2) I am affectionate; (3) I am conscientious; (4) I am independent; (5) I am sympathetic; (6) I am moody; (7) I am assertive; (8) I am sensitive to the needs of others; (9) I am reliable; (10) I have a strong personality; (11) I am understanding; (12) I am jealous; (13) I am forceful; (14) I am compassionate; (15) I am truthful; (16) I have leadership abilities; (17) I am eager to soothe hurt feelings; (18) I am secretive; (19) I am willing to take risks; (20) I am warm; (21) I am adaptable; (22) I am dominant; (23) I am tender; (24) I am conceited; (25) I am willing to take a stand; (26) I love children; (27) I am tactful; (28) I am aggressive; (29) I am gentle; and (30) I am conventional. The masculine measures include items 1, 4, 7, 10, 14, 16, 19, 22, 25, and 28. The feminine measures include 2, 5, 8, 11, 14, 17, 20, 23, 26, and 29. The neutral items are 2, 6, 9, 12, 15, 18, 21, 24, 27, and 30. For ease of presentation and clarity, I have included a table (Table 1, see below) to display the masculine, feminine, and neutral items from the short form BSRI (Bem 1974; Bem 1979; Bem 1981).
Several scores can be obtained from these items including masculinity, femininity, androgyny, and social desirability (Bem 1974:158). Masculinity and femininity scores are calculated by taking the average score of the respective items and can be viewed as independent scores. The alpha reliability of the masculinity score is .82 and it is .92 for femininity. To calculate a “Bem Score” or “androgyny” score as Bem (1974) termed it, the feminine score is subtracted from the masculine score. The resulting value can be placed on a continuum of values ranging from -10 to +10 that measure gender where low scores indicate “feminine,” high scores indicate “masculine,” and scores close to zero indicate androgyny. The alpha reliability for the Bem score is .91.

According to Bem, a masculine sex role indicates adherence to masculine attributes and a rejection of feminine traits; whereas, a feminine sex role indicates adherence to feminine attributes and a rejection of masculine attribute. Last, an androgynous sex role indicates the endorsement of both feminine and masculine attributes (Bem 1974:158). I use the “Bem score” or androgyny score as my measure of gender role orientation in this dissertation.
The Bem Sex-Role Inventory (BSRI) has undergone numerous tests of validity and has been evaluated as well as subjected to many critiques by researchers since its inception in 1974 (Auster & Ohm 2000; Choi & Fuqua 2003; Hoffman & Borders 2001; Holt & Ellis 1998). Attempts to replicate the BSRI and inconsistent findings using the BSRI have made the BSRI a contested measurement of gender and gender role orientation. For example, Holt and Ellis (1998) found that all but two of the adjectives, loyal and “childlike” which are not included in the short-form BSRI, were validated using Bem’s (1974) recommendations suggesting that the BSRI is a valid way to measure gender role perceptions, but cautions that gender role orientations may have changed in the nearly 40 years since the BSRI was developed.

Auster and Ohm (2000) found that despite societal change that has occurred since the development of the BSRI an examination of the desirability ratings revealed that respondents still consider traditional traits of what it means to be “masculine” or “feminine” to be desirable indicating that the BSRI is still a valid measure of gender role expectations or gender orientation. Additionally, Hoffman and Borders (2001) argue that scores from the short form BSRI, which is used in this dissertation, are more reliable than scores obtained from the original BSRI. The Bem Sex-Role Inventory is one of the most widely used measures of gender role orientation and has undergone numerous stringent tests and critiques from researchers (Bem 1979; Choi & Fuqua 2003; Hoffman & Borders 2001; Holt & Ellis 1998). Not all researchers agree that the BSRI is the best measure of gender role orientation or androgyny, but it is a useful tool in examining the potential impact of gender role orientation.
While the Bem Sex Role Inventory is employed as a measurement of gender role orientation, some researchers have proposed that the Bem Sex Role Inventory may be measuring some other concept or construct such as instrumentality (for the masculine subscale), expressiveness (for the feminine subscale), or some other personality characteristic (Bohannon & Mills 1979; Choi & Fuqua 2003; Moreland et al. 1978; Spence 1991). Evidence for the potential of the Bem Sex Role Inventory to be useful as a measurement of some other construct or concept come from factor analyses (Choi & Fuqua 2003). This indicates that the Bem Sex Role Inventory may be useful tool in measuring constructs or concepts other than gender role orientation.

Despite its limitations, I utilize the BSRI short form as my measure of gender. Gender and gender role orientation has not been examined in a longitudinal study concerning alcohol use trajectories and is thus a major gap alcohol use research. Moreover, the study of heavy episodic drinking trajectories across time while accounting for gender role orientation has never been empirically examined until now. Additionally, a serious consideration of gender (aside from or in addition to sex) has not been included in the majority of criminological theories despite research which finds that gender and sex each are important in the commission of criminogenic behaviors (Messerschmidt 1997).

**Social support: Parent and school connectedness**

Social support during adolescence is hypothesized to be a protective factor against involvement in heavy episodic drinking meaning that those with higher levels of social support will engage in lower levels of heavy episodic drinking in comparison to those with lower levels of social support. Previous research indicates that informal social
support is a protective factor against engaging in excessive alcohol use, especially during adolescence (Chapple, McQuillian & Berdahl 2005; Hirschi 1969; McNeely & Falci 2004; Sampson & Laub 1990 & 2005). In this dissertation, there are two categories of social support considered: parent connectedness and school connectedness (Libbery 2004; McNeely & Falci 2004; McNeely, Nonnemaker & Blum 2002; Resnick et al. 1997). Measures of social support during adolescence are measured at wave I when adolescents are in grades 7-12.

*Parent connectedness*\(^{11}\). Social support in the form of parent connectedness or parent closeness is measured by creating a scale from four questions following previous scale formations using the Add Health data (McNeely & Falci 2004; Resnick et al. 1997). First, respondents were questioned about how close they feel to their mother and father figures. Respondents were asked: “How close do you feel to your mother figure/father figure?” Second, respondents were questioned about how much their mother or father figure cares from them. Respondents were asked: “How much does she/he care?” Possible responses for each of the four questions include: not at all, very little, somewhat, quite a bit, or very much. The alpha reliability for this scale is .75. Previous research has shown that relationships with parents are an important facet of social support. For example, Kempf (1993), who reviewed 70 studies, found that attachment to parents was the most consistently supported social bond that has an effect on involvement in criminal and delinquent activity.

\(^{11}\)Questions about relationships with siblings are also included in the Add Health data. I choose not to include these because many participants did not have siblings, which decreased my n.
School Connectedness. Social support in the form of school connectedness is assessed in wave I as was done with the parental relationship measurement of social support. I use the school connectedness scale developed by Resnick and colleagues (1997) and McNeely and Falci (2004). In addition, several of the Add Health questions pertaining to social belonging at school were created by Bollen and Hoyle (1990). The school connectedness scale includes items taken from five questions. Respondents were asked how much they agree with the following statements: “You feel close to people at school,” “You feel like you are part of your school,” “You are happy to be at your school,” “You feel that teachers treat students fairly,” and “You feel safe in your school.” Potential responses were presented in the form of a Likert scale with a range from “strongly agree” to “strongly disagree.” These items were reverse coded so that 1=strongly disagree and 5=strongly agree so that higher values indicate higher levels of school connectedness. The alpha reliability for this scale is .79. Using the same data and similar measures, McNeely and Falci (2004) found that increased levels of social support in the form of school connectedness was a protective factor against engaging in health risk behaviors (including using alcohol) as adolescents.

Life transitions: Education, employment, marriage/cohabitation, and parenthood

Previous research has shown that life transitions are an important element to consider when studying alcohol use and crime/delinquency (Carlson 2013; Devers 2011; Duncan, Wilkerson & England 2006; Laub, Sampson & Sweeten 2008; Leonard & Rothbard 1999). Life transitions that occur in young adulthood are hypothesized to have an association with alcohol use patterns. Life transitions that occur in young adulthood which are considered in this dissertation include: education, parenthood, marriage and
cohabitation, employment. Each measurement of a life transition that typically occurs during young adulthood is detailed below. Moreover, these life transitions are gendered (work (Szinovacz & Harpster 1993; Thompson & Walker 1989), marriage (Katsurada & Sugihara 2002; Thompson & Walker 1989), and parenthood (Sanchez & Thompson 1997; Thompson & Walker 1989). Of particular importance is the gendered features of education, work, marriage, and parenthood. For example, the gendered nature of who tends to be the stay at home parent; who tends to work outside the home; and the gendered nature of marriage (“husband” “wife”; and “fatherhood,” and “motherhood”) (Carlson 2013).

**Education/Current student.** Education or current student status is intended to measure if respondents are attending school (middle/high school) or college at the time of data collection and is measured at each wave. At waves I and II when respondents were most likely in middle or high school, they were asked, “Are you presently in school?” At waves III and IV respondents were asked if they were currently attending a college, university, or vocational/technical school where they were taking courses for academic credit. Those who answered yes to this question were included as a current student. Being a current student, especially being a college student, is hypothesized to play a role in alcohol use trajectories in the transition from adolescence into young adulthood. Being a college student and being exposed to the college environment is associated with a greater risk of heavy alcohol use (Gfroerer et al. 1997; Muthen & Muthen 2000; Schulenberg & Maggs 2002; SAMHSA 2012; SAMHSA 2013; White, Labouvie & Papadaratsakis 2005; White et al. 2006). Heavy alcohol use is associated with lower levels of educational attainment, although this relationship has not shown to be causal (Chatterji 2006).
However, alcohol use is related to detrimental effects on education. For example, Wechsler and colleagues (1994) found that heavy episodic drinking was strongly related to getting behind in school work and missing class which both are risk factors for school failure and dropping out.

*Parenthood.* Parenthood is measured at each wave of data collection. Parenthood is measured using an indirect method: respondents were not asked directly if they were parents or if they had children. In order to assess if respondents were parents I gleaned this information from the “household roster” where participants are asked about who lives in their household and the nature of their relationship with each household member. To measure parenthood, I deduce that “living with a son or daughter” is indicative of parental status. A son or daughter may be biological, adoptive, step, or foster child. For this dissertation, I will code this variable dichotomously: (1) yes or (0) no for parenthood for each wave of data collection. This measure is not an ideal measure of having born or adopted children because respondents may have had children that did not live with them at the time the survey was conducted. Thus, I rely on a proxy measure for parenthood. It is important to note, however, that living with a child may be a better measure of parenthood given the increased responsibilities associated with sharing a household with a child. Previous research indicates that parenthood is an important variable in studying crime, especially exploring parenthood when the parent and child that live together in the same household (Ganem & Agnew 2007; Graham & Bowling 1995).

*Marriage/Cohabitation.* Marriage/cohabitation is measured at each wave of data collection. Similar to parenthood, marriage/cohabitation was measured in an indirect manner—marital status was not asked directly. In order to assess if respondents are
married or cohabitating, I assembled information from the “household roster” where participants are asked about who lives in their household and the nature of their relationship with each household member. To assess if a respondent is married or living with a spouse, or cohabitating with a romantic partner, I was able to identify the nature of the relationship husband, partner (boyfriend), wife, and partner (girlfriend) from the household roster. I code this variable dichotomously: (1) yes or (0) no marriage/cohabitation at each wave of data collection. This measure is not a fully accurate measurement of marriage or sharing a home with a partner because respondents may be in marriages or relationships where they do not live with their romantic partner. However, as was the case with parenthood, “living together with a partner” may be a better measure of a significant life transition (physically living with a spouse or significant other). Previous research indicates that marriage and living with a significant other has a strong effect on involvement in health risk behaviors and involvement in crime in particular (Craig & Foster 2013; Duncan, Wilkerson & England 2006; Warr 1998). While marriage and cohabitation are not necessarily qualitatively the same, the idea is to examine how living with a partner may or may not impact activities such as engaging in heavy episodic drinking practices. Therefore, I examine marriage and cohabitation together rather than separating each type of relationship. Additionally, some of the household roster questions only detailed the member as “partner” rather than “spouse” which presents a problem when attempt to parse out those who are married and those who are cohabitating.

*Employment.* Employment is measured at each wave of data collection. Respondents were asked about their current paying job and responded to the question,
“How many hours do you usually work at this job?” Potential responses include whole hour measurements beginning at 10 hours to over 80 hours. Additionally, at waves 1 and 2, when respondents are most likely to be attending regular school, I include measures from “non-summer” employment which represents a greater proportion of the year, rather than only the summer months. Employment will be coded dichotomously with (1) representing full time employment at 35 hours or more and (0) representing non-full time employment or underemployment. This measure of employment is reflective of full time employment, but it may not be reflective of having meaningful employment (i.e., having a career). Previous research suggests that employment, similar to other life transitions, has a positive impact on peoples’ lives (Wright & Cullen 1998; Uggen 2008).

*Additional demographic and background variables*

This dissertation also includes several important demographic and background variables. These include sex, age, and race. Each of these variables is related to alcohol and crime/deviance, which was discussed in chapter 2.

*Sex.* First, sex (termed gender in the Add Health instrument) is dummy coded with female coded as 0 and male coded as 1. Biological sex is taken from wave IV, as recommended by the Add Health team because any mistakes in recoding biological sex are corrected in wave IV (Harris et al. 2009). Sex is also considered to be an important potential correlate and predictor of alcohol use trajectories which is discussed in the literature review. Previous research indicates that males engage in heavy episodic drinking more frequently than females and have greater incidences of alcohol-related problems (Huselid & Cooper 1992; SAMHSA 2012; White & Huselid 1997).
Race. Second, race/ethnicity includes five categories: White, Black/African American, American Indian/Native American, Asian/Pacific Islander, and other. Race/ethnicity will be coded as 0=non-white and 1=white. Race/ethnicity is taken from wave I because that is the most comprehensive measure of race in the Add Health dataset. White students tend to engage in heavy episodic drinking more than non-white students (Dawson 1998; Hope & Ham 2003) and for a variety of different reasons (Peralta 2005). Previous research indicates that whites with at least some postsecondary education were significantly more likely to engage in past-month heavy drinking compared to non-white students with some postsecondary education (Paschall & Flewelling 2002). Although it is important to examine race in a more comprehensive manner than coding race as white versus non-white, a detailed examination of race is beyond the scope of my dissertation.

Age. Age is utilized as the measure of time in the analyses and is measured at each wave of data collection. By using age as the measure of time, rather than wave of data collection, I am able to consider patterning of alcohol use trajectories. If I were to use each “wave” as the measurement of time, this would present a problem with the unequal spacing of waves of data collection and the varying age range of participants. For example, in wave IV there is a maximum and potential 8 year difference between participants. Thus it does not make sense methodological sense to conduct analysis by wave – by age is more appropriate.

Analytic Strategy

The Add Health data is a longitudinal study that follows a group of adolescents into young adulthood; therefore, to take advantage of this unique data set, I will estimate developmental trajectories of heavy episodic drinking and examine additional covariates.
of alcohol use (Jones, Nagin & Roeder 2001; Nagin & Tremblay 2001). Studying developmental trajectories using group-based trajectory modeling allows researchers to “chart out” distinctive trajectories of heavy episodic alcohol use and to better understand what factors are important to consider when study heavy alcohol use over time (Nagin 2005). Traditional approaches to studying longitudinal behavioral trajectories often relied on creating trajectory groups based on theory and assumptions regard alcohol use behaviors.

Nagin (2005) states: “Rather than assuming the existence of developmental trajectories of a specific form before statistical data analysis begins, the method provides the capacity for testing whether the hypothesized trajectories emerge from the data itself” (2005:2). In addition, group-based trajectory modeling allows for the identification of factors which may predict and/or alter behavior trajectories (Nagin 2005). The overall goal of utilizing group-based modeling or finite mixture modeling is to identify distinctive heavy episodic drinking trajectories and to better understand characteristics of individuals that “might account for qualitative differences across persons in their developmental course” (Nagin 2005:2).

The analysis is done in two major steps. I follow the progression of identification of distinctive trajectory groups and their covariates which include various predictors or risk factors (for similar analytical strategies, see Jones, Nagin, and Roder (2001), Nagin and Tremblay (2001), Nagin (2005), and Jones and Nagin (2007)). First, I identify distinctive groups of heavy episodic drinking trajectories. This will serve as my base model in each of my subsequent series of models. Second, I link group membership to covariates by extending my basic trajectory model to include covariates of heavy episodic
drinking that potentially have an association or relationship with trajectory group membership.

In addition to identifying distinctive heavy episodic drinking trajectory groups (step one), I employ three distinct series of models in order to address my research questions and hypotheses. First, I extend the basic model to include violence and non-violent delinquency/crime. Second, I add social support measures (parental and school) to the model. Last, I examine life course transitions/events by adding them to the model. In addition, in each of these series of models, I also include gender role orientation and background/demographic variables (sex and race).

In these series of models, potential risk and protective factors are those which occur at or before the first wave of data collection and are time-stable variables. These covariates include the social support measures (parental and school) and the background/demographic variables. Risk and protective factors are included to examine predictors of trajectory group membership (Nagin 2005; Nagin & Odgers 2010).

Also employed in these series of models are time varying covariates which include events that occur during the trajectory time period and include violence, non-violent delinquency/crime, and life course transitions/events. These time varying covariates are intended to analyze whether transitions and life course events alter the developmental trajectory. The estimates provide trajectory group specific information as to whether life course events and transitions alter the developmental course (Nagin 2005; Nagin & Odgers 2010).

To estimate group based trajectories, I employ Proc Traj using SAS statistical software and the additional Proc Traj software available for free download online at
This SAS procedure was developed by Jones, Nagin, and Roeder (2001) and is based on “semiparametric group-based modeling” strategies. Specifically, the group-based trajectory model is an application of “finite mixture modeling.” The structure of the likelihood function of the group-based trajectory model is flexible and is able to be used with longitudinal data that includes sociological, criminological, and psychological measures which tend to include scales and measures of count and binary data which are specified by the user (Jones, Nagin & Roeder 2001; Jones & Nagin 2007; Nagin 2005; Nagin & Odgers 2010). It is important to note that in the Proc Traj procedure and finite mixture modeling the focus is on group membership and identifying subgroups within the population; therefore, individual level information is not given because it is assumed that all grouped subjects follow the same trajectories (Arrandale et al. 2006). In addition, the groups estimated using this procedure are not “reified groups,” rather the identified groups are of estimations of patterns of change and not complete certainties (Arrandale et al. 2006:11). Therefore, caution should be used in making causal inferences.

Model parameters are estimated using maximum likelihood which allows for missing values (i.e., cases are not deleted because they have a missing data point) and can handle data that are missing at random (Arrandale et al. 2006; Jones, Nagin & Roeder 2001). It is important to mention that attrition and non-random missing data are concerns which must be dealt with differently—usually by not including the case in the analyses. I utilize multiple imputation for missing values in the Add Health data by employing Proc Mi and Proc Mianalyze in SAS which creates a new dataset with imputed values and a means to analyze the new imputed dataset(s). First, Proc mi creates a new dataset with
imputed values for missing data. Then, Proc Mianalyze is utilized in conjunction with Proc Traj which estimates heavy episodic drinking trajectories over time using the imputed datasets (Jones 2007). The original public use data includes 6,505 cases. Cases that were dropped include those which had missing survey weights (n=3,139) and missing dependent variable (heavy episodic drinking) data at all four waves (n=10). In addition, those who did not have data on sex category (n=15) were excluded from the analyses. The final analytical sample includes 3,341 cases.

I utilize the censored normal (Tobit) model because the alcohol use variable is a scale variable that tends to cluster around the “ends” of the spectrum rather than being normally dispersed (Nagin 2007). The censored normal model, which can be thought of as the linkage between age and heavy episodic drinking, is established using a latent variable denoted as $y_{it}^{\ast}$ which can be understood as measuring the potential for engaging in heavy episodic drinking (Jones & Nagin 2007:544). Below is the model I will use to estimate group-based heavy episodic drinking trajectories which allows estimation up to a third-order polynomial:

$$y_{it}^{\ast} = \beta_0 + \beta_1 Age_{it} + \beta_2 Age_{it}^2 + \beta_3 Age_{it}^3 + \epsilon_{it}$$

where the error term $\epsilon_{it}$ is assumed to be normally distributed with a mean of 0 and a constant standard deviation. The model’s coefficients determine the shape of the trajectory. The parameters, denoted by $\beta_i$, are trajectory group specific and its values can vary freely across the specified number of groups (Jones & Nagin 2007:544). This is the baseline model with no covariates. This model serves as the basis for estimating heavy episodic drinking trajectories over time.
To identify the optimal number of trajectory groups I will estimate twelve different models that include no covariates and I include terms for linear, quadratic, and cubic time (age) effects. The first model fits one group, the second fits two groups continuing until I reach eight groups¹² (Wang, Xie & Fisher 2012; Nagin 2005). I will select the most parsimonious model based on the BIC (Bayesian Information Criterion) which is calculated as (Nagin 2005:64):

\[
BIC = \log(L) - 0.5k \log(N)
\]

Where \( L \) is the value of the model’s maximized likelihood, \( N \) is the sample size and \( k \) is the number of parameters in the model. The number of parameters increases with adding groups and time effects. The BIC measures improvement in model fit that is gained by including more parameters (this is the first part of the BIC equation), but there is also a penalty for adding more parameters (this is the second part of the BIC equation) (Nagin 2005; Wang, Xie & Fisher 2012). According to Nagin (2005) and Wang, Xie, and Fisher (2012), the model that should be selected is the model with the largest BIC score (or the score closest to zero) with a minimum of 5% of the population in each trajectory group.

The second aspect of the analysis is to “link” characteristics of individuals to the probability of group membership (Nagin 2005:95). Nagin (2005) contends that the inclusion of potential correlates and predictors provides “an objective portrayal of the degree to which membership in a specific trajectory group can be predicted with high probability” (2005:95). There are two types of variables that are considered: “preexisting tendencies/vulnerabilities” or risk and protective factors (social support variables and

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¹² I planned to run trajectory models until I reached twelve groups; however, the models began having convergence problems - there were only 1% in many groups when I reached nine groups. Thus, I stopped at eight trajectory groups.
demographic variables) and events that occur during the trajectory period (crime/delinquency measures and life transitions/events)

Using insights from Sampson and Laub’s Life Course Theory of Crime and the life course perspective focused on the transition into young adulthood, covariates or events that occur during the trajectory period are hypothesized to have an association with alcohol use behaviors, specifically the models estimate the possible influence of covariates on the trajectory (i.e., having divergence from the trajectory they are already on). The estimates provide trajectory group specific information as to whether life course events and transitions alter the developmental course (Nagin 2005; Nagin & Odgers 2010). The basic model is extended by including covariates:

\[ y_{it}^j = \beta_0^j + \beta_1^j Age_{it} + \beta_2^j Age_{it}^2 + \beta_3^j Age_{it}^3 + \alpha_1^j z_{1t} + \alpha_2^j z_{2t} + \cdots + \alpha_L^j z_{Lt} + \epsilon_{it} \]

The coefficients estimated in this model are interpreted similar to regression coefficients and the estimates “measure the change in the response variable associated with changes in the explanatory variables” (Nagin 2005:123).

For the covariates which are risk or protective factors (measured at or before wave 1), the estimates for each trajectory group are interpreted as the effect of its associated variable on the probability of transition to that alcohol use trajectory relative to the low-alcohol use trajectory (i.e., trajectory group 1 is the reference group). These covariates include: social support (parental and school connectedness), gender role orientation, sex, and race. The estimates for the time-varying covariates or events that occur during the trajectory period are group specific and detail whether the event(s) alter the developmental course. The time-varying covariates include: violence, non-violent crime/delinquency and life transitions (education/current student, work,
marriage/cohabitation, and parenthood). A major strength of utilizing group-based trajectory modeling is that estimates of covariates are provided as “trajectory-group-specific” estimates which allows me to examine whether the covariate of interest varies across groups (Nagin 2005:131).

As stated previously, I employ three distinct series of models that address my overarching theoretically driven research questions and hypotheses that extend beyond identifying and describing heavy alcohol use trajectory group membership. First, I examine violence and non-violent delinquency/crime. Second, I explore social support (parental and school measures). Third, I examine life course transitions/events by adding them to the model. To assess gender role orientation and sex more fully and specifically to explore gender role orientation within sex category, I will run trajectory models for males and females separately in addition to a full sample analysis.

In summary, I will examine my hypotheses using the Add Health Data using developmental trajectories. First, I estimate developmental trajectories of heavy episodic drinking without substantive covariates in each of the models to identify distinctive trajectory groups. Next, I include each of the covariates into my model to assess their potential impact on heavy episodic drinking trajectories. More specifically, I extend the basic model to include the additional covariates in three distinct series of models. Last, I examine sex and gender role orientation more closely by running separate trajectory models for males and females. I follow the same procedures used with the full sample in the split sex sample. The results stemming from my analysis will be presented in chapter IV.
CHAPTER IV
RESULTS

This chapter describes and details the findings from data analyses that were conducted using each of the four waves of data from the Add Health project. In the first section, I report the descriptive statistics of the sample. Then, I describe the key variables of interest by sex. I use chi-square tests and t-tests to determine if there are statistically significant differences by sex for many of the study covariates.

In the second section of this chapter, results from the group-based trajectory models are detailed. I first identify the optimal number of heavy episodic drinking trajectory groups for the overall sample then I extend the basic models to include substantive covariates which allow me to link group membership to various covariates including: violence and non-violent crime/delinquency, social support measures, and life course transitions/events.

Then I run the group-based trajectory models using split sex samples. I first identify the optimal number of heavy episodic drinking trajectory groups for males and for females. Then I extend the basic models separately for males and females to include substantive covariates in three series of distinct models including: violence and non-violent crime/delinquency, social support measures, and life course transitions/events. This chapter concludes with the results being discussed in relation to the hypotheses laid out at the end of chapter II.
Descriptive Analyses: Full Sample

Table 2 shows the means/proportions\textsuperscript{13} and standard deviations for all variables utilized in the analyses (N=3,341). For the descriptive statistics, I utilize weighted and imputed data. I start by describing the demographic and background variables then I detail the substantive variables. It is important to note that I conduct my major analyses scaled by age, rather than by wave. I include descriptive statistics by wave to give an overall picture of the data and the variables used in the analyses.

The sample is split nearly evenly by sex. Half are male (n=1,670) and half are female (n=1,671). Nearly three quarters (76\%) of the sample reported their self-identified race as “white” (note: I created a dummy variable of “non-white” which included Black/African American, American Indian/Native American, Asian/Pacific Islander, and other in order to create a reference group and to conduct comparative analysis between majority and minority group- status\textsuperscript{14}). The mean age at wave 1 is 15.52; 15.90 at wave 2; 21.36 at wave 3; and 28.52 at wave 4. The mean age of alcohol use onset is 16.29 years old. This finding is on par with recent statistics: The 2011 National Survey on Drug Use and Health (NSDUH) found that the mean age of alcohol use onset was 16.8 years old, and in 1995 when the first wave of data was collected the mean age of alcohol use onset was slightly lower at 15.9 years old according to the 1995 National Household Survey on Drug Abuse (the precursor to the NSDUH) (SAMHSA 1995; SAMHSA 2012).

\textsuperscript{13} Variables which are dichotomous are proportions rather than means.
\textsuperscript{14} Race/ethnicity is an important variable to consider beyond a dichotomous white versus non-white variable especially in terms of criminogenic or alcohol use behaviors. However, because race is not the focus of this dissertation, I only examine the white versus non-white aspect of race/ethnicity.
In regard to the major covariates, both violence and non-violent crime/delinquency are measured at each of the four waves of data collection. Violence is an index variable that ranges from 0-5. At wave 1 the mean of violence was .51; .43 at wave 2; .23 at wave 3; and .13 at wave 4. Non-violent crime/delinquency is also an index variable measured at each of the four waves and ranges from 0-4. The mean at wave 1 is .37; .32 at wave 2; .23 at wave 3; and .12 at wave 4.

Gender role orientation is measured at wave 3 using the short form Bem Sex Role Inventory (BSRI-short form) (Bem 1974; Bem 1979; Bem 1981). The short form BSRI ranges from -10 to 10, with lower scores indicating a more “feminine” gender role orientation, high scores indicating a more “masculine” gender role orientation, and scores close to zero indicating a more androgynous or “neutral” gender role orientation. The mean for the Bem score is -.79. I also calculated the mean for the feminine items ($\bar{x} = 5.7$) and the masculine items ($\bar{x} = 4.9$) (These scores range from 0-7). This indicates that both masculine traits and feminine traits are rated similarly.

The covariates taken from Sampson & Laub’s Life Course Theory of Crime are social support in adolescence and life transitions into young adulthood. Social support is measured as parent and school connectedness and each are measured at wave 1. The mean for parent connectedness is 4.46 and school connectedness is 3.73 (each of these variables has a range of 1-5).

The four life transitions/events analyzed in this dissertation are education/current student, employment, marriage/cohabitation, and parenthood and are measured at each wave of data collection. For education, at wave 1 98%, at wave 2 94%, at wave 3 39%, and at wave 4 16% were current students. For full-time employment (35+ hours/week),
5% at wave 1, 7% at wave 2, 70% at wave 3, and 79% at wave 4 reported being employed at 35 or more hours a week. At wave 1 1%, at wave 2 2%, at wave 3 34%, 66% report being married or cohabitating with a partner. Lastly, for parenthood, 1% of the sample reported being a parent (and living with their child) at wave 1, 2% at wave 2, 25% at wave 3, and 49% at wave 4 were parents and living with their child(ren).

Table 2: Descriptive Statistics for All Analysis Variables (N=3341)

<table>
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<th></th>
<th>Wave 1</th>
<th>Wave 2</th>
<th>Wave 3</th>
<th>Wave 4</th>
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<td>.76(.47)</td>
<td>.76(.47)</td>
<td>.76(.47)</td>
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<td></td>
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<td>15.90(1.62)</td>
<td>21.36(1.81)</td>
<td>28.52(1.77)</td>
<td>12-34</td>
<td></td>
</tr>
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<td>16.29(2.67)</td>
<td>16.29(2.67)</td>
<td>16.29(2.67)</td>
<td>5-33</td>
<td></td>
</tr>
<tr>
<td><strong>Major Covariates</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interpersonal violence</td>
<td>.51(.85)</td>
<td>.43(.83)</td>
<td>.24(.54)</td>
<td>.13(.44)</td>
<td>0-5</td>
<td>.74</td>
</tr>
<tr>
<td>Non-violent crime/del.</td>
<td>.37(.76)</td>
<td>.32(.73)</td>
<td>.23(.57)</td>
<td>.12(.41)</td>
<td>0-4</td>
<td>.75</td>
</tr>
<tr>
<td>Gender Identity (Bem Score)</td>
<td>-.79(.99)</td>
<td>-.79(.99)</td>
<td>-.79(.99)</td>
<td>-.79(.99)</td>
<td>-10-10</td>
<td>.91</td>
</tr>
<tr>
<td>Masculine items</td>
<td>4.9(95)</td>
<td>4.9(95)</td>
<td>4.9(95)</td>
<td>4.9(95)</td>
<td>0-7</td>
<td>.82</td>
</tr>
<tr>
<td>Feminine items</td>
<td>5.7(1.02)</td>
<td>5.7(1.02)</td>
<td>5.7(1.02)</td>
<td>5.7(1.02)</td>
<td>0-7</td>
<td>.92</td>
</tr>
<tr>
<td><strong>Social Support</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent connectedness</td>
<td>4.46(.57)</td>
<td>4.46(.57)</td>
<td>4.46(.57)</td>
<td>4.46(.57)</td>
<td>1-5</td>
<td>.75</td>
</tr>
<tr>
<td>School connectedness</td>
<td>3.73(.75)</td>
<td>3.73(.75)</td>
<td>3.73(.75)</td>
<td>3.73(.75)</td>
<td>1-5</td>
<td>.79</td>
</tr>
<tr>
<td><strong>Transitions/Life Events</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education/Current student</td>
<td>.98(14)</td>
<td>.94(.24)</td>
<td>.39(.48)</td>
<td>.16(.37)</td>
<td>0-1</td>
<td></td>
</tr>
<tr>
<td>Employment</td>
<td>.05(.21)</td>
<td>.07(.25)</td>
<td>.70(.46)</td>
<td>.79(.41)</td>
<td>0-1</td>
<td></td>
</tr>
<tr>
<td>Marriage/Cohabitation</td>
<td>.01(.12)</td>
<td>.02(.13)</td>
<td>.34(.47)</td>
<td>.66(.47)</td>
<td>0-1</td>
<td></td>
</tr>
<tr>
<td>Parenthood</td>
<td>.01(.11)</td>
<td>.02(.16)</td>
<td>.25(.43)</td>
<td>.49(.50)</td>
<td>0-1</td>
<td></td>
</tr>
<tr>
<td><strong>Alcohol Use: Trajectory Variable</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy Episodic Drinking</td>
<td>1.12(1.67)</td>
<td>1.23(1.72)</td>
<td>2.24(1.82)</td>
<td>2.18(1.78)</td>
<td>0-7</td>
<td></td>
</tr>
</tbody>
</table>

The major variable of interest is heavy episodic drinking (HED). It is measured at each of the four waves of the Add Health data. The variable ranges from 0-7 with 0 representing those who have never drank more than 2 or 3 drinks in their life and 7 representing those who consume at least 5 drinks every day or almost every day over the
past year. At wave 1 the mean for HED is 1.12; 1.23 at wave 2; 2.24 at wave 3; and 2.18 at wave 4.

In Table 3, the distribution of heavy episodic drinking is displayed for each of the waves of data collection. The distribution is also displayed graphically in Figure 1. At waves 1 and 2 when respondents are most likely to be in middle or high school, the majority (52.01% and 52.12% respectively) of respondents have not drank more than 2 or 3 drinks in their lifetime. At waves 3 and 4 when respondents are out of high school and beginning to enter young adulthood, only 22.87% and 19.69% respectively, reported only drinking 2 or 3 drinks in their lifetime. As the respondents age, their heavy episodic drinking behaviors tend to increase. Additionally, the vast majority do not engage in extremely high levels of heavy episodic drinking such as drinking 5 or more drinks every day for the past year.

**Table 3: Distribution of Heavy Episodic Drinking**

<table>
<thead>
<tr>
<th>HED Wave 1</th>
<th>0=52.01%</th>
<th>1=21.79%</th>
<th>2=9.25%</th>
<th>3=6.22%</th>
<th>4=4.59%</th>
<th>5=3.43%</th>
<th>6=1.66%</th>
<th>7=1.05%</th>
</tr>
</thead>
<tbody>
<tr>
<td>HED Wave 2</td>
<td>0=52.12%</td>
<td>1=17.23%</td>
<td>2=10.37%</td>
<td>3=7.30%</td>
<td>4=5.52%</td>
<td>5=4.45%</td>
<td>6=2.13%</td>
<td>7=0.89%</td>
</tr>
<tr>
<td>HED Wave 3</td>
<td>0=22.87%</td>
<td>1=20.27%</td>
<td>2=17.36%</td>
<td>3=11.84%</td>
<td>4=10.95%</td>
<td>5=11.82%</td>
<td>6=3.82%</td>
<td>7=1.07%</td>
</tr>
<tr>
<td>HED Wave 4</td>
<td>0=19.69%</td>
<td>1=24.62%</td>
<td>2=18.87%</td>
<td>3=11.92%</td>
<td>4=10.83%</td>
<td>5=9.47%</td>
<td>6=3.30%</td>
<td>7=1.29%</td>
</tr>
</tbody>
</table>
Table 4 displays the means separately for male and female for selected analysis variables. In addition to the means, chi-square and t-test (for gender role orientation/Bem score) results are presented. The means for the main variable of interest, heavy episodic drinking, indicate that males and females have different reported levels of heavy drinking in each wave of data collection. Males consistently report higher levels in comparison to females. For males the mean for HED was 1.26, 1.36, 2.71, and 2.55 for each of the waves respectively. For females the mean for HED was .37, .30, .10, and .06 for each of the waves respectively. The chi-square tests indicate that males and females were significantly different in terms of heavy episodic drinking at each wave of data collection ($\chi^2=71.27 ; 52.34 ; 314.13 ;$ and $224.75$ for each wave respectively).

The time-varying criminological covariates (violence and non-violent crime/delinquency) also indicate that males and females engage in different levels of crime and delinquency across time. For violence, the mean for males is .65 at wave 1, .56
at wave 2, .38 at wave 3, and .20 at wave 4. For females, the means are .37 at wave 1, .30 at wave 2, .10 at wave 3, and .06 at wave 4. The chi-square tests indicate that males and females significantly differ in violence at each wave of data collection ($\chi^2=153.62; 123.08; 289.56; \text{ and } 111.01$ for each wave respectively). For non-violent crime and delinquency, males and females also report different levels of non-violence criminal engagement. For males the means are .47, .39, .33, and .17 for each wave respectively. For females the means are .26, .24, .13, and .06 for each wave respectively. The chi-square tests also indicate that there are significant differences between males and females in terms of non-violent crime/delinquency at each wave ($\chi^2=100.37; 56.64; 127.70; \text{ and } 98.78$ for each wave respectively).

For the gender role orientation measure (Bem score), men and women are also different. As noted above, higher scores indicate a more masculine gender role orientation, lower scores indicate a more feminine gender role orientation, and scores near zero indicate a more “neutral” gender role orientation. For men, the mean Bem score is -.43 and for women the mean Bem score is -1.1. The t-test indicates that there are significant differences between men and women for their Bem score or gender role orientation ($t=122.82$) with men having a higher or more masculine mean Bem Score than females.

The means for the social support variables (parental and school connectedness) are also included on Table 3. For parental connectedness, men had a mean of 4.38 and females had a mean of 4.52. The chi-square test indicates that there is a significant difference between males and females ($\chi^2=57.87$). For school connectedness, males
reported a mean of 3.69 and females reported a mean of 3.76. This is one of the only variable in which males and females did not have a significant difference.

The life transition (education, employment, marriage/cohabitation, and parenthood) variables also show the continued differences between males and females. For employment, 4%, 8%, 75%, and 85% of males were employed at full-time (35 hours and above) for each of the waves of data collection. For females, 3%, 6%, 60%, and 75% were employed full-time at each wave of data collection. At each wave, the difference is statistically different ($\chi^2 = 9.13, 8.44, 74.03, 76.99$ respectively).

For marriage/cohabitation, there is also a significant difference across time. For males, 1%, 1%, 26%, and 64% were married/cohabitating across the waves of data collection. For females, 1%, 2%, 38%, and 69% reported being married or cohabitating with a partner. These differences are statistically different for each wave of data collection ($\chi^2 = 12.12, 12.30, 28.43, 6.72$ respectively).

In terms of parenthood, males and females also differ significantly. For males, 0%, 0%, 11%, and 37% were parents and lived with their children. For females, 2%, 4%, 33%, and 61% of females were parents and lived with their children. The chi-square tests showed that this difference is significant across time ($\chi^2 = 31.56, 63.84, 195.73, 221.67$ respectively).

For the education variable (being a current student or being currently enrolled in school), males and females are both similar and different. For waves 1 and 2, there are no statistically significant differences between males and females and being currently enrolled in school ($\chi^2 = 1.13$ and $1.68$). This is expected, given that the Add Health data are drawn from a school-based sample. During these waves of data collection, the vast
The majority of respondents were enrolled in school (males=98% and 93%; females=98% and 94%). For waves 3 and 4, there were significant differences ($\chi^2=27.98$ and 24.04). For males, 36% and 14% reported being a current student. For females, 43% and 18% were current students. Each of the above findings indicates that further analyses of alcohol use, sex, gender role orientation, crime/delinquency, and life course transitions across time are warranted, especially examining males and females separately.

Table 4: Descriptives of Selected Variables at Each Wave by Sex

<table>
<thead>
<tr>
<th>Variable</th>
<th>Wave 1</th>
<th>Wave 2</th>
<th>Wave 3</th>
<th>Wave 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Females</td>
<td>Males</td>
<td>Females</td>
<td>Males</td>
</tr>
<tr>
<td>Heavy Episodic Drinking</td>
<td>0.97</td>
<td>1.26***</td>
<td>1.11</td>
<td>1.36***</td>
</tr>
<tr>
<td>Interpersonal Violence</td>
<td>0.37</td>
<td>0.65***</td>
<td>0.3</td>
<td>0.56***</td>
</tr>
<tr>
<td>Non-violent Crim/Del.</td>
<td>0.26</td>
<td>0.47***</td>
<td>0.24</td>
<td>0.39***</td>
</tr>
<tr>
<td>Bem Score</td>
<td>-1.1</td>
<td>-0.43***</td>
<td>-1.1</td>
<td>-0.43***</td>
</tr>
<tr>
<td>Parental connectedness</td>
<td>4.38</td>
<td>4.52***</td>
<td>3.69</td>
<td>3.76</td>
</tr>
<tr>
<td>School connectedness</td>
<td>.98</td>
<td>.98</td>
<td>.94</td>
<td>.93</td>
</tr>
<tr>
<td>Education/Current student</td>
<td>.03</td>
<td>.04***</td>
<td>.06</td>
<td>.08***</td>
</tr>
<tr>
<td>Employment</td>
<td>.01</td>
<td>.01***</td>
<td>.02</td>
<td>.01***</td>
</tr>
<tr>
<td>Marriage/Cohabitation</td>
<td>.02</td>
<td>.00***</td>
<td>.04</td>
<td>.00***</td>
</tr>
</tbody>
</table>

Only means presented for ease of presentation

*Indicates a significant difference between males and females (Chi-square results/T-test for Bem Score): *p<.05, **p<.01, ***p<.001

Alcohol Use Group-Based Trajectory Models: Full Sample

The first stage of my analysis is to identify alcohol use trajectory groups. As discussed in Chapter 3, I will determine the optimal number of groups by examining the BIC value. I examined the BIC value by running models with 1-8 groups. Below are the BIC values which I compared to identify the ideal number of trajectory groups (see Table 5 below). The BIC value steadily becomes larger (approaches zero) as the number of groups is increased until I reach four groups. Highlighted in bold on the table, the BIC...
value is -20,741.32. After four groups, the BIC value then decreases indicating that four groups is the ideal number of trajectory groups for the full sample.

<table>
<thead>
<tr>
<th>No. of Groups</th>
<th>BIC (N=3,341)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-21840.37</td>
</tr>
<tr>
<td>2</td>
<td>-20988.26</td>
</tr>
<tr>
<td>3</td>
<td>-20884.04</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td><strong>-20741.32</strong></td>
</tr>
<tr>
<td>5</td>
<td>-20769.43</td>
</tr>
<tr>
<td>6</td>
<td>-20750.46</td>
</tr>
<tr>
<td>7</td>
<td>-20751.32</td>
</tr>
<tr>
<td>8</td>
<td>-20755.49</td>
</tr>
</tbody>
</table>

Table 5: BIC Values for Selection of Number of Trajectory Groups (Full Sample)

Figure 2 displays the heavy episodic drinking trajectories for the full sample. About 14% (14.3%) of the sample falls into group 1 which appears to have the lowest level of drinking across time that remains relatively steady with a slight increase during adolescence into young adulthood. I refer to this group as “infrequent heavy episodic drinkers.” Next, we see that almost 35% (34.9%) of the sample is in group 2. This group has a low level of heavy episodic drinking during adolescence, has a sharp increase during their early 20s, then the level of drinking remains steady during the transition from adolescence into young adulthood. I refer to this group as “increasing seldom heavy episodic drinkers.” Group 3 encompasses 27.8% of the sample. This group has a constant moderate level of heavy episodic drinking over time. I refer to this group as “seldom heavy episodic drinkers.” Finally, group 4 includes 23% of the sample. This group has an initial moderate level of drinking that sharply increases during their 20s then decreases very slightly during the transition into young adulthood. I refer to this group as

---

15 It is important to note that the “alcohol use” scale on the side of Figure 2 is scaled down (the HED drinking measurement is a 0-7 scale) and capped at 5 because nearly everyone did not engage at extremely high levels of heavy episodic drinking over time.
“increasing occasional heavy episodic drinkers.” Looking at each of the trajectories, it also seems that, in line with prior research, heavy episodic drinking peaks around age 21 and declines thereafter.

Figure 2: Alcohol Use Trajectories Basic Model (Full Sample)
The second step of the analyses is to add covariates and extend my basic model in order to link group membership to covariates. I do this by running three distinct series of models. The first series extends the basic model to include violence and non-violent crime/delinquency. The second series extends the models to include social support including parental and school connectedness. The final series of models includes life transitions/events including education, employment marriage/cohabitation, and parenthood.

In the first series, I examine the time-varying covariates of violence and non-violent crime/delinquency. Table 6 displays the results of the group-based trajectory models. Model 1 includes only the demographic and background variables. It is important to note that for the demographic/background variables (i.e., non-time-varying covariates), group 1 (infrequent heavy episodic drinkers) is the reference group for interpreting the estimates. Being male, being white, and having a higher BEM score or having a more masculine gender role orientation is associated with membership in a higher alcohol use trajectory group in comparison to being in the infrequent heavy episodic drinker group (group 1).

In models 2 and 3, I add violence and non-violent crime/delinquency separately. For each of the trajectory groups, both violence and non-violent crime/delinquency are positive and significant. This indicates that both violence and non-violent crime delinquency are associated with increases in alcohol use for each of the four trajectory groups. Lastly, in model 4, both violence and non-violent crime/delinquency are included together. The same pattern seen in the separate models is observed when both violence and non-violent crime/delinquency are added to the model together meaning that violence
and non-violent crime/delinquency are associated with increases in alcohol use for each of the trajectory groups across time and while taking the background and demographic variables into account.

Table 6: Trajectories of Alcohol Use Extension 1 (Violence & Delinquency)

<table>
<thead>
<tr>
<th>Group</th>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Intercept</td>
<td>-96.43***</td>
<td>-85.89***</td>
<td>-105.62***</td>
<td>32.48**</td>
</tr>
<tr>
<td></td>
<td>Violence</td>
<td>.58**</td>
<td>.72**</td>
<td>.86***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Delinquency</td>
<td>.72**</td>
<td>2.09***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Intercept</td>
<td>-87.46**</td>
<td>-48.04**</td>
<td>-29.65*</td>
<td>-38.7</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>.20+</td>
<td>.50*</td>
<td>.20+</td>
<td>.45*</td>
</tr>
<tr>
<td></td>
<td>Race</td>
<td>1.08***</td>
<td>1.18***</td>
<td>1.18***</td>
<td>1.01***</td>
</tr>
<tr>
<td></td>
<td>Bem Score</td>
<td>0.23*</td>
<td>0.21*</td>
<td>0.20*</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>Violence</td>
<td>.81***</td>
<td></td>
<td></td>
<td>.73***</td>
</tr>
<tr>
<td></td>
<td>Delinquency</td>
<td></td>
<td></td>
<td></td>
<td>.76***</td>
</tr>
<tr>
<td>3</td>
<td>Intercept</td>
<td>-12.33**</td>
<td>-20.13**</td>
<td>-24.77**</td>
<td>-22.04**</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>1.84***</td>
<td>1.47***</td>
<td>1.01**</td>
<td>1.14**</td>
</tr>
<tr>
<td></td>
<td>Race</td>
<td>1.82***</td>
<td>1.66***</td>
<td>1.66***</td>
<td>1.88***</td>
</tr>
<tr>
<td></td>
<td>Bem Score</td>
<td>.52***</td>
<td>.55**</td>
<td>.53**</td>
<td>.42**</td>
</tr>
<tr>
<td></td>
<td>Violence</td>
<td>.42*</td>
<td>.62*</td>
<td>.24+</td>
<td>.37*</td>
</tr>
<tr>
<td></td>
<td>Delinquency</td>
<td></td>
<td>.32+</td>
<td>.37*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>1.01**</td>
<td>1.64***</td>
<td>1.73***</td>
<td>1.78***</td>
</tr>
<tr>
<td></td>
<td>Race</td>
<td>1.33***</td>
<td>2.07***</td>
<td>2.02***</td>
<td>2.12***</td>
</tr>
<tr>
<td></td>
<td>Bem Score</td>
<td>.56***</td>
<td>.38**</td>
<td>.48**</td>
<td>.25*</td>
</tr>
<tr>
<td></td>
<td>Violence</td>
<td>.57***</td>
<td>.57***</td>
<td>.42**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Delinquency</td>
<td></td>
<td></td>
<td></td>
<td>.54***</td>
</tr>
</tbody>
</table>

BIC -1371.39 -1340.63 -1366.06 -1342.86

+p<.10, *p<.05, **p<.01, ***p<.001
Group 1=Infrequent heavy episodic drinkers
Group 2=Increasing seldom heavy episodic drinkers
Group 3=Seldom heavy episodic drinkers
Group 4=Increasing occasional heavy episodic drinkers

In the second series of models, I extend the basic model to include two predictors of trajectory group membership (parental and school social support) in addition to the time varying covariates of violence and non-violent crime/delinquency. Table 7 displays the results of the group based trajectory models. The first model includes only the demographic/background variables and is identical to the first model in the first series of
models. Males, whites, and those who adhere to a more masculine gender role orientation are more likely to be in a higher alcohol use trajectory group in comparison to being a part of group 1 (infrequent heavy episodic drinkers).

In model 2, I add the social support variables: parental and school connectedness. For parental connectedness, those who have higher levels of parental social support are less likely to belong to the higher trajectory group in comparison to group 1, although this is marginally significant for the group 2 versus group 1 comparison. For school connectedness, those who have higher levels of social support are less likely to belong to a higher alcohol use trajectory use group in comparison to being in group 1 (infrequent heavy episodic drinkers) with the exception of group 3 versus group 1 which is not significant.

In models 2 and 3, the time-varying covariates of violence and non-violent crime/delinquency are added to the model separately and in model 5, they are added together. For each of these models, violence and non-violent crime delinquency is positive and significant (with several of the estimates being marginally significant p<.10). This indicates that both time-varying measures of crime/delinquency are associated with an increase in alcohol use for each of the trajectory groups while taking social support measures into account.
The third and final series of models extends the basic model to include the time-varying covariates of life course transitions/events which include education, employment, marriage/cohabitation, and parenthood in addition to the time-varying measures of violence and non-violent crime/delinquency. Table 8 shows the results of the group based
trajectory models of this third series of models. Once more, the first model includes only the demographic/background variables and is identical to the first model in the first and second series of models. Males, whites, and those who adhere to a more masculine gender role orientation are more likely to be in a higher alcohol use trajectory group in comparison to group 1 (infrequent heavy episodic drinkers).

Model 2 includes the life course transitions/events. Education is only marginally significant for group 3 (seldom heavy episodic drinkers) indicating that being a student is associated with increases in alcohol use for this group. Having full-time employment is significant for group 1 and 2 meaning that full-time employment (35+ hours/week) is associated with an increase in alcohol use over time for the infrequent heavy episodic drinking group. Marriage/cohabitation is negative and significant for groups 2 (increasing seldom heavy episodic drinkers) and 4 (increasing occasional heavy episodic drinkers) indicating that being married or cohabitating is associated with decreases in alcohol use over time for these two groups. Parenthood is negative and significant for each of the groups (it is only marginally significant (p<.10) for group 2). This indicates that being a parent and living with that child is associated with decreases in heavy episodic drinking for each of the groups over time.

Models 3 and 4 include violence and non-violent crime/delinquency separately whereas model 5 includes these two measures of crime/delinquency together. The results of these three models are similar. Violence and delinquency remain positive and significant for each of the groups (group 3 violence is only significant at the p<.10 level) indicating that both violence and non-violent crime/delinquency are associated with increases in heavy episodic drinking behaviors for each of the groups while taking life
transitions/events into account. Employment is associated with increases in heavy episodic drinking behaviors for groups 1 and 2. Marriage/cohabitation and parenthood are each significantly associated with decreases in heavy episodic drinking for each of the heavy episodic drinking trajectory groups (group 1 marriage/cohabitation is significant at the p<.10 level). Lastly, education/current is significantly related to increases in drinking for group 3 (seldom heavy episodic drinkers).
<table>
<thead>
<tr>
<th>Group</th>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
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</tr>
</tbody>
</table>

BIC: -1371.39 -5344.14 -5180.02 -5294.2 -5150.44

*p<.10, **p<.05, ***p<.01, ****p<.001

Group 1=Infrequent heavy episodic drinkers
Group 2=Increasing seldom heavy episodic drinkers
Group 3=Seldom heavy episodic drinkers
Group 4=Increasing occasional heavy episodic drinkers
Alcohol Use Group-Based Trajectory Models: Males

In order to examine sex and gender role orientation within sex category more thoroughly, I conduct analyses using split sex samples. I first present the results of the male only sample then I detail the results of the female only sample. I begin by determining the ideal number of trajectory groups for males by examining BIC scores (Table 9) of models that include no substantive covariates. The three group model has the best model fit.

Table 9: BIC Values for Number of Male Trajectory Groups

<table>
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<th>No. of Groups</th>
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<td>5</td>
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<td>6</td>
<td>-9704.21</td>
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Figure 3 (below) shows the heavy episodic drinking trajectories for males. Group 1 encompasses 15.8% of the sample. Those in this group begin with very low levels of heavy episodic drinking then increase slightly over time. I refer to this group as “increasing infrequent heavy episodic drinkers.” Group 2 includes 38.8% of the male sample. This group has a sharp increase in heavy episodic drinking in the early 20s and then slightly decreases thereafter. I call this group “increasing seldom heavy episodic drinkers.” Group 3 (45.3% of the males) has a relatively moderate starting level of heavy episodic drinking that decreases slightly after age 21. I call this group “increasing occasional heavy episodic drinkers.”
Next, I begin to add covariates and extend the basic model using three distinct series of models. The first series extends the basic model to include violence and non-violent crime/delinquency. The second series extends the model to include social support including parental and school connectedness. The final series of models includes life transitions/events including education/current student, employment, marriage/cohabitation, and parenthood.

First, I include violence and non-violent crime/delinquency. Table 10 displays the results of the first extension of the basic male only group-based trajectory models. Model 1 includes only the demographic and background variables. As a reminder, for non-time varying variables (i.e., variables that occur at or before data collection), group 1 (increasing infrequent heavy episodic drinkers) is the reference group for interpreting the estimates. Being white (as opposed to non-white) and those who adhere to a more
masculine gender role orientation are associated with membership in a higher alcohol use trajectory group in comparison to being a part of the infrequent heavy episodic drinker group (group 1). It is important to note that the white/non-white comparison for group 1 versus group 3 is only marginally significant (p<.10).

In models 2 and 3, I add violence and non-violent crime/delinquency separately. As a reminder, for time-varying covariates, the estimates are trajectory group specific (i.e., there is no reference group). For each of the trajectory groups, both violence and non-violent crime/delinquency are positive and significant. This indicates that both violence and non-violent crime delinquency are associated with increased in alcohol use for each of the four trajectory groups for males. Model 4 includes violence and non-violent crime/delinquency in the model together. Both are positive and significant indicating that violence and non-violent crime/delinquency are associated with increases in alcohol use for each of the trajectory groups across time for males while taking the background and demographic covariates into consideration.
In the second series of male models, I extend the basic model to include social support (school and parental connectedness) in addition to the time-varying covariates of violence and non-violent crime/delinquency. Table 11 shows the results of the second extension of the male group-based trajectory models. The first model includes only the demographic/background variables and is identical to the first model in the first series of male only models. Being white (as opposed to non-white) and those who adhere to a more masculine gender role orientation are associated with membership in a higher alcohol use trajectory group in comparison to the infrequent heavy episodic drinker group.

In model 2, I add the social support measures: parental and school connectedness. Parental connectedness is not significantly related to an increased probability of belonging to a particular alcohol use trajectory group for males. For school social
support, those who have higher levels of school connectedness have a higher probability of belonging to a lower alcohol use trajectory group in comparison to a higher alcohol use trajectory group.

Next, I include the time-varying covariates (violence and delinquency). First they are added separately then they are added to the model together. For each of these models (models 3, 4, and 5), violence and non-violent crime delinquency are positive and significant. This indicates that for males both violence and delinquency are associated with an increase in heavy episodic drinking for each of the trajectory groups over time while taking school and parental social support in account. In this full model (model 5), parental and school connectedness are related to belonging in a lower alcohol use trajectory group, although this is significant at the p<.10 level for parental connectedness.
In the final male only series of models, I extend the basic model to include the time-varying covariates for life course transitions/events which include education/student status, employment, marriage/cohabitation, and parenthood in addition to the time-varying measures of violence and non-violent crime/delinquency. Table 12 shows the results of the group based trajectory models of this third extension of male only models. The first model is the basic model with demographic variables and is the same as the first two male only series of extension models.

Model 2 includes the life course transitions/events. Employment is associated with increases in heavy episodic drinking for groups 2 and 3. Marriage/cohabitation and parenthood are each associated with decreases in heavy episodic drinking for all of the

Table 11: Male Trajectories of Alcohol Use Extension 2 (Social Support)

<table>
<thead>
<tr>
<th>Group</th>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
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<td>-16.17*</td>
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<td>Delinquency</td>
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<td></td>
<td></td>
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<td>.44**</td>
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<tr>
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<td>.58**</td>
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<td>.44*</td>
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<td>-.11*</td>
<td>-.20*</td>
<td>-.48*</td>
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<tr>
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<td>-.39*</td>
<td>-.17+</td>
<td>-.15+</td>
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<td>.22*</td>
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<tr>
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<td>-36.85***</td>
<td>-32.84**</td>
<td>-11.24*</td>
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<td></td>
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<td>.38*</td>
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BIC  
-2596.01  
-1432.34  
-1396.86  
-1418.86  
-1388.93

*p<.10, **p<.05, ***p<.01, ****p<.001

Group 1=Increasing infrequent heavy episodic drinkers
Group 2=Increasing seldom heavy episodic drinkers
Group 3=Increasing occasional heavy episodic drinkers
heavy episodic drinking trajectory groups. Education/current student is not significant for any of the groups in model 2.

Models 3, 4, and 5 include violence and non-violent crime/delinquency along with the life course transitions/events. Violence and non-violent crime delinquency are positive and significant. This indicates that for males both violence and delinquency are associated with an increase in heavy episodic drinking behaviors for each of the trajectory groups over time. Education/current student is associated with decreases in drinking for groups 1 and 2, but is associated with increases in HED for group 3 (increasing occasional heavy episodic drinkers). Full time employment is associated with increased HED for each of the groups. Finally, marriage/cohabitation as well as parenthood are associated with decreases in heavy episodic drinking for each of the groups over time.
I now turn my attention to the female only series of models. I first determine the ideal number of trajectory groups for the female only sample. Table 13 shows the BIC values used to determine the optimal number of trajectory groups. As shown below, four is the ideal number of trajectory groups for the female only sample.

**Table 12: Female Trajectories of Alcohol Use**

<table>
<thead>
<tr>
<th>Group</th>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
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</tr>
<tr>
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<td>-5.49***</td>
<td>-3.44***</td>
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</tbody>
</table>

BIC

-2596.01 -2158.14 -2093.89 -2144.09 -2081.53

+p<.10, *p<.05, **p<.01, ***p<.001

Group 1=Increasing infrequent heavy episodic drinkers
Group 2=Increasing seldom heavy episodic drinkers
Group 3=Increasing occasional heavy episodic drinkers

**Alcohol Use Group-Based Trajectory Models: Females**

I now turn my attention to the female only series of models. I first determine the ideal number of trajectory groups for the female only sample. Table 13 shows the BIC values used to determine the optimal number of trajectory groups. As shown below, four is the ideal number of trajectory groups for the female only sample.
Table 13: BIC Values for Number of Female Trajectory Groups

<table>
<thead>
<tr>
<th>No. of Groups</th>
<th>BIC (N=1,671)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-11561.89</td>
</tr>
<tr>
<td>2</td>
<td>-11104.16</td>
</tr>
<tr>
<td>3</td>
<td>-1053.07</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td><strong>-1029.10</strong></td>
</tr>
<tr>
<td>5</td>
<td>-1089.23</td>
</tr>
<tr>
<td>6</td>
<td>-1111.04</td>
</tr>
</tbody>
</table>

Figure 4 shows the heavy episodic drinking trajectories for females. Group 1 includes 14.4% of the females. This group has a low level of heavy episodic drinking that increases slightly over time. I term this group “infrequent heavy episodic drinkers.”

Group 2 includes 21% of the females. This group has a moderate level of heavy episodic drinking initial and then decreases with the level remaining steady over time. I refer to this group as “decreasing seldom heavy episodic drinkers.” Group 3 (48.1% of the sample) has a relatively low initial level of HED which increases and remains steady over time. This group is called “increasing seldom heavy episodic drinkers.” Last, group 4 includes 16.5%. This group begins with a moderate level of heavy episodic drinking which increases in the respondents’ early 20s and then decreases very slightly over time. I refer to this group as “increasing occasional heavy episodic drinkers.”
Next, I include the substantive covariates into the female only models by employing three distinct series of models. First I examine the time-varying covariates of violence and non-violent crime/delinquency. Second, I add social support (parental and school connectedness). Last, I add the life course transitions/events time-varying covariates to the basic model.

First, I examine violence and non-violent crime/delinquency. Table 14 displays the results of the first extension of the basic female only group-based trajectory models. Model 1 includes only the demographic and background variables. Being white and having a higher Bem Score (i.e., having a more masculine gender role orientation) are each associated with membership in a higher heavy episodic drinking trajectory group in comparison to belonging to group 1 (infrequent heavy episodic drinker group). It is
important to note that race is only significant at the p<.10 level for the group 1 versus group 3 comparison.

In models 2, 3, and 4 violence and non-violent crime/delinquency are added to the basic model, first separately and then together. For each of the heavy episodic drinking trajectory groups, violence and delinquency are positive and significant. This signifies that both violence and non-violent crime delinquency are associated with increases in alcohol use for each of the four heavy episodic drinking trajectory groups for females over time.

Table 14: Female Trajectories of Alcohol Use Extension 1 (Violence & Delinquency)

<table>
<thead>
<tr>
<th>Group</th>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
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<td>-71.62**</td>
<td>-42.89***</td>
<td>-29.38**</td>
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<tr>
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<td>Violence</td>
<td>1.59**</td>
<td></td>
<td>1.09***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Delinquency</td>
<td></td>
<td>2.71***</td>
<td>2.37***</td>
<td></td>
</tr>
<tr>
<td>2</td>
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<td>-23.71**</td>
<td>-23.86***</td>
<td>-25.29***</td>
</tr>
<tr>
<td></td>
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<td>2.51***</td>
<td>2.38***</td>
<td>2.49***</td>
</tr>
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<td>.44**</td>
<td>.54**</td>
<td>.43**</td>
</tr>
<tr>
<td></td>
<td>Violence</td>
<td>.51**</td>
<td></td>
<td>.72**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Delinquency</td>
<td></td>
<td>1.01***</td>
<td>.98***</td>
<td></td>
</tr>
<tr>
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<td>Intercept</td>
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<td>-17.79**</td>
<td>-21.78***</td>
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<tr>
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<td>1.26***</td>
<td>1.09**</td>
<td>1.27***</td>
</tr>
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<td>.35*</td>
<td>.76**</td>
<td>.65**</td>
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<tr>
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<td>Violence</td>
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<td></td>
<td>.39**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Delinquency</td>
<td></td>
<td>1.00***</td>
<td>.72***</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Intercept</td>
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<td>-18.33**</td>
<td>-30.56***</td>
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<tr>
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<td>1.09***</td>
<td>1.73***</td>
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<tr>
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<td>.65**</td>
<td>.58**</td>
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<tr>
<td></td>
<td>Violence</td>
<td>1.59***</td>
<td></td>
<td>1.25**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Delinquency</td>
<td></td>
<td>1.89**</td>
<td>1.04*</td>
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<tr>
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<td>-3723.06</td>
<td>-3802.65</td>
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</tr>
</tbody>
</table>

+p<.10, *p<.05, **p<.01, ***p<.001
Group 1=Infrequent heavy episodic drinkers
Group 2=Decreasing seldom heavy episodic drinkers
Group 3=Increasing seldom heavy episodic drinkers
Group 4=Increasing occasional heavy episodic drinkers
In the second series of female only models, I extend the basic model to include two predictors of trajectory group membership: parental and school connectedness in addition to the crime and delinquency time-varying variables. Table 15 displays the results of this series of female only models. The first model includes the demographic and background variables only and is identical to the first model in the first series of models. Being white and having a higher Bem Score (i.e., having a more masculine gender role orientation) are each associated with membership in a higher heavy episodic drinking trajectory group in comparison to belonging to group 1 (infrequent heavy episodic drinker group).

I add the two social support variables in model 2. Parental connectedness is associated with a higher probability of belonging to group 1 (infrequent heavy episodic drinkers) rather than group 4 (increasing occasional heavy episodic drinkers). School connectedness is associated with a higher probability of belonging to group 1 (infrequent heavy episodic drinkers) in comparison to each of the groups.

In models 3, 4, and 5 violence and non-violent crime/delinquency are added to the basic model. For each of these models, violence and non-violent crime/delinquency is positive and significant indicating that crime/delinquency are associated with an increase in alcohol use for each of the trajectory groups while taking social support measures into account. Additionally, each of the social support measures are significant and negative (with the exception of school connectedness for the group 2 versus group 1 comparison which is significant at the p<.10 level). This indicates that, for females, higher levels of school and parental social support are associated with membership in a lower alcohol use trajectory group rather than a higher alcohol use trajectory group.
The third series of female only models extends the basic model to include the
time-varying life course transitions/events along with the violence and non-violent
crime/delinquency variables. Table 16 displays the results of this final female only series
of group-based trajectory models. Again, model 1 includes only the demographic and
background variables. Being white and having a higher Bem Score (i.e., having a more
masculine gender role orientation) are each associated with membership in a higher

<table>
<thead>
<tr>
<th>Group</th>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
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<td>-43.19**</td>
<td>-33.21**</td>
<td>-47.56***</td>
</tr>
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</tr>
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<td>-20.88*</td>
<td>-16.86**</td>
<td>-27.81**</td>
<td>-18.4**</td>
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<td>1.28**</td>
<td>.98*</td>
<td>1.47**</td>
</tr>
<tr>
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<td>.54**</td>
<td>.61**</td>
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</tr>
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<td>Delinquency</td>
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</tr>
<tr>
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<td>1.29**</td>
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</tr>
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<td>-.55</td>
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<td>School Connectedness</td>
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<td>.36*</td>
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<td>.78+</td>
<td>2.91***</td>
<td>2.72***</td>
<td>2.14**</td>
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<td>.69**</td>
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<td>-.79*</td>
<td></td>
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<td></td>
<td>School Connectedness</td>
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<td>-.33*</td>
<td>-.99**</td>
<td>-1.16**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Violence</td>
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<td></td>
<td>.67**</td>
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</tr>
<tr>
<td></td>
<td>Delinquency</td>
<td></td>
<td></td>
<td></td>
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<td>6.71***</td>
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</tbody>
</table>

BIC: -3843.82, -2142.29, -2076.32, -2133.86, -2082.72

+p<.10, *p<.05, **p<.01, ***p<.001

Group 1=Infrequent heavy episodic drinkers
Group 2=Decreasing seldom heavy episodic drinkers
Group 3=Increasing seldom heavy episodic drinkers
Group 4=Increasing occasional heavy episodic drinkers
heavy episodic drinking trajectory group in comparison to belonging to group 1 (infrequent heavy episodic drinker group).

I include the life course transitions/events in model 2. Education is significant for group 2 (decreasing seldom heavy episodic drinkers) and approaching significance (p<.10) for group 3 (increasing seldom heavy episodic drinkers) and group 4 (increasing occasional heavy episodic drinkers) indicating that those who are students in these groups have increases in heavy episodic drinking behaviors over time. Full time employment is negative and significant for group 4 and marginally significant for group 3. This signifies that, for these groups, employment is associated with decreases in heavy episodic drinking behaviors. Both marriage/cohabitation and parenthood are significant and negative for each of these groups. This indicates that marriage/cohabitation and parenthood are associated with decreases in heavy episodic drinking for each of the groups over time.

Models 3, 4, and 5 include the life course transition/events in addition to violence and non-violent crime delinquency. The full model (model 5) includes all of the time-varying variables together. For each of the groups, crime and delinquency are positive and significant meaning that both violence and non-violent crime/delinquency are associated with increases in heavy episodic drinking behaviors for each of the groups while taking life transitions/events into account. Education is positive and significant for groups 2 and 3 and marginally significant for group 4 indicating that being a current student is associated with increases in HED for all the groups but group 1 (infrequent heavy episodic drinkers). Employment is positive and significant for groups 1 and 2 signifying employment is associated with increases in drinking behaviors for these
groups. Employment is negative and significant for groups 3 and 4 indicative that employment is associated with increases in HED for these groups. Marriage/Cohabitation is negative and significant for each of the groups as is the case with parenthood. This suggests that marriage/cohabitation and parenthood are each associated with decreases in heavy episodic drinking behaviors for each of the heavy episodic drinking trajectory groups over time.
Table 16: Female Trajectories of Alcohol Use Extension 3 (Life Transitions/Events)

<table>
<thead>
<tr>
<th>Group</th>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
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<td>-.5764**</td>
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</tr>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Delinquency</td>
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<td>1.23**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td>.32</td>
<td>.53</td>
<td>.21</td>
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</tr>
<tr>
<td></td>
<td>Employment</td>
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<td>.38</td>
<td>3.36***</td>
<td>.98*</td>
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<tr>
<td></td>
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<td>-.77*</td>
<td>-.87*</td>
<td>-.91*</td>
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<tr>
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<td>-.3269***</td>
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<td>.98***</td>
<td>1.04**</td>
<td>1.37***</td>
</tr>
<tr>
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<td>Bem Score</td>
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<td>.36**</td>
<td>.64***</td>
<td>.39**</td>
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<td>Violence</td>
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<td>-.70**</td>
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</tr>
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<td>Marriage/Cohabitation</td>
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<td>-.63*</td>
<td>-.66*</td>
<td>-.77*</td>
<td></td>
</tr>
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<td>Parenthood</td>
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<td>-.65**</td>
<td>-.72***</td>
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<td></td>
</tr>
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<td>-.1056**</td>
<td>-.1007**</td>
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<td>1.88***</td>
<td>1.87***</td>
<td>1.77**</td>
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<tr>
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<td>Bem Score</td>
<td>.59**</td>
<td>.68**</td>
<td>.62**</td>
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<td>.66***</td>
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<td></td>
<td>.54**</td>
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</tbody>
</table>

BIC = -3843.82 - 3233.33 - 3141.05 - 3104.97 - 3098.7

*p<.10, *p<.05, **p<.01, ***p<.001

Group 1=Infrequent heavy episodic drinkers
Group 2=Decreasing seldom heavy episodic drinkers
Group 3=Increasing seldom heavy episodic drinkers
Group 4=Increasing occasional heavy episodic drinkers
Results in Relation to Hypotheses

A summary of the hypotheses and the findings are displayed in Table 17. The table displays each hypothesis and if there was support found the analyses conducted in this dissertation.

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1. Males will have a higher probability of being in a higher HED trajectory group in comparison to females</td>
<td>Supported</td>
</tr>
<tr>
<td>H2. Those with a more masculine gender role orientation will have a higher probability of being in a higher HED trajectory group</td>
<td>Supported</td>
</tr>
<tr>
<td>H2a. Gender role orientation will have an impact on trajectory group membership regardless of sex category</td>
<td>Supported</td>
</tr>
<tr>
<td>H3. Violence will be associated with higher levels of HED for each trajectory group</td>
<td>Supported</td>
</tr>
<tr>
<td>H4. Non-violent crime/delinquency will be associated with higher levels of HED for each trajectory group</td>
<td>Supported</td>
</tr>
<tr>
<td>H5. Those with higher levels of social support (parental and school connectedness) will have a higher probability of belonging to a lower HED trajectory group</td>
<td>Partially supported; Results not significant for each model</td>
</tr>
<tr>
<td>H6. Life transitions (education, employment, marriage/cohabitation, and parenthood) will be associated with lower levels of HED for each trajectory group</td>
<td>Partially supported &amp; Partially refuted; Marriage/cohabitation &amp; Parenthood: Supported; Education: Mixed findings; Employment: Mixed findings that indicate potential sex differences</td>
</tr>
</tbody>
</table>

The first hypothesis stated that sex will have an impact on trajectory group membership with males having a higher probability of being in higher heavy episodic drinking trajectory groups. This hypothesis is supported by the analyses. In the vast majority of the models, males had an increased probability of belonging to a higher heavy episodic drinking trajectory group in comparison to belonging to group 1 (infrequent heavy episodic drinkers).

The second hypothesis is that gender role orientation will have an impact on trajectory group membership. Specifically, those who have a more masculine gender role...
orientation (or higher Bem score) will have a higher probability of being in a higher heavy episodic drinking trajectory group in comparison to belonging to group 1 (infrequent heavy episodic drinkers). The full sample analyses support this hypothesis. All of the models suggest that those with a more masculine gender role orientation are more likely to belong to a higher heavy episodic drinking trajectory group in comparison to the infrequent heavy episodic drinking group.

The second portion of hypothesis two (H2a) is that regardless of sex category, gender role orientation will have an impact on heavy episodic drinking trajectory group membership. All of the split-sex sample models indicate that those with a higher (or more masculine Bem Score) are more likely to belong to a higher alcohol use trajectory group in comparison to being a member of group 1 (increasing infrequent heavy episodic drinkers for males and infrequent heavy episodic drinkers for females). This suggests that regardless of sex category, gender role orientation plays an important role in engaging in heavy episodic drinking.

The third hypothesis states that involvement in violence will have an impact on heavy episodic drinking trajectories. Specifically, violence will be associated with higher levels of heavy episodic drinking for each alcohol use trajectory group over time. This hypothesis is supported by each of the models in both the full and split-sex samples. More precisely, violence is found to be positively and significantly related to increases in heavy episodic drinking for each of the trajectory groups over time. This suggests that violence has the potential to impact heavy episodic drinking trajectories throughout the transition from adolescence into young adulthood.
The fourth hypothesis is that non-violent crime and/or delinquency will have an impact on alcohol use trajectories. Specifically, non-violent crime/delinquency will be associated with higher levels of heavy episodic drinking for each alcohol use trajectory group over time. This hypothesis is also supported by each of the models in both the full and split-sex samples. Non-violent crime/delinquency is positively and significantly related to increases in heavy episodic drinking for each of the trajectory groups over time. Similar to violence, non-violent crime/delinquency has the potential to alter heavy episodic drinking trajectories.

The fifth hypothesis proposes that social support, parental and school connectedness in particular, in adolescence will have an impact on trajectory group membership. Those who have higher levels of social support will have a higher probability of belonging to lower heavy episodic drinking trajectory group. This hypothesis is partially supported by both the full and split-sex sample models. In the full sample, higher levels of parental and school connectedness are each protective factors against belonging to a higher heavy episodic drinking trajectory group but it is not significant for each group. I also confirm these findings with the split-sex models. This suggests that social support in the form of parental and school connectedness are important protective factors, but, perhaps, not for everyone.

The sixth and last hypothesis states that life transitions/events will have an impact on alcohol use trajectories. Specifically, life course transitions are hypothesized to be associated with reducing levels of heavy episodic drinking for each of the trajectory groups. This supposition is partially supported and partially refuted. In the full sample analyses, education is marginally significant for group 3 (seldom heavy episodic
drinkers) indicating that being a student is associated with increases in alcohol use for this group. Full-time employment (35+ hours/week), for the full sample, is related to increases in heavy episodic drinking for groups 1 and 2. For the full sample, both marriage/cohabitation and parenthood are each associated with decreases in heavy episodic drinking for all of the trajectory groups.

The split-sex sample models have somewhat different results. For males, education/current student is associated with decreases in drinking for groups 1 and 2, but is associated with increases in HED for group 3 (increasing occasional heavy episodic drinkers). For females, education is positive and significant for groups 2 and 3 and marginally significant for group 4 indicating that being a current student is associated with increases in HED for all the groups but group 1 (infrequent heavy episodic drinkers). Employment, for males, is associated with increased HED for each of the groups. For females, full time employment is negative and significant for group 4 and marginally significant for group 3. This signifies that, for these groups, employment is associated with decreases in heavy episodic drinking behaviors. For both the male and female only models, marriage/cohabitation and parenthood are both associated with decreases in heavy episodic drinking for all of the trajectory groups. The final chapter of this dissertation will discuss these results in greater depth and also put the results in the context of previous research and theory.
CHAPTER V
DISCUSSION AND CONCLUSION

The main objective of this dissertation was to examine heavy episodic drinking trajectories and to explore covariates of heavy episodic drinking trajectories during the transition from adolescence into young adulthood. In particular, I focus on crime/delinquency (violence and non-violent crime/delinquency), sex, gender role orientation, and important variables related to emerging adulthood as identified by Sampson & Laub’s Life Course Theory of Crime and the life course perspective including parental connectedness, school connectedness, education, employment, marriage/cohabitation, and parenthood. This dissertation fills several gaps in the literature and adds to our criminological, sociological, and alcohol use theoretical and empirical knowledge in several ways.

First, I expand and examine Sampson and Laub’s Life Course Theory of Crime by including sex and gender role orientation and examining several covariates important to the theory including social support and life transitions. Second, gender role orientation and sex are studied simultaneously—which in my extensive literature review I have not found a study which examines alcohol use trajectories and gender role orientation alongside sex category. Third, trajectories of heavy episodic drinking are examined in conjunction with important covariates that have yet to be adequately studied in this capacity. Fourth, our knowledge of alcohol use is furthered and, of particular interest,
heavy alcohol use trajectories are examined during the transition to young adulthood when both alcohol and crime/delinquency are typically at their highest point during the life course.

This chapter summarizes the major findings from the analyses and details and interprets the findings in relation to the overarching research questions presented at the conclusion of chapter I. Implications for theory, Sampson and Laub’s Life Course Theory of Crime and the life course perspective are then discussed. The limitations of the study, strengths of the study, directions for future research, and policy implications conclude this chapter and the dissertation.

Alcohol Use Trajectories

One of the purposes of this dissertation was to identify and examine trajectories of heavy episodic drinking in emerging adulthood. My first overarching research question (see conclusion, chapter I) was, “What are the trajectories of heavy episodic drinking during adolescence into young adulthood?” I identify four distinct trajectories of heavy episodic drinking. These include: infrequent heavy episodic drinkers (14.3% of the sample), increasing seldom heavy episodic drinkers (34.9% of the sample), seldom heavy episodic drinkers (27.8% of the sample), and increasing occasional heavy drinkers (23% of the sample).

Previous research has identified varying numbers of distinct alcohol use trajectory groups using different sample types and several statistical methodological approaches. Toumbourou and colleagues (2003) identify five categories (non-drinkers, infrequent drinkers, low weekly consumption, moderate weekly consumption, and high weekly consumption); Colder and colleagues (2002) identify five categories (occasional very
light drinkers, escalators, occasional heavy drinkers, rapid escalators, and heavy drinkers with declining frequency); and Casswell, Pledger, and Pratap (2002) identify three alcohol use trajectory categories (the authors did not name their groups). The majority of these studies utilize younger populations (i.e., middle school and high school samples), with the exception of Caswell, Pledger, and Pratap (2002) who examine the trajectories of 18-26 year olds in New Zealand. This dissertation expands our knowledge of alcohol use trajectories and more specifically, trajectories of heavy episodic drinking by concentrating on adolescents (the mean age at wave 1 was 15.52) as they move into young adulthood (the mean age at wave 4 was 28.52).

My findings indicate that there are a variety of heavy episodic drinking patterns present among adolescents as they transition into young adulthood. Moreover, only 14.3% of the sample is included in the “infrequent heavy drinker” group. This suggests that a majority (85.7%) of the sample engaged in more frequent heavy episodic drinking during emerging adulthood which may be problematic as risk for serious negative outcomes such as alcohol dependence and crime/delinquency stemming from sustained heavy episodic drinking increase with more frequent heavy episodic drinking (NIAAA 2012a; NIAAA 2012b). The finding that a majority of the sample engaged in somewhat frequent or occasional heavy episodic drinking suggests that drinking alcohol and participating in heavy episodic drinking is perhaps a normative behavior for those leaving adolescence and entering young adulthood.

Similar to previous research, I also find that alcohol use increases leading up to and peaking around age 21 during the transition to young adulthood (Casswell, Pledger & Pratap 2002; Maggs & Schulenberg 2004/2005; SAMHSA 2012). This is seen in each of
the four identified trajectory groups (See Figure 2). When looking at the shape of the trajectories, there is a similarity among each of the groups. My results indicate that heavy episodic drinking behaviors stabilize around age 21 which contradicts much research that shows that drinking behaviors steadily decrease after age 21 (Maggs & Schulenberg 2004/2005; SAMHSA 2012). This suggests that alcohol use patterns are established during the critical period of emerging adulthood. Trajectories seem to be in place and relatively stable once young adults reach approximately age 21 and do not change very much thereafter. This finding provides evidence for my assertion that studying the transition from adolescence into young adulthood is necessary in order to more fully understanding heavy episodic drinking patterns that seem to be laid into place during this transitional and important period of development.

Alcohol Use Trajectories: Sex & Gender Role Orientation

The second overarching research question was: “Do heavy episodic drinking trajectories vary by sex?” I address this question in two ways: by examining the impact of sex on trajectory group membership and by conducting split-sex sample analyses. I find that males (in the biological sense) have a higher probability of belonging to higher heavy episodic drinking trajectory groups compared to belonging to the infrequent HED group (group 1: infrequent heavy episodic drinkers). In addition, the descriptive analyses confirm that males and females have significantly different mean levels of heavy episodic drinking behavior across time, although Chi-square analyses cannot confirm “directional” differences between two group means.

My results are in accordance with previous research that suggests the sex gap in alcohol use has not disappeared despite changes in gender roles and gender role
expectations stemming from social shifts such as the women’s liberation movement (Christie-Mizell & Peralta 2009; Huselid & Cooper 1992; Mahalik et al. 2013; White & Huselid 1997). Rather, sex differences in alcohol use persist, especially for heavy episodic drinking behavior, among participants analyzed in this study. This dissertation provides more evidence that the sex gap in alcohol use has yet to disappear or to reach convergence as predicted by numerous scholars (Huselid & Cooper 1992; Wechsler & McFadden 1976; White & Huselid 1997).

When I examine the split-sex sample alcohol use trajectories, I find distinct trajectory groups for males and females. Specifically, I identify 3 heavy episodic drinking trajectory groups for males and 4 heavy episodic drinking trajectory groups for females. For males: group 1 (increasing infrequent heavy episodic drinkers) encompasses 15.8% of the sample which has a low initial level that increases slightly into adulthood; group 2 (increasing seldom heavy episodic drinkers) contains 38.8% of the sample which has a low initial level that sharply increases around age 21 to a moderate level of drinking that decreases slightly thereafter; and group 3 (increasing occasional heavy episodic drinkers) includes 45.3% of the sample and has a higher initial level that increases around age 21 that decreases slightly. For females: group 1 (infrequent heavy episodic drinkers) contains 14.4% of the sample which has a low initial level of drinking that increases slightly over time; group 2 (decreasing seldom heavy episodic drinkers) includes 21% of the sample which has a higher initial level that decreases and remains constant from around age 21; groups 3 (increasing seldom heavy episodic drinkers) (low initial level with 48.1%) and 4 (increasing occasional heavy episodic drinkers) (higher initial level with 16.5%) increase sharply around age 21 and remain stable into adulthood.
These findings suggest that males and females differ in terms of their heavy episodic drinking trajectories and their patterns of heavy alcohol use across time. One of the most mentioned factors that may contribute to this sex difference in alcohol use are biological factors. Specifically, researchers have suggested that women reach higher blood alcohol levels compared to men who drink the same amount of alcohol (Barnes, Farrell & Dintcheff 1997; Wechsler et al. 1995; Wilsnack et al. 2000). Feeling the effects of alcohol more quickly compared to men may explain why women tend to drink less (Wilsnack et al. 2000). However, there is limited evidence to support this explanation. I do find that men are more likely to belong to higher alcohol use trajectory groups in comparison to women in my full sample analyses, but I cannot assess blood alcohol levels. An explanation of sex differences in drinking that is potentially more empirically convincing are socio-cultural explanations, especially the structuring effects of socialization and gender role orientation (Huselid & Cooper 1992; White & Huselid 1997; Wilsnack et al. 2000; Wilsnack & Wilsnack 1987).

There are socio-cultural explanations for these sex differences in heavy alcohol use patterns. Alcohol drinking patterns may be related to gendered socialization of men and women (Barnes, Farrell & Dintcheff 1997; White & Huselid 1997; Wilsnack et al. 2000). Men are socialized to be masculine and engaging in heavy episodic drinking has been found to be a historical and contemporary expression of masculine behavior (Huselid & Cooper 2002; Wilsnack et al. 2000). Whereas women are socialized to be feminine and heavy alcohol use has not historically been associated with feminine attributes, thus women have often been discouraged from drinking and/or have perhaps concealed their drinking from others (Wilsnack et al. 2000).
However, because gender is a fluid social construct, women too can express masculinity and thus participate in heavy alcohol use for a variety of reasons and at varied social costs or rewards. For example, perhaps women choose to “drink like a man” in certain social situations such as when making an effort to be viewed favorably by peers or to be seen as “equals” to men or others in a social setting (Young et al. 2005). Young and colleagues (2005) argue that women who “drink like men” and engage in a highly masculine behavior such as heavy episodic drinking may do so for varying reasons such as enacting gender equality, being viewed in a favorable light, or as a means of emphasizing sexuality. My findings regarding sex and gender role orientation differences provide support for considering gender role orientation (i.e., masculinity and femininity) in conjunction with sex category in the study of alcohol use trajectories because it seems that gender role orientation is important predictor of heavy alcohol use patterns, regardless of biological sex category.

The differential patterns of alcohol use by males and females over time suggest that perhaps men are more constrained in their alcohol use behaviors and that masculinity, masculine gender role orientation in particular, potentially shapes their behavior. Specifically, the progression of heavy episodic drinking takes on similar shapes for each of the trajectory groups: Each group’s alcohol use increases until approximately age 21 and then stabilizes at those levels of continued heavy alcohol use into young adulthood. Women, on the other hand, have more variation in their alcohol use trajectories: Some groups’ alcohol use increase during the transition to adulthood while another groups’ alcohol use decreases during adolescence (Group 2: decreasing seldom heavy episodic drinkers). This suggests that women’s alcohol use behavior is more
diverse and perhaps suggests that women are not as constrained by a need to adhere to masculine gender roles which emphasize engaging in traditionally masculine behaviors such as heavy episodic drinking in comparison to men. Overall, my results suggest that sex differences are likely rooted in both gender role orientation and biological sex differences.

According to my analyses, gender role orientation (i.e., Bem score) impacts heavy episodic drinking trajectories regardless of sex category. Despite the limitations\textsuperscript{16} of using the Bem Sex Role Inventory as my measure of gender role orientation, I repeatedly find that those who report a more masculine gender role orientation have a higher probability of being in a higher alcohol use trajectory group meaning that gender role orientation is a risk factor for being a member of a higher alcohol use trajectory group. Gender role orientation is significant in each of the full sample models and the split sex sample models which is a powerful finding. This indicates that regardless of biological sex category, gender role orientation has a significant impact on alcohol use trajectory group membership. Specifically, both males and females who adhere to a more masculine gender role orientation are more likely to be a member of a higher heavy episodic drinking trajectory group in comparison to belonging to the lowest alcohol use trajectory group.

The results suggest that gender role orientation plays an important and critical role in shaping drinking practices during the transition from adolescence into young adulthood. Expressions of gender and of masculinity specifically, regardless of sex, appear to influence drinking behavior including how much alcohol is consumed and how

\textsuperscript{16} Limitations in this instance refers to the criticisms laid against the Bem Sex Role Inventory (see chapter III for a more detailed explanation).
often it is consumed which can have highly specific and gendered meanings (Carlsson 2013; Huselid & Cooper 1992; Wilsnack & Wilsnack 1978 & 1997; Young et al. 2005). For example, engaging in heavy episodic drinking is one way to potentially display equality or to make a favorable impression on others who are also participating in heavy episodic drinking behaviors (Moore et al. 2012; Young et al. 2005). This dissertation provides support for the congruence and deviance models discussed in chapter II in that those who adhere to traditional gender role orientations engage in the expected alcohol use behaviors. Specifically, those who are more masculine engage in higher levels of heavy episodic drinking and those who are more feminine engage in lower levels of heavy episodic drinking. This suggests that masculinity, regardless of sex, is significantly associated with engaging in heavy episodic drinking which is a traditionally masculine behavior.

Sex and gender role orientation are likely operating together and the results suggest that this process is interrelated. This is shown through my analyses which examine gender role orientation within sex category. Men and more masculine oriented individuals are most at risk for being in higher alcohol use trajectory groups. My results support previous findings such as the prominent study by Huselid and Cooper (1992) which argued that gender roles have an impact on alcohol use and the patterning of alcohol use across time.

*Covariates of Alcohol Use Trajectories*

My third overarching research question was: “What are the covariates of heavy episodic drinking?.” There are three components which I discuss below. These include crime/delinquency, social support, and life transitions. Each of these covariates of alcohol
use has an impact on trajectory group membership and/or alcohol use trajectories themselves.

**Crime/Delinquency**

I first address how violence and non-violent crime/delinquency impact heavy episodic drinking trajectories during the transition to adulthood. For each of the models (both the full sample and split-sex samples) violence and non-violent crime/delinquency are positive and significant indicating that higher levels of crime/delinquency are associated with higher levels of alcohol use for each trajectory group. Although a causal relationship cannot be inferred, this finding supports previous research which indicates that alcohol use and crime/delinquency are related (Barnwell, Borders & Earlywine 2006; Bonomo et al. 2001; Felson et al. 2008; Ford 2005; Parker & McCaffree 2013; Schulenberg et al. 1996; Wechsler et al. 1994).

This dissertation adds to our knowledge by demonstrating that heavy episodic drinking and crime/delinquency are related to one another across time, not only cross-sectionally, and especially during emerging adulthood when involvement in alcohol use and crime/delinquency tend to reach their peak. In terms of the theoretical paradigms discussed in the literature review (chapter II), my results provide the strongest evidence for sociological/criminological theories (reciprocal theory and spuriousness theory) because the covariates of violence and non-violent crime/delinquency alter and have an impact alcohol use trajectories. Although this study could not examine causality and the theoretical paradigms concerning causality, it does show that heavy episodic drinking and violence perpetration and non-violent crime/delinquency have an association with one another over time. Specifically, violence and non-violent crime/delinquency are each
associated with higher levels of heavy episodic drinking for each of the alcohol use trajectory groups.

_Social support_

Next, I evaluate social support (also referred to as adolescent social bonds within Sampson and Laub’s theory) which I identify as important to the transition from adolescence into young adulthood based on Sampson & Laub’s Life Course Theory of Crime and the life course perspective in general. The first domain of social support I considered was parental connectedness. Overall, I find that parental connectedness is a protective factor against being in a higher heavy episodic drinking trajectory group, although this finding is not significant for each group comparison. This finding is observed in both the full and split-sex samples indicating that for both males and females, parental social support is an important protective factor against engaging in heavy episodic drinking or belonging to a higher alcohol use trajectory group.

My finding is in line with previous research which finds that parental social support is a protective factor against engaging in negative behaviors such as alcohol use and crime (Akers and Sellers 2012; Barnes et al. 2006; Chapple, McQuillian & Berdahl 2005; Frech 2012; Kempf 1993; Larzelere & Patterson 1990). Perhaps I do not find full support for parental social support because my measure does not account for all facets or perhaps the most meaningful aspects of parental social support. Specifically, I measure parental connectedness which addresses closeness and perceived caring. Other measures of social support, such as parental presence or parental caring, may have produced different and more powerful results.
The second aspect of social support is school connectedness. I find that school connectedness is a protective factor against being a member of a higher heavy episodic drinking trajectory group, although this finding is not significant for each group comparison. This finding is observed in both the full and split-sex sample models indicating that for both males and females, school social support is an important protective factor against engaging in heavy episodic drinking.

Previous research indicates that school connectedness is a protective factor against engaging in alcohol use and crime/delinquency (McNeely, Nonnemaker & Blum 2002; McNeely & Falci 2004). My findings indicate that those who have a higher level of school connectedness have a higher probability of belonging to the lower alcohol use trajectory group (group 1: infrequent heavy episodic drinkers) suggesting that important aspects of social support and adolescent social bonds are put into place during adolescence and continue to have an impact on later behavior patterns including engaging in heavy episodic drinking. Similar to parental social support, I do not find full support for school connectedness as a protective factor. Perhaps school attachment or commitment to school may be a more powerful predictor of alcohol use trajectory group membership.

**Life transitions**

The last component of the third research question addresses life transitions. I identify these life events as important to the transition into young adulthood based upon Sampson & Laub’s Life Course Theory of Crime and the life course perspective. These transitions/life events include: Education/current student, full-time employment, marriage/cohabitation, and parenthood.
Education. I find conflicting results regarding education and its impact on heavy episodic drinking trajectories, especially with the split-sex models. For males, education/current student is associated with decreases in drinking for groups 1 and 2 (increasing infrequent heavy episodic drinkers and increasing seldom heavy episodic drinkers), but is associated with increases in HED for group 3 (increasing occasional heavy episodic drinkers). For females, education is positive and significant for groups 2 and 3 (decreasing seldom heavy episodic drinkers and increasing seldom heavy episodic drinkers) and marginally significant for group 4 (increasing occasional heavy episodic drinkers) indicating that being a current student is associated with increases in HED for all the groups but group 1 (infrequent heavy episodic drinkers).

One way to explain these conflicting findings regarding education could be to take into consideration other factors that may impact the educational experience. On one hand, being a college student and being exposed to the college environment is associated with a greater risk of heavy alcohol use (Gfroerer et al. 1997; Muthen & Muthen 2000; Schulenberg & Maggs 2002; SAMHSA 2012; SAMHSA 2013; White, Labouvie & Papadaratsakis 2005; White et al. 2006). On the other hand, being busy with college courses and having other life responsibilities such as having a full time job, children, or a partner at home may decrease involvement with heavy episodic drinking behaviors.

These students with other life responsibilities may be those who are also not immersed in the college context and environment which tend to be permissive of engaging in heavy episodic drinking. In addition, those who report being enrolled in an education program may not be taking traditional college courses. For example, those who are taking more career or vocational focused classes may not be exposed to the traditional
college environment that is most associated with engaging in heavy episodic drinking behaviors.

*Employment.* I also find mixed results with regard to the impact of full-time employment on drinking behaviors for males and females. Employment, for males, is associated with increased heavy episodic drinking for each of the groups. For females, full time employment is negative and significant for group 4 (increasing occasional heavy episodic drinkers) and marginally significant for group 3 (increasing seldom heavy episodic drinkers). This signifies that, for these female groups, employment is associated with decreases in heavy episodic drinking behaviors.

The opposing results also reflect the conflicting findings often found within the literature regarding the relationship between work and heavy alcohol use. For instance, Wright and Cullen (1998) argue that employment reduces engagement in crime and other deviant behavior when other coworkers reject engaging in crime and deviant behavior. Stated another way, employment only reduces crime and deviance when behaviors are restructured in a positive way that promotes engagement in a lifestyle focused on conventional behavior (McMorris & Uggen 2000; Sampson & Laub 1993; Tripodi, Kim & Bender 2010; Uggen 2000; Wright & Cullen 1998).

The finding regarding employment and heavy episodic drinking may be indicative of the gendered nature of institutions such as participating in the economy and the gendered expectations of having a job. For example, males may be conforming to expectations of drinking alcohol that are exhibited by others in their workplace environment (McMorris & Uggen 2000; Moore et al. 2012). For example, McMorris and Uggen (2000) found that working long hours, particularly in high school, is predictive of
engaging in drinking practices suggesting that employment and working with peers who drink increasing drinking practices. The descriptive analyses indicate that men tend to enter full-time jobs earlier than women, which provides some support for the study done by McMorris and Uggen (2000). Further, there are often expectations to “go out” after work with other employees (Moore et al. 2012). Perhaps one reason that males are able to engage in after work drinking is that they do not have as many responsibilities within the home (i.e., caring for children or the home).

Women, in contrast, may have stronger bonds to or have more responsibilities within the home environment which may act as a protective factor against engaging in crime and deviance because they do not enter full-time employment as early as men. Additionally, the gendered expectations of women and women participating in the workforce may prevent them from participating in deviant behaviors such as drinking heavily as often as their male counterparts when they have a full-time job.

Marriage/Cohabitation. Findings regarding the “effect” of marriage are supported by both the full and split-sex sample analyses. Nearly all of the models show that marriage/cohabitation significantly reduces heavy episodic drinking for each of trajectory groups over time. Each of these findings indicate that marriage/cohabitation is a factor against participating in and reducing heavy episodic drinking over time.

Previous research indicates that marriage/cohabitating has a positive impact (i.e., lessens drinking alcohol) on drinking behaviors in that it restructures behaviors for those who are in relationships (Miller-Tutzauer, Leonard & Windle 1991). For example, engaging in heavy alcohol use and/or crime/delinquency is not compatible for a relationship to be successful in the long term (Farrington & West 1995; Warr 1998).
Warr (1998) found that the transition into marriage has a major effect on restructuring routine activities, as is predicted by Sampson and Laub’s (1993) theory. Specifically, exposure to and time spent with delinquent or criminal peers is reduced when individuals enter into a serious relationship or marriage which leads offenders to alter their behaviors and involvement with delinquency or crime.

**Parenthood.** Similar to marriage/cohabitation, I find that the majority of my models show that parenthood reduces engaging in heavy episodic drinking for each of the trajectory groups. This trend is observed in the full sample models as well as the split-sex sample models indicating that parenthood is another factor which protects against involvement in deviant behaviors such as heavy drinking practices for both males and females who are parents and live with their children.

Becoming a parent and living with one’s child(ren) was predicted to reduce heavy episodic drinking. This was expected because having children in one’s home tends to restructure behaviors in a way that is not conducive with engaging in heavy episodic drinking and/or crime/delinquency (Sampson & Laub 1993). However, it would not have been unexpected to find that men’s drinking patterns did not change due to being a parent. For example, Sanchez and Thompson (1997) find that when men and women become parents, gendered household roles tend to become crystallized often resulting in the restructuring of women’s lives/routines, while men often retain freedom and flexibility in their lives/routines. My findings suggest that gendered household expectations regarding parenthood may be changing. Specifically, it appears that both men’s and women’s behaviors are modified when a child is living in the household indicating that raising children takes priority over engaging in negative behaviors such as
drinking heavily for both men and women. Fatherhood and motherhood status appear to eclipse traditional masculine behavioral pursuits such as engaging in heavy episodic drinking practices during emerging adulthood.

*Additional sex differences*

My fourth research question pertains to sex differences in the covariates. The descriptive analyses indicated that males and females were significantly different for almost every variable included in the analyses (means/proportions and Chi-square/t-test results reported in Table 4). The only variables that males and females did not significantly differ on was school connectedness and being a current student at waves 1 and 2. This finding indicates that males and females are dissimilar from each other in many different aspects of their lives. Prior research supports my results. For example, males report engaging in more alcohol use and in more crime/delinquency in comparison to females (FBI 2012; Forsyth & Lennox 2010; Gussler-Burkhardt & Giancola 2005; Hope & Ham 2003; SAMHSA 2012; Wechsler 1995). This finding indicates that differences between males and females should be considered further when studying alcohol use and crime/delinquency and when creating/testing theories of crime and deviance. This can be accomplished by examining split-sex models which allows for a more in depth analysis and examination of sex differences.

*Theoretical Implications*

My final two overarching research questions pertain to theory. Question five states, “What implications does including sex and gender role orientation have for Sampson and Laub’s Life Course Theory of Crime and criminological theory?,” and question six asks, “How is Sampson and Laub’s Life Course Theory of Crime impacted
by examining social support and life transitions during the transition from adolescence into young adulthood? In this section, I discuss the theoretical implications this dissertation has on Sampson and Laub’s Life Course Theory of Crime, the life course perspective, emerging adulthood, and the literature concerning alcohol use. Namely, I discuss how examining sex and gender role orientation, social support and life transitions, the transition from adolescence into young adulthood, and alcohol use literature impact theory.

*Sex and gender role orientation*

This dissertation expands Sampson and Laub’s Life Course Theory of Crime by taking both sex and gender role orientation into consideration separately and together. Sex and gender are largely absent from criminological literature and theories or are included as a means of comparison or control variable(s). Sampson & Laub’s theory is based on an all-male sample and data that were collected during an era of criminology when females and the concept of gender, that is—that men and women are profoundly influenced by gender socialization and gendered social structures, were not considered in crime research or criminological theory. Even today, significant and serious analyses of sex and gender are often missing from major criminological theories (Chesney-Lind 2006). This dissertation shows that sex and gender role orientation matter in examining alcohol use and crime/delinquency across time.

I contend that examining sex, gender role orientation, and examining gender role orientation within sex category are imperative to advancing our understanding of alcohol use and alcohol use trajectories during in the transition to adulthood. Gender, specifically gender role orientation, and sex category influences our social behavior and needs to be
given more thoughtful research attention instead of merely including sex or measures of gender as control or descriptive variables. The analyses in this dissertation reveal that both sex and gender role orientation have a significant and intersecting impact on alcohol use trajectories during the transition from adolescence into young adulthood.

I find that sex and gender role orientation both significantly impact probabilities of heavy alcohol use trajectory group membership. Explicitly, males and those who adhere to a more masculine gender role orientation have an increased probability of belonging to a higher alcohol use trajectory group. This finding highlights the importance of both sex and gender role orientation as explanatory covariates of heavy episodic drinking and provides support for their inclusion in criminological theories including Sampson and Laub’s Life Course Theory of Crime.

An even more powerful finding from my analyses is that regardless of biological sex category, gender role orientation was a significant risk factor for belonging to a higher alcohol use trajectory group. For both males and females, those who had a more masculine gender role orientation had a higher probability of being part of a higher heavy episodic drinking trajectory group. This suggests that masculinity is a potentially pervasive social force that shapes behaviors for both males and females, especially a highly masculinized behavior such as heavy episodic drinking.

What it means to be masculine or feminine has implications for which behaviors are deemed appropriate for both males and females. Gender role orientation, masculinity and femininity specifically, also have the potential to shape trajectories of alcohol use and potentially criminal behavior during emerging adulthood (Carlsson 2013). For instance, Carlsson (2013) contends that masculinity shapes the process of desistence from crime
and deviance because men are compelled to accomplish masculinity which often include engaging in crime/delinquent behaviors. My analyses support his findings. During the transition to adulthood, masculinity seems to have a significant influence on alcohol use trajectory group membership regardless of sex category. Masculinity and what it means to “be a man” and femininity and what it means to “be a women” may also impact how adolescents navigate their way into young adulthood. Conceivably, in order to accomplish masculinity, males and females may engage in more frequent heavy alcohol during adolescence and these patterns of behavior seem to remain stable and level off as they enter into young adulthood.

Additionally, these findings support both the deviance and congruence models as described by White and Huselid (1997). They explain “…females who have adopted masculine attributes would be expected to drink more, and males who have adopted feminine attributes to drink less, than their conventionally sex-typed counterparts” (1997:183). Specifically, my results support these theoretical models in that those who adhere to a more traditional masculine gender role orientation are more likely to belong to a higher heavy episodic drinking alcohol use trajectory group than those who adhere to a more traditionally feminine gender role orientation.

Social support and life transitions

This dissertation examines two important aspects of Sampson and Laub’s Life Course Theory of Crime that are also important covariates of alcohol use: social support (parental and school connectedness) and life transitions (education, employment, marriage/cohabitation, and parenthood). The analyses show that social support and life transitions each have an impact on alcohol use trajectories. However, I find mixed results
for each of these categories of covariates. Below I discuss how these findings inform and advance Sampson and Laub’s Life Course Theory of Crime.

Social support as a protective factor against belonging to a higher heavy episodic drinking trajectory group in comparison to a low alcohol use trajectory group was partially supported by my analyses. Social support was generally a protective factor for both males and females. Specifically, those who have higher levels of social support had a higher probability of belonging to lower heavy episodic drinking trajectory group, but social support, both parental connectedness and school connectedness, was not significant for every group.

Feeling that one is a part of a family or a school environment (i.e., feeling connected) or having support from one’s family or those in the school setting are each important protective factors against involvement with negative delinquent behaviors such as heavy episodic drinking (McNeely & Falci 2004). The results of the analyses support previous research which suggests that social support is a protective factor against engaging in heavy episodic drinking and this dissertation demonstrates that social support in adolescence has the potential to shape and predict behavior patterns during the transition to young adulthood.

This indicates that while parental and school connectedness are important constructs and are most likely protective factors against participating in heavy episodic drinking, perhaps a different measure/aspect of social support would have yielded different and more pervasive results. Additionally, the nature of how and why social support impacts trajectory group membership may be more understood using a different measure that address different aspects of social support. Perhaps it is not connectedness
to the school and family, but it is being committed to school, doing well academically, having support from family, and/or not wanting to disappoint family that impacts later involvement in alcohol use during emerging adulthood. My findings show that social support is an important covariate of heavy episodic drinking and merits further investigation in the context of Sampson and Laub’s Life Course Theory of Crime.

Four life transitions/events were considered in this dissertation: Education/current student, full-time employment, marriage/cohabitation, and parenthood. I found both support and dissent for my hypothesis that each transition will reduce involvement in heavy episodic drinking behaviors for each trajectory group. I found support for marriage/cohabitation and parenthood, and I found mixed findings for education and employment.

Marriage/cohabitation and parenthood both reduced heavy episodic drinking for males and females in each of the alcohol use trajectory groups. This was expected because both marriage/cohabitation and parenthood tend to heavily restructure behaviors because caretaking and other responsibilities are added to the individuals’ everyday life. The results for marriage/cohabitation and parenthood were likely especially strong given the fact that the measure assessed if one was living with a partner or child(ren) which is likely to have a more direct impact on behaviors.

These findings provide support for Sampson and Laub’s Life Course Theory of Crime and their assertion that the restructuring of behaviors which accompanies forming adult social bonds is effective in the reduction of deviance and crime for marriage/cohabitation and parenthood specifically (Laub & Sampson 2003). Individuals who have a partner or child in their home are likely to experience increased social
support, monitoring of behaviors, or have responsibility for or to someone other than themselves which may lead to a reduction in engaging in heavy episodic drinking behaviors.

I found sex differences and conflicting/mixed findings for education and employment. Education/being a current student was associated with decreases in heavy episodic drinking for several of the male alcohol use trajectory groups and associated with an increase for one of the groups (the highest group: increasing frequent heavy episodic drinkers). Education/current student was associated with increases for each of the female trajectory groups with the exception of group 1 (infrequent heavy episodic drinkers) which was not significant.

These findings suggest that education may not have a uniform effect or impact on everyone. Perhaps the measure which addresses current student status across time may not be indicative of being immersed in a (college) student role which is often associated with increases in heavy episodic drinking behaviors. Additionally, being enrolled in an education program does not necessarily mean that one is a traditional college student, but rather is taking some sort of educational class whether it be at a traditional 4-year college or vocational training school which may help to explain the conflicting and mixed results which show that there are a variety of heavy alcohol use patterns associated with being a current student. These findings indicate that education, being a current student, and/or completing an education program need to be further studied as a life course transition or event which has the potential to shape and alter behavior trajectories.

I also found sex differences regarding full-time employment. Specifically, for males, employment is associated with increased heavy episodic drinking for each of the
groups. For females, full time employment is negative and significant for group 4 (increasing occasional heavy episodic drinkers) and marginally significant for group 3 (increasing seldom heavy episodic drinkers). This signifies that, for these groups, employment is associated with decreases in heavy episodic drinking behaviors.

These findings highlight yet another sex difference that can be potentially attributed to gendered expectations regarding behavior. For example, males may feel pressure to drink with work colleagues, whereas women instead return home after work rather than engaging in heavy episodic drinking. This sex difference warrants additional and more in-depth investigation of the “effect” of employment and examining sex and/or gender differences in drinking practices associated with full-time employment.

The transition from adolescence into young adulthood

The period between adolescence and young adulthood has been referred to a “critical period” of development and a “critical developmental transition,” yet there is relatively little research within the alcohol use and criminological literature which focuses on the emerging adulthood period (Arnett 2000; Newcomb & Bentler 1987; Peterson 1983; Schulenberg et al. 1996:289; Sherrod, Haggerty & Featherman 1993). This dissertation examined alcohol use trajectories and their covariates during this important transitional period. Below I discuss how our understanding of the transition from adolescence into young adulthood is enhanced because of the analyses and findings presented in this dissertation.

First, this dissertation provides support for the assertion that the transition from adolescence into young adulthood is a time when the foundations for behavioral trajectories are laid. Specifically, alcohol use trajectories, as seen in each of the three
figures, seem to have variance until adolescents reach approximately age 21, about the midpoint of emerging adulthood, and after this point alcohol use trajectories seem to “level off” and remain relatively stable as adolescents transition into young adulthood. This finding highlights the importance of emerging adulthood as a developmental period when choices that potentially have significant effects on behavioral trajectories are made. This dissertation provides evidence for the importance of studying the critical period of development prior to young adulthood.

Second, this dissertation provides additional support for previous research which suggests that the transition into young adulthood is often marked by an increase in engaging in criminal, deviant, or unhealthy behaviors (Caswell, Pledger & Pratap 2002; Frech 2012; Gottfredson & Hirschi 1990; Hirschi & Gottfredson 1983; Johnston et al. 2013; SAMHSA 2012). I found that levels of heavy episodic drinking and involvement in crime (both violence and non-violent crime/delinquency) increased during the transition to young adulthood and decreased as individuals entered young adulthood. This finding again illuminates the importance of this developmental period of change and provides a strong rationale for continuing to focus on the transition from adolescence into young adulthood.

Lastly, this dissertation examined multiple time points within the transition into young adulthood. Being able to examine multiple time points within individuals’ lives, especially during a critical developmental period, gives a more complete view of behavioral patterns. In this dissertation, I was able to more fully examine heavy episodic drinking patterns during the developmental period of emerging adulthood. The alcohol use trajectories during the transition to young adulthood showed that alcohol use patterns
are not static during emerging adulthood. Instead, this dissertation provides evidence that alcohol use patterns are variable within the emerging adulthood period and are also different for males and females.

*Alcohol use literature*

The findings from this dissertation advance our knowledge of alcohol use. In this dissertation, I focused on the transitional period from adolescence into adulthood with an emphasis on Sampson & Laub’s Life Course Theory of Crime. Specifically, I concentrate on three domains that are important in Sampson & Laub’s theory: crime/deviance (violence and non-violent crime/delinquency), social support (parental and school connectedness), and life transitions (education, employment, marriage/cohabitation, and parenthood). Additionally, I pay special attention to sex and gender role orientation and their impact on alcohol use trajectories. In my study, each of these elements has some impact on alcohol use trajectories and/or trajectory group membership. Below, I discuss three ways that this dissertation advances our knowledge of alcohol use.

First, this dissertation provides strong evidence that sex and gender role orientation need to be examined in alcohol use studies. More specifically, this dissertation shows that serious consideration of sex and gender can yield important findings. As discussed above, the results demonstrated that sex and gender role orientation are important predictors concerning heavy alcohol use. Specifically, males and more masculine oriented individuals had a higher risk of belonging to a higher alcohol use trajectory group. Rather than using sex and/or gender as a means of comparison or as a control variable, each should be taken into consideration within alcohol use studies and our theoretical understanding of alcohol use.
Second, our knowledge concerning alcohol use trajectories and their covariates is enhanced and advanced. This dissertation examined alcohol use trajectories and the covariates of alcohol use trajectories during emerging adulthood. The covariates taken into consideration include: violence, non-violent crime/delinquency, sex and gender role orientation, social support (parental and school connectedness), and life transitions/events (education, employment, marriage/cohabitation, and parenthood). Previous research often concluded with the examination of alcohol use trajectories and did not take additional covariates into consideration. While this was an important and essential first step in understanding alcohol use patterns over time, covariates are necessary to better understand what factors are important in explaining alcohol use patterns. This dissertation showed that each of the covariates taken into consideration have some impact on heavy episodic drinking trajectories during emerging adulthood.

Lastly, the theoretical paradigms (discussed in Chapter II) related to alcohol use and violence and non-violent crime/delinquency can be enhanced using the results presented in this dissertation. A majority of research concerning alcohol use and its relationship with crime are based on cross-sectional analyses. Therefore, this dissertation enhances our knowledge because it shows that violence and non-violent crime/delinquency impact alcohol use trajectories over time. Although this study could not examine causality and the theoretical paradigms concerning causality, it does show that heavy alcohol use and violent perpetration and non-violent crime/delinquency are related over time. Explicitly, violence and non-violent crime delinquency are associated with increased alcohol use for each of heavy episodic drinking trajectory groups. This dissertation provides support for sociological/criminological theories (reciprocal theory
and spuriousness theory specifically) which emphasize the importance of covariates of alcohol use including violence, non-violent crime/delinquency, sex, gender role orientation, social support, and life transitions.

Limitations of the Study

There are several limitations in this study. The major limitations are related to the measures and data. Additional limitations are related to the methodology utilized. The Add Health Data provides researchers with a large nationally representative longitudinal data set which includes numerous variables spanning a variety of topics. However, this useful data set is not without flaws. As in any longitudinal data set, there is a problem of attrition. Researchers may lose contact with study participants, they may choose not to continue with the study, or participants may die during the course of the study.

The quality of measures important to criminological and sociological theory and method presents some limitations. The measurement of gender is not ideal. The Bem Sex Role Inventory has been called into question by numerous researchers (Auster & Ohm 2000; Bohannon & Mills 1979; Choi & Fuqua 2003; Hoffman & Borders 2001; Holt & Ellis 1998; Moreland et al. 1978; Spence 1991). The two main critiques of the BSRI is that it may be based on outdated measures of masculinity and femininity and that it may not be a valid or reliable measure of gender role orientation. Rather, the Bem Sex Role Inventory may be measuring some other psychological concept or construct such as personality characteristics, instrumentality, or expressiveness (Bohannon & Mills 1979; Choi & Fuqua 2003; Moreland et al. 1978; Spence 1991). I use this measure of gender because it is the only measure available in the Add Health Data. Although this measure is
not ideal, its use did yield important results regarding gender differences in my study which lends support to the potential importance of the Bem Sex Role Inventory.

Next, my measures of marriage/cohabitation and parenthood are not direct questions asked to participants about being married, cohabitating, or being a parent. Rather, I use a proxy measure taken from a household inventory variable. This method of measuring significant life transitions may have misled my analyses if I did not include married/cohabitating or parents in the correct categories. Arguably, the measure I employ does address the potential for marriage/cohabitation or parenthood to restructure behaviors because my measure only includes those who live with their partner or children in their home.

My measures of violence and non-violent crime/delinquency did not provide a detailed spectrum of criminogenic behaviors. Numerous variables were omitted from some of waves of data collection. For example, many of the delinquency variables related to youth were not included in the survey once participants were no longer adolescents. This limited the number of criminological measures which could be included in my analyses. Additionally, the measures of violence and non-violent crime/delinquency did not account for the severity and frequency of violence and non-violent crime/delinquency. Instead, my measures only accounted for occurrence in the last year. Examining the severity and frequency of involvement in crime would broaden and deepen our knowledge. Heavy episodic drinking trajectories may be different for those who are involved in crime/delinquency more frequently and with greater severity of instances.
My measure of heavy episodic drinking has several limitations. First, I cannot use the sex specific measure of heavy episodic drinking, as put forth by Wechsler and colleagues (1995), sets the limit for females engaging in heavy alcohol use at four drinks for males and five drinks for males. The intention of this sex separation is to better account for biological differences in body fat, body mass, and how alcohol is processed in the body (Wechsler et al. 1995). Second, my alcohol use measure could be more robust. For example, a measure which accounts for the approximate number of drinks consumed on a typical drinking day could help to better identify problematic alcohol users. Additionally, a shorter alcohol use reference period, such as the past month, could help to ensure respondents are accurately reporting their involvement in heavy episodic drinking.

A last area of limitation pertains to my method: group-based trajectory models. As with any methodological approach in the social sciences, there are cautions against inferring statistical causality. While modeling trajectory group membership over time provides researchers with an innovative way to examine developmental trajectories, there are some drawbacks to this approach. The trajectory membership groups are not “reified groups” meaning that trajectory group membership, the numbers of groups identified, and the shape of trajectories are not an absolute certainty. Rather, group membership is an approximating method for estimating patterns of change within a population (Arrandale et al. 2006; Nagin 2005).

Strengths of the Study

Despite the limitations of my study, there are also several major strengths. First, this is one of the few studies to examine alcohol use trajectories and their covariates. The
majority of studies do not extend alcohol use trajectories beyond including a few risk factors (i.e., demographic variables). I examine several important risk factors or protective factors for trajectory group membership including sex, race, and gender role orientation. Additionally, I examine crime/deviance, social support, and life transitions. Understanding what factors, beyond demographics, impact and change trajectories of risky drinking practices are important in order to extend our knowledge of alcohol use behaviors. Additionally, alcohol use/abuse prevention and intervention programs can be better tailored in order to decrease negative outcomes of heavy episodic drinking especially during emerging adulthood when adolescents are forming their alcohol use patterns. For example, education programs need to be in place prior to the emerging adulthood period (i.e., before college) because behavioral trajectories are often already in place during this time.

Second, I address both sex and gender role orientation. The vast majority of studies do not examine both sex and gender orientation simultaneously and I am unaware of any study that has looked at both sex and gender role orientation longitudinally or intersectionally in conjunction with alcohol trajectories. Rather, studies examine sex differences and refer to them as gender differences. Studies which utilize both measurements of sex and gender help to disentangle the complexities of the relationship between alcohol use, gender, sex, and deviance/crime. For instance, my study showed that masculine gender role orientation has an important and significant impact on alcohol use patterns in emerging adulthood.

Third, I extend our knowledge of alcohol use and crime/deviance by conducting a longitudinal analysis. A preponderance of criminological research is cross-sectional in
nature. While cross-sectional analyses provide important information, longitudinal analyses allow for the examination of long term patterning of behavior of negative behaviors such as alcohol use and crime/delinquency. Currently, the long term patterning of alcohol use and crime/deviance has yet to be adequately studied.

Finally, utilizing group-based trajectory models to examine developmental trajectories allows researchers to identify and analyze distinct trajectories of heavy alcohol use. Traditional methodological approaches such as regressions or growth curve models only allow for one mean to be examined in the dependent variable while group-based trajectory models allow for multiple means to be included simultaneously (Arrandale 2006; Nagin 2005). Additionally, group-based trajectory models also enable the statistical examination of covariates which may predict group membership and perhaps determine which covariates alter and impact developmental trajectories (Nagin 2005).

**Directions for Future Research**

The findings of this dissertation justify a number of directions for future research. This is in part due to the fact that my dissertation, while answering important questions, has raised many new questions. A few of these questions include: Why do men and women have different alcohol use trajectories? Why and how does gender role orientation impact alcohol use trajectories? Why and how do crime and deviance alter trajectories? What do the trajectories of crime/delinquency look like over time and what impacts them? How does race and ethnicity impact alcohol use trajectories? What type of social support has the most impact on alcohol use trajectories? Why were my findings mixed
and conflicting regarding education and employment? Do drinking behaviors remain stable into later adulthood?

Alcohol use trajectories and their covariates warrant a deeper investigation because this study was an important first step in exploring what factors might impact heavy episodic drinking behaviors. This dissertation was a prospective study in that it addressed the importance of crime/delinquency and covariates gleaned from Sampson & Laub’s Life Course Theory of Crime and the life course perspective in exploring alcohol use trajectories over time. More research is required in order to fully examine alcohol use trajectories and their covariates during the transition from adolescence into adulthood. For example, dual trajectory analysis which examines alcohol use and crime/deviance trajectories together would be an important next step in examining alcohol use trajectories and their covariates. Specifically, dual trajectory analysis enables researchers to examine how two related behaviors vary together.

Finally, gender and sex should continue to be explored in regard to alcohol use trajectories as well as in conjunction with crime/delinquency. Future research should include different measures of gender such as gender ideology (i.e., the Personal Attributes Questionnaire (PAQ)) or utilizing qualitative data to examine gender role orientation would be helpful in disentangling the complexities in studying alcohol use and crime/delinquency. Using additional measures of gender will enhance and potentially confirm the results reported in this dissertation. Specifically, future research should address if gender measures which assess different aspects of gender such as identity or ideology may help unravel why and how gender impacts alcohol use and crime/delinquency. A qualitative longitudinal examination of gender could shed light on
why or how masculinity influences engaging in heavy episodic drinking and crime/delinquency during the transition to young adulthood by obtaining in-depth information first hand rather than from a scale which does not provide researchers with valuable contextual information.

Policy Implications

There are important policy implications stemming from the analyses and results of this dissertation. My study shows that alcohol continues to be a problematic substance that many adolescents and young adults use heavily over time. In general, males tend to use more alcohol than females, but both sexes engage in dangerous drinking patterns to some extent. Alcohol use/abuse education programs need to focus on both males and females because both sexes engage in this dangerous behavior. Additionally, the dangers of narrow and traditional masculinity should be integrated into prevention and intervention programs because masculine gender role orientation impacted alcohol use trajectories regardless of sex category.

A powerful finding from this dissertation are the alcohol use trajectories. The heavy episodic drinking trajectories show that drinking patterns increase during the transition to adulthood and remain stable after (approximately) age 21. This indicates that heavy alcohol use patterns, once established, may not change much despite life transitions and changes that occur during the life course. Alcohol use/abuse education programs should be enacted prior to the establishment of heavy alcohol use behaviors that seem to remain stable after adolescence.

Additionally, this dissertation provides some evidence that social support in adolescence is important for reducing heavy episodic drinking practices. In particular,
parental and school connectedness and providing a support home and school environment may help to discourage involvement in crime and delinquency for both males and females. This dissertation provides evidence that parents, not only adolescents, should be educated on how to support their children and how to prevent their children from engaging in problematic behaviors such as heavy alcohol use or crime/delinquency.

In sum, this dissertation adds to the sociological, criminological, and alcohol use literature by examining alcohol use trajectories and their covariates during emerging adulthood using insights from Sampson and Laub’s Life Course Theory of Crime. Alcohol use and its covariates tend to be studied cross-sectionally; thus, the long-term patterning of alcohol use behaviors are yet to be fully understood. This dissertation demonstrates that patterns or trajectories of heavy episodic drinking behaviors are established during the important developmental period of the transition into young adulthood. This dissertation also examines sex and gender role orientation as major substantive variables which is largely absent from the literature both empirically and theoretically. Future research should continue to examine alcohol use trajectories and their covariates during emerging adulthood, especially focusing on sex, gender, and crime/delinquency.
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