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Determinants of Social Disorganization as Predictors of Illicit Drug Use During Recessionary Years

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Walden University
2015

Abstract

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by

Daniel Kirk Westmoreland, Jr.

MS, University of Phoenix, 2010

BA, Rollins College, 1995

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Clinical Psychology

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Abstract

Research suggests evidence of an association between sociodemographic determinants and illicit drug use. However, these data do not take into consideration the effect an economic obstacle, such as a recession, could have on an individual's urge to cope with this stressful period with illicit drugs. Furthermore, there is no research to suggest how clinicians and/or treatment institutions can forecast whether the use of monetary resources will be sustainable due to private and/or governmental fund reductions during an economic recession. Based on theories of social learning and social disorganization within an ecological framework, this study employed a quantitative trend analysis to explore the impact the 2007-2009 economic recession had on illicit drug use throughout the United States. A sample of respondents from the Substance Abuse and Mental Health Data Archive from 2006 to 2010 surveys was used to run the statistical analysis. Based on the analyses, age and gender (covariates) and all variables (social disorganization and Gross Domestic Product) were found to be significant predictors of illicit drug use. Although methamphetamine was not significant for prevalence over time, total drug use, cocaine, and heroin were prevalent over time based on predictors. These findings suggest local, state, and federal policies regarding the prosecution and imprisonment of nonviolent and minor drug offenders should be reprioritized towards the rehabilitation of addicts while enforcing firmer laws upon the most disruptive and severe aspects of the drug trade in order to promote a genuine positive change towards social organization.

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Dedication

This dissertation is dedicated to my father, Dr. Daniel K. Westmoreland, Sr. Without his unconditional love and support; I would not have had the energy or the resources to complete this project. For this, I am forever indebted and thankful.

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Chapter 1: Introduction to the Study

Introduction

The federal government has become more interested in learning how social factors play a role in substance abuse due to the financial burden it poses on individuals, communities, and research (Heavyrunner-Rioux & Hollist, 2010). Therefore, a national movement in this direction could inform researchers, clinicians, investigators, and law enforcement agencies of how accurately social indicators can predict the prevalence of substance abuse during the United State's financial hardships (Heavyrunner-Rioux & Hollist, 2010). This research contributes to this movement by understanding how the country's monetary issues affect social influences, such as learning, conflict, and social disorganization. Using previously explored model-based social theories and the incorporation of surveys and social data, the relationship between predicting and estimating illicit drug use during recessionary years will be studied.

According to many psychologists, learning can be described as the process of obtaining new and sustainable information, abilities, and behaviors (Corsini, 2002; Pryse-Phillips, 2009; Terry, 2006). Learning can also be described as the modification of behavior as a result of practice, study, or experience (Terry, 2006). Therefore, learning can be exhibited through test taking, behavior, and/or the application of new knowledge to old and new situations (Thompson, 2008). Although this definition of learning is relatively clear, how and why individuals learn behavior is a debatable topic depending upon the behavior, such as substance abuse (Flay et al, 1994). Thus, a concise etiological explanation for how learned behavior influences substance abuse has eluded researchers.

Throughout the last several decades, and in conjunction with other fields of study, the social sciences have improved the understanding of the etiology of substance abuse (Hartinger-Saunders & Rine, 2011). In the past, either the focus of substance abuse has been on the specific act of drug use or the pathology associated with the behavior (Ritter & Chalmers, 2011). While some emphasis has been researched toward socioeconomic factors, little focus has been geared towards an economic etiology through learning and conflict, and how it may have an underlying effect on social disorganization as a result of substance abuse due to a recession (Monterosso & Ainslie, 2009). Previous research has addressed the source of substance abuse as proffered in isolation or absent of monetary variables such as market volatility, government sequesters and furloughs, threats of government shutdowns, and/or recessionary times (Dave, 2004). Therefore, in this study, I will explore how collaborative psychological theories and economic trends may better explain and predict substance abuse within the United States. Within an ecological framework, illicit drug use will be investigated through the lenses of social learning and social disorganization, and how it affects aspects of social disorganization (i.e., socioeconomic variables indicated by income and employment; psychosocial history variables indicated by education, family disruption, and residential mobility) and demographic covariates (i.e., age and gender) will be examined. Furthermore, an overview of illicit drugs (i.e., cocaine, heroin, and methamphetamine) will be presented. Finally, a summary of the economy, the prominent method for measuring the nation's economic health, and how an economic recession can affect an individual's anxiety and stress levels will be discussed.

Background of the Study

Current research on drug abuse has primarily focused on the socioeconomic status and the biological risk factors associated with an individual but researchers have neglected to investigate how a large scale or macrolevel factor, such as a recession, may influence a surge in illicit drug use across the United States (Ritter & Chalmers, 2011). At the beginning of the 2007-2009 recession, the healthcare share of the Gross Domestic Product (GDP) inflated from 15.9% in 2007 to 16.2% in 2008 despite healthcare growth slowing to a 48-year low of 4.4%, affecting every healthcare service (Hartman et al., 2010). There is also evidence to suggest that during the 2007-2009 recession, substance abuse increased (Substance Abuse and Mental Health Services Administration, 2013). This has raised questions about how the 2007-2009 recession affected substance abuse (Bretteville-Jensen, 2011; Ricaurte & McCann, 2005; Sivagnanam, 2012). While previous researchers have explored its effect on alcohol consumption, they have failed to provide any viable theoretical base or conclusion on how an economic recession might affect illicit drug use (Bor et al., 2013; Bretteville-Jensen, 2011). Given that the pervasiveness of illicit drug use is an essential factor used for developing policies and treatment facilities, it is essential to explore what dynamics were affected by the 2007-2009 recession that may have led to a surge in illicit drug use (Bretteville-Jensen, 2011). Given the lack of adequate current research on this topic, exploring additional research based on psychosocial theories using the ecological conceptual framework to help explain why individuals may choose to use illicit drugs during economic recession will help fill this gap in the literature (Bretteville-Jensen, 2011; Ricaurte & McCann, 2005;

Sivagnanam, 2012). Furthermore, this information can be used to make policy adjustments towards funding healthcare systems geared for treating substance abuse during future recessionary periods.

Problem Statement

Substance abuse has been studied extensively through the chemical, biological, and behavioral lenses (Grossman, Chaloupka, & Shim, 2002; Schneider Institute for Health Policy, 2001; Whiteford et al., 2013). However, researchers have relatively ignored the effects of an economic environment, as it relates to each of these factors, while substance abuse of new synthetic and more potent traditional recreational drugs is becoming more prevalent within the United States (Ricaurte & McCann, 2005; Sivagnanam, 2012). Furthermore, funding for substance abuse treatment in 2009 accounted for 1.0% of the total spending for healthcare, a percentage that was nearly half of what it was in 1986, and continued to decline throughout the 2007-2009 recession (SAMHSA, 2013). In addition, researchers have largely failed to consider how the continuing drug wars, driven by both finance and demand within the United States, play a significant role in the quantity, quality, and availability of illicit drugs during an economic downturn (Bretteville-Jensen, 2011; The MOST project, 2001; Thomas, 2012). These factors, coupled with the nation's growing economic crisis, have made illicit drug use an available and socially acceptable coping mechanism to relieve these stressors for thousands of Americans (Ritter & Chalmers, 2011). Many Americans may adopt similarly related high-risk behaviors in order to cope with social and economic factors by growing, manufacturing, and/or distributing illegal substances (Caulkins & Nicosia,

2010). The proliferation of illegal substance sales and trafficking appears to be growing into a national socioeconomic, health, and clinical crisis (Thomas, 2012). There is also evidence that stress related amphetamine use amongst low-income females and general illicit drug use in older adults between the ages of 35 and 45 years of age has increased, suggesting that sociodemographics may play a role (Hartel et al., 2006; Sunder, Grady, & Wu, 2007). Therefore, by implementing an ecological framework to make associations between recessionary years, demographic, socioeconomic, psychosocial history factors, and illicit drug use, as it relates to social disorganization during a recession, perhaps clinicians and policy makers can develop prophylactic instruments and measures to prevent the proliferation of illicit drug use within the society. Furthermore, if a relationship is found between an economic recession and substance abuse, psychologists will become vital in the goal of identifying determinants vulnerable to exacting socioeconomic factors during a recessionary environment. The outcome of this line of work could provide new policies to eliminate subsidy cuts to facilities during a recession while implementing treatment modalities and preventative intervention strategies for those potentially at risk during a recession.

Purpose of the Study

The purpose of this quantitative analysis was to identify whether or not illicit drug use, within an ecological framework, inrceases due to determinants of social disorganization during recessionary years. Through this study, a further analysis of individual demographics (age and gender), socioeconomic factors (income and employment), and psychosocial history (education, single, married, or divorced), and

residential mobility determined whether a macrolevel enviromental change (i.e., a recession) affects factors of social disorganization in order to predict an increase in a microlevel issue (i.e., illicit drug use). Independent variables were determinants of social disorganization: (a) income, (b) employment, (c) education, (d) family disruption (single, married, or divorced), and (e) residential mobility. The dependent variables were drug use (use or nonuse) and the GDP. Age and gender were analyzed as covariates.

Research Questions and Hypotheses

The foundation of this study is a 5-year research outcome from survey results provided by the University of Michigan's SAMHDA. Indicated below are the research questions and hypotheses for this study. Chapters 2 and 3 provide a more detailed explanation of these research questions and hypotheses and the quantitative analysis.

Research Question 1

Does an economic recession predict an increase in illicit drug use through sociodemographic indicators defined by age and/or gender?

Research Hypothesis 1

$H_1 1$: Age does predict recessionary illicit drug use defined as cocaine, heroin, and/or methamphetamine use.

$H_0 1$: Age does not predict recessionary illicit drug use defined as cocaine, heroin, and/or methamphetamine use.

Research Hypothesis 2

$H_1 2$: Gender does predict recessionary illicit drug use defined as cocaine, heroin, and/or methamphetamine use.

*H*02: Gender does not predict recessionary illicit drug use defined as cocaine, heroin, and/or methamphetamine use.

Research Question 2

Will drug use in individuals associated with higher levels of social disorganization increase more than in individuals associated with lower levels of social disorganization during recessionary years?

Research Hypothesis 3

*H*13: Social disorganization defined by a composite score of disadvantaged indicators does predict recessionary illicit drug use.

A. income, B. employment, C. education, D. family disruption (marriage), E. residential mobility

*H*03: Social disorganization defined by a composite score of disadvantaged indicators does not predict recessionary illicit drug use.

A. income, B. employment, C. education, D. family disruption (marriage), E. residential mobility

Research Question 3

Does the prevalence of illicit drug use increase during an economic recession?

Research Hypothesis 4

*H*14: There is a relationship between the annual GDP and the prevalence of recessionary illicit drug use in the United States.

*H*04: There is no relationship between the annual GDP and the prevalence of recessionary illicit drug use in the United States.

Research Question 4

Does the prevalence of illicit drug use change over time as predicted by sociodemographics and/or social disorganization in relation to an economic indicator (GDP)?

Research Hypothesis 5

$H_1 5$: The prevalence of illicit drug use changes over time as predicted by sociodemographics and/or social disorganization in relation to an economic indicator (GDP).

$H_0 5$: The prevalence of illicit drug use does not change over time as predicted by sociodemographics and/or social disorganization in relation to an economic indicator (GDP).

Theoretical Framework

Bronfenbrenner's ecological framework for human development was introduced in the 1970s and became a respected theoretical model a decade later (Tudge et al., 2009). Initially, this theory placed more significance of the context of an individual's position within the framework, but Bronfenbrenner later realized the importance and influence of an individual's experiences on development (Rosa & Tudge, 2013; Tudge et al., 2009). Despite revisions and alterations, the essence of Bronfenbrenner's theory remains focused on how the context of ecology affects an individual on different levels (McLaren & Hawe, 2005). The ecological framework is based on the idea that no one factor can give an explanation as to why some individuals behave differently than others (Bronfenbrenner, 1994; Rosa & Tudge, 2013). This framework explores interpersonal

behavior as the result of several interactions at four distinct levels: the individual, the relationship, the community, and the societal (Rosa & Tudge, 2013; Tudge et al., 2009). Thus, in order to apply an ecological framework to a behavior, such as illicit drug use, it is necessary to explore social theories that directly affect an individual and a society.

The social disorganization theory, developed by Shaw and McKay (1942), is based on social structure and focuses on characteristics that promote social disorganization such as illicit drug use (Bohnert, Bradshaw, & Latkin, 2009; Bursik & Webb, 1982). In particular, the social disorganization theory explains how urbanization may lead to the degeneration of community regulation and the substitution of wholesome merit with criminal and derelict practices (Bursik & Webb 1982). Unlike social learning, the application of this theory demands researchers to view individuals from a fractal or macro perspective while attempting to understand what drives an individual to a micro issue like substance abuse (Capece & Lanza-Kaduce, 2013).

The social disorganization theory was generated to make social predictions on a macro level (Bursik & Webb, 1982). Shaw and McKay (1942) believed swift industrialization, urbanization, and immigration were the major contributing factors responsible for social disorganization (Kingston, Huizinga, & Elliot, 2009). In particular, Shaw and McKay believed societal disruptions could be attributed to three major factors: low socioeconomic status, racial heterogeneity, and habitation mobility (Sampson & Groves, 1989). Eventually, swayed by the field of ecology, research widened the social disorganization theory in an attempt to understand how social characteristics within locales contribute to criminal acts such as drug use and distribution (Taniguchi, Ratcliffe,

& Taylor, 2011). Through an ecological framework, researchers Bursik and Web (1982) were able to discern patterns of delinquency within the city of Chicago and concluded criminal activity was the result of macroeconomic and social processes. Furthermore, the more dense areas of crime were centered in urban industry and business districts while decreasing towards more rural areas (Shoemaker, 2000). The area through which higher levels of crime takes place is known as "the zone of transition" and was described as housing projects consisting of ethnic/racial minorities where antisocial values and norms had not been properly established (Mollenhorst, Völker, & Flap, 2012). This is the essence of social disorganization. Given these areas are traditionally known for having socioeconomic hardships, understanding how an economic recession affects determinants of social disorganization on a societal level may provide insight into a possible facet of substance abuse etiology.

Nature of the Study

The research design is a retrospective cross-sectional study over time, with a portion of the study using individual-cohorts by year. This type of time series analysis was chosen due to the nature of the sample data collected. The sample design was intended to enhance the precision of calculations made in a year-to-year trend analyses due to the overlapping of sample areas between successive years. This overlapping technique provides a positive correlation between these areas for each successive year and the ability to observe whether a predictable relationship exists between the sociodemographic (age and gender as covariates) and social disorganization determinants (income, employment, education, family disruption, and residential mobility), indicated

as independent variables, with the presence or absence of drug use and the GDP as dependent variables within an assessed period of time. Using this explanatory design, I will evaluate quantitative archival data compiled from a random sample of survey results from over 30,000 individuals at or above the age of 18 within the United States for each year. Due to the nature of public access data, no protected populations or mention of regional location were included within the data set.

Definition of Terms

Ecological framework: A framework that treats the interaction between different factors, at different levels, with equal significance, by demonstrating the influence that one factor at a single level has on multiple levels at the same time (Dahlberg & Krug, 2002). This approach is more likely to sustain prevention efforts over time than any single intervention (Dahlberg & Krug, 2002).

Illicit drug use: "Illicit drug use includes the non-medical use of a variety of drugs that are prohibited by international law" (MAjOR, A. T. S., 2004, p. 1111).

Psychosocial indicator: "A measurement that potentially relates psychological phenomena to the social environment" (Hemingway & Marmot, 1999, p. 1460).

Recessionary illicit drug use: The use of illegal substances, that is, heroin, cocaine, and/or methamphetamine, within recessionary years (Bretteville-Jensen, 2011).

Recessionary years: Years of economic decline defined by the U.S. Department of the Treasury, that is, years 2007 to 2009.

Residential mobility: A decision-making process that leads an individual to frequently change their residence "defined as the number of residential moves made by an individual during his or her lifetime" (Stokols, Shumaker, & Martinez, 1983, p. 7)

Social disorganization: "Social disorganization theory suggests that neighborhood structural factors disrupt a community's ability to self-regulate, which in turn leads to crime and delinquency" (Hart & Waller, 2013, p. 18). "Three structural factors—low socioeconomic status, ethnic heterogeneity, and residential mobility—disrupt a community's social organization, which in turn explains the spatial variations in the rates of crime and delinquency" (de Salvia, 2014, p. 219).

Social learning: "A differential association with those persons and groups (primary, secondary, reference, and symbolic) that comprise or control the individual's major sources of reinforcement, most salient behavioral models, and most effective definitions and other discriminative stimuli for committing and repeating behavior" (Akers, 1998, pp. 52–53).

Socioeconomic indicators: Income and occupation (employment; Bailey et al., 2015).

Assumptions

There are a number of assumptions to this study. A primary assumption is that social disorganization can be measured quantitatively. Furthermore, it is assumed that illicit drug use has a predictable socioeconomic and psychosocial foundation. As a result, a pattern of economic and socioeconomic factors is correlated to the psychosocial

consequences of illicit drug use to a specific population. It is also assumed that socially accepted and law tolerated substance abuse may not lead to social disorganization throughout the United States. Moreover, illicit substance abuse is recognized as an escape or coping mechanism to defer thought or perpetuate dissonance of disadvantage due to economic and socioeconomic situations. I assumed that substance abuse can be best understood by examining the socioeconomic and psychosocial factors associated with use, and how recessionary years play a role in the United States population during this process. It is also an assumption that social disorganization is a measureable construct by examining the exogenous factors: income, employment, education, family disruption, and residential mobility. In this study, I will use archival data collected from the SAMHDA. It is assumed that all materials and instruments used in the original data collection were valid and reliable for the targeted population.

Delimitations

In this study, I attempt to establish if illicit drug use correlates with social disorganization and an economic recession within the United States population. Based on the previously collected data, participants were sorted as users and nonusers of illicit drugs within a particular year. Because preexisting archival data were used in this nonexperimental study, issues related to internal and external validity cannot be controlled. Extraneous variables concerning internal validity such as history, maturation, testing, instrumentation, statistical regression to the mean, selection, experimental mortality, and selection interactions do not apply (Campbell & Stanley, 1966). Factors that affect external validity such as interaction with subjects, pretesting subjects, the

experimental setting, and treatments/interventions do not apply either (Campbell & Stanley, 1966). The dissemination of the results from this study is applicable to the unprotected United States population over the age of 18 as a whole. No causal inferences can be drawn due to the cross-sectional design of the study. Because the data are archival, I could not control any of the variables used in this study.

Limitations

The results of this particular study lacked an aspect of social disorganization (i.e., ethnic heterogeneity). The results from this data set were limited by the definition of substance use set by SAMHSA. This study was dependent on data being reported by individual states and compiled as a whole. Thus, the public access data used had some data removed or modified to protect the identity of respondents, which could influence this study. The study may not be as accurate as assumed, as an underlying belief is that all respondents were honest with their responses. SAMHSA did not collect data from jailed, homeless, or hospitalized individuals or military persons on active duty. Because these individuals are a part of a protected population and/or are within a controlled environment, these individuals were not included in the public access data set. SAMHSA answers a series of questions that I did not create and were not designed to specifically answer the research questions being examined. However, questions within the survey are exhaustive, and the hypotheses were derived based on the questions asked on the survey. Thus, the questions align perfectly with answering the research questions, thereby preserving construct validity.

Significance of the Study

By understanding how recessionary years affect the proliferation of substance abuse, psychologists can assist designing policies and treatment/preventative programs to deter substance abuse. Moreover, knowing how economic stressors affect individuals with current substance abuse issues, researchers and clinicians can study and prepare treatments geared towards this etiology. In turn, this study may help to plan and prepare for a possible pandemic of substance abuse in the United States (Collins-McNeil, MacCulloch, & Shattell, 2009). It is imperative that researchers understand how an economic recession may affect illicit drug use and the nation's growing need for subsidized treatment facilities. If patterns can be established and linked to present day human conditions such as addiction, effective approaches and an application to treatment or therapy may result. This approach to illicit drug use will fill the gap in the psychological literature by providing an environmental and economic context of substance abuse necessary to broaden the knowledge of this problem as well as provide direction for prevention. As a result, the implication of this research is important to the future of positive social change in the United States by providing evidence of illicit drug use predictors for policy changes in substance abuse treatment funding during an economic recession.

Summary

Chapter 1 has provided an introduction to the literature, a background of information germane to this study, a section describing the problem statement, the purpose of this quantitative study indicating covariates, independent and dependant

variables, and the research design, and questions and hypotheses. Furthermore, the theoretical framework through which this study will be examined, along with the definition of key terms has been provided. Lastly, the significance of performing this study along with all assumptions, limitations, and delimitations has been explained. Chapter 2 provides a more detailed exploration of the theoretical basis of this study citing previous research employing an ecological model, social learning, and social disorganization. Additionally, a detailed description of the covariates and independent and dependent variables is provided. Lastly, the nation's economy, how it is measured, and the effect an economic downturn can have on stress and anxiety is discussed.

Chapter 2: Literature Review

Introduction

Researchers have relatively ignored how an economic environment may affect determinants of social disorganization as it relates to illicit drug use, while substance abuse of new synthetic and more potent traditional recreational drugs is becoming more prevalent within the United States (Bretteville-Jensen, 2011; Ricaurte & McCann, 2005; Sivagnanam, 2012). Furthermore, researchers have largely failed to consider how the drug wars, driven by both finance and demand within the United States, play a significant role in the quantity, quality, and availability of illicit drugs during an economic downturn (Bretteville-Jensen, 2011; The MOST project, 2001; Thomas, 2012). These factors, coupled with the nation's growing economic crisis, have made illicit drug use an available and socially acceptable coping mechanism to relieve these stressors for thousands of Americans (Ritter & Chalmers, 2011). Therefore, the purpose of this quantitative analysis is to identify whether or not illicit drug use, within an ecological framework, inrceases due to determinants of social disorganization during recessionary years.

Literature Search Strategy

The review of this study's literature was attained by interpreting research from primary and secondary sources retrieved from EBSCOhost, SAGE, and Google Scholar citing the following terms: *social disorganization, social learning, illicit drug use, ecological models, economic psychology, economic recession,* and *psychosocial adaptation*. Through this study, a further analysis of individual demographics (age and

gender), socioeconomic variables (income and employment), and psychosocial history variables (education, family disruption and residential mobility) will determine whether a macrolevel enviromental change (i.e., a recession) affects factors of social disorganization in order to predict an increase in a microlevel issue (i.e., illicit drug use). Because there is very little research devoted to exploring how an economic downturn can affect illicit drug use, research was focused on exploring what existing theories could link illicit drug use to a large-scale phenomenon such as a recession. Within an ecological framework, illicit drug use was investigated through the lenses of social learning and social disorganization. Thus, by researching how to apply the economy to an ecological model, a connection may be made between an economic recession and illicit drug use.

The ecological model in conjunction with social learning and social disorganization theories have relevance to this study because all consider how maladaptive developmental processes can affect an individual's decision making as it pertains to illicit drug use as well as being viewed as part of a larger social issue (Menard & Morris, 2012). By exploring these theories through an ecological systems model as a factor of social disorganization and social learning, facilitated by an economic recession, this research study may impact the development of social policy, public policy, and governmental agency's approach to subsidizing treatment facilities (Walker, 2009).

Theoretical Foundation

The term anomie, the idea of a society lacking norms, was first introduced by Durkheim (1893) in his significant work, *The division of labor.* Through his work, Durkheim suggested that human behavior is governed by the unified order of a society,

and that conformity is the product of social integration and consistency, while deviance, such as illicit drug use, is the product of social disorganization (Besnard, 1993; Ruohui & Liqun, 2010). A healthy social system can be characterized as organized if norms, values, and social interactions are cohesive and interact in an orderly fashion (Shoemaker, 2000). Conversely, an unhealthy social system can be characterized as disorganized when there is an interruption in its social cohesiveness resulting in conflict and a collapse of social norms and values within the system (Cancino et al., 2007). Hence, Shaw and McKay's (1969) contention is that social disorganization is the failure of social solidarity within a particular community or society (Bursik & Webb, 1982). Therefore, social disorganization theory may be useful to describe and understand illicit drug use because it emulates the present social and economic state of our nation during this post recessionary era (Ritter & Chalmers, 2011).

While social learning theory contributes more to understanding how social indicators influence and affect individual illicit drug use through differential associations, there are few research discussions on how macrolevel structures may influence and affect an individual's decision to use illicit drugs due to associations or affiliations with role models (Bretteville-Jensen, 2011; Shaw, 2003). Researchers have found that the society in which an individual lives may dictate their choice of affiliation with certain groups of people (Lum, 2011; O'Hare & Mather, 2003). The groups of people an individual chooses to associate with due to societal pressures may inadvertently expose them to attitudes and behaviors conducive to the rationalization of illicit drug use (Enoch, 2011). Individuals living in a society during an economic recession may revert to rationalizing

behaviors that may have previously been considered taboo due to limited options during an economic downturn (Bretteville-Jensen, 2011; Katona, 1997). How macrolevel and microlevel factors and processes affect an individual provides sufficient grounds for integrating social disorganization with social learning. This helps to provide insight as to how one level of the ecological framework affects another.

How illicit drug use affects aspects of social disorganization (i.e., socioeconomic and psychosocial factors) and demographic factors (i.e., age and gender) were examined. Furthermore, an overview of illicit drugs (i.e., cocaine, heroin, and methamphetamine) are presented to illustrate the dangers associated with each substance. Finally, a summary of the economy, the prominent method for measuring the nation's economic health, and how an economic recession can affect people's anxiety and stress levels are discussed. The findings from this literature review were used to examine how an economic recession may affect micro- and macro-levels of behavior responsible for illicit drug use.

Ecological Framework

Bronfenbrenner's ecological systems model (1994) stated that an individual's development is shaped by environmental factors and divided in to five levels:

- Microsystem
- Mesosystem
- Exosystem
- Macrosystem
- Chronosystem

The microsystem is the innermost layer and refers to direct contact with those closest to the individual including work, school, daycare, or home (Bronfenbrenner, 1994; Rosa & Tudge, 2013). The relationships in this system are bidirectional or dependent on reciprocation (Rosa & Tudge, 2013). This level is generally the most influential of all five and most closely related to social learning. The mesosystem includes interconnected microsystems (Bronfenbrenner, 1994). An example would be a doctor speaking with a child's parents. The exosystem, which follows, does not involve the individual as an active participant, but still affects the individual (Bronfenbrenner, 1994). An example of this would be the government of a city. The government's actions used in running a city and setting local laws affect civilians even though the civilians are not members or active participants in the government's policies (Rosa & Tudge, 2013). The macrosystem refers to the cultural environment of the individual and all other systems that contribute to that macrosystem (Bronfenbrenner, 1994; Tissington, 2008). The chronosystem is the three-dimensional parameter of the environment that measures how characteristics either change or stay consistent over time (Bronfenbrenner, 1994).

Microsystem

The microsystem is the closest ecological level to the individual. It contains the structures with the most direct contact and embodies the interactions and relationships an individual has with his or her immediate surroundings, including one's family, friends, community, and workplace environment (Bronfenbrenner, 1994). At this level, bidirectional influences are the most potent and have the strongest impact on an individual's decision-making (Santrock, 2009). It is important to note that outer level

interactions can also have a profound effect on one's perception of microsystem factors (Banyard, 2011). This includes anything from fashion preference and cuisine to political views and recreational behaviors.

The microsystem is an individual's primary environment and is typically the initial medium through which an individual learns about the world (Bronfenbrenner, 1994). Given an individual's introductory and most intimate learning atmosphere is within the realm of social learning, this microsystem process is usually the template for how an individual understands the world (Myer & Moore, 2006). While social learning is responsible for many of an individual's microlevel processes, such as substance abuse, it has the capacity to extend beyond microsystem mechanisms and apply to larger systems (Hartinger-Saunders & Rine, 2011). Because the microsystem provides individuals with their initial nurturing and development, the compilation of learned behaviors and experiences provided at this level can set the tone for how much influence outer level systems will have in the future (Aneshensel, Ko, Chodosh, & Wight, 2011).

Macrosystem

The macrosystem is the furthest ecological level from an individual, but it contains structures that can have a profound effect on one's behavior (Myer & Moore, 2006). It consists of laws, customs, and cultural values, and it refers to a society's organization and the ideological foundation for which it stands (Bronfenbrenner, 1994). Furthermore, macrosystems describe how societal groups structure socioeconomic class, ethnicity, and religion as well as actuating the how, when, where, and what relationships people engage (Bronfenbrenner, 1994). Given that a macrosystem is the outermost level

of an individual's ecological structure, it can have a surging influence throughout all the inner levels and affect a large group of individuals in any number of similar and/or different ways (Rosa & Tudge, 2013). Since a substantial number of lives are affected, a macrosystem can either unite or pull apart a society. From a precautionary viewpoint, this is how the social learning of illicit drug use may affect a macrosystem, leading to social disorganization (Moon, Patton, & Rao, 2010).

A social ecological systems model is based on the thought that the family is the immediate environment surrounding the individual, which can be adapted in a variety of ways (Bronfenbrenner, 1994). Bronfenbrenner (1994) discussed the association between the child's familial background, adulthood occupation, and educational accomplishments. Although the focus of this study is not about occupational and educational attainment, there is a connection between the familial background of an individual and what happens once that individual reaches adulthood (Rosa & Tudge, 2013).

Social Learning

One of the most instrumental psychological theories of behavior is the social learning theory created by Bandura (1969). According to social learning, conditioned behavior is a network of rewards provided by modeling and physiological triggers (Bandura, 1969, 1977). These rewards are directly imposed on an individual by their parents at an early age. They can also be a result of actions of influential social peers (Capece & Lanza-Kaduce, 2013).

When people develop attitudes and behaviors through reinforcement, punishment, and modeling, these learned responses are an imitation of learned behaviors used to cope

with specific situations (Kelso, French, & Fernandez, 2005). The formation of learned behavior is the basis for social learning and implemented through four components of the imitation process: close contact, imitating superiors, understanding concepts, and behavioral role models (Fisk, 2004). Individuals imitate behaviors that have positive responses and avoid negative responses from their social models (Davis & Luthans, 1980). Therefore, individuals conditioned in an environment where substance abuse is rewarded (has the appearance of pleasure, respect, and/or gratitude) will imitate these behaviors to be rewarded, thereby reinforcing those views and behaviors (Ford, 2008).

According to the social learning theory, observation is the basis for the development of imitated behaviors. This has led to an emphasis on how social situations and exposure to models affects an individual's cognition and the synthesis of information, which is an essential aspect of forming beliefs, attitudes, and values (Prati, 2012). Through this observational learning, an individual may actively attend to, encode, and retain behaviors portrayed by social role models (Orcutt & Schwabe, 2012). Thus, if social models perform maladaptive behaviors, the observer may retain and display those same beliefs, attitudes, and values that lead to maladaptive behaviors (Davis & Luthans, 1980; Prati, 2012). With this in mind, people may occasionally react with aggressive or passive aggressive behavior towards any number of dilemmas in different ways learned through encoding social situations, such as substance abuse (Ong et al., 2013). Therefore, the cognitive processes that accompany social learning can provide insight used to better understand maladaptive behavior concerning substance abuse.

Cognitive Social Learning

Examining social learning theory from a substance abuse perspective, research can be directed towards model groups and the obtainment of beliefs and values accommodating this behavior (Paterson, 2002; Prati, 2012). This is built on ideas adopted from cognitive learning theory. The cognitive concept of substance abuse through social learning primarily focuses on knowledge and awareness (Niaura, 2000; Zentall, 2011). Two approaches to the cognitive concept are the information-processing approach and the constructivist approach.

The information-processing approach, commonly described as an abstract analysis, does not explicitly describe the neural events taking place during the act of learning (David, Miclea, & Opre, 2004). Instead, an abstract simulation of these processes is used to describe the act of learning and is often compared to computer programming (Daniels et al, 2009). For instance, the cognitive view to problem solving can be compared to the systematic progression found in a computer where an initial state progresses towards a goal state (Robinson-Riegler & Robinson-Riegler, 2008). This computer simulation is known as the general problem solver (GPS).

The GPS approach tries to reduce the distance needed to achieve a goal by breaking down problems into subgoals. While operators or techniques do the subgoal analysis, the important component of the GPS approach is the concept of problem space (Robinson-Riegler & Robinson-Riegler, 2008). Problem space refers to the mental representation of a problem and the amount of intermediate states between the initial state and the goal state (Robinson-Riegler & Robinson-Riegler, 2008). Therefore, with regards

to financial difficulties and substance abuse, a user may represent their initial state as "feeling bad" due to losing money in the market or becoming unemployed, and the goal state as "feeling good" by using chemicals (Boeri, Sterk, & Elifson, 2006). While these two states are relatively obvious, the intermediate phases, which connect the initial and goals states, are what researchers are interested in understanding (Niaura, 2000; Zentall, 2011).

The constructivist approach postulates that sensory stimulation is insufficient on its own to promote learning (Økland, 2012). Therefore, the brain must have past experiences in order to interpret sensory cues that by themselves may be vague and difficult to understand (Zane, 2009). Moreover, by assembling these ambiguous cues with past behavioral experiences, an individual can learn through his or her perceptions of the world (Robinson, 2004). With this said, perhaps the best theory for explaining learning is through a combination of behaviorism and cognition.

Cognitive-Behavioral Social Learning

Bandura's theory of social learning is a bridge between behaviorism and cognition (Neziroglu, Khemlani, & Veale, 2008). With this premise in mind, social learning is understood by four key elements: (a) people learn by observing behaviors and from suffering the consequences of those behaviors, (b) while someone may learn a behavior, they may not perform that behavior, (c) while reinforcement may enhance learning, it is not a necessary, and (d) cognitive processes play a role in the learning process (Davis & Luthans, 1980; Wheeldon, 2009; Zentall, 2011). These principles of social learning have led to the four phases of observational learning: attention, retention,

motor reproduction, and reinforcement/motivation (Kretchmar, 2008). This understanding coincides with the behavioral and cognitive processes involved with social learning.

Considering the preceding, there must be a behavioral and cognitive process happening when people learn to behave in a society (Davis & Luthans, 1980). Looking at the components of observational learning it is clear why this process makes sense. First, people cannot learn by observation unless they attend (attention). Second, in order to have learned something, a person must recall the attended observation (retention). Third, in order to replicate a behavior, one must have the necessary cognitions and motor skills (motor replication). Lastly, people do not simply imitate behaviors (Akers et al., 1979). An individual must possess some type of motivation (reinforcement/motivation) in order to replicate a behavior (Deci & Ryan, 1987; Feltenstein & See, 2008). The idea behind social learning is that individuals repeat behaviors that are reinforced and avoid repeating behaviors that are damaging to the cognitive and behavioral mechanism (Akers, 1985; Kao et al., 2014). From this, research may be able to understand how a micro-level influencer such as social learning can affect a society on the macro level (Lee, Akers, & Borg, 2004).

Social Disorganization and Social Learning

Social disorganization, which can be described as "A decrease in the influence of existing social rules of behavior on members of society, and a weakening of relationships as a result of communities that do not clearly articulate values and norms", serves as an effective theory to analyze different levels of behavioral dysfunction (Porter, Rader, &

Cossman, 2012; Robinson, 2004, p. 227; Weisburd, 2012). In particular, it provides a platform for how socio-economic factors affect individuals at the micro-level and a society on the macro-level (Shaw, 2003). Furthermore, it provides a fractal view of behavior that includes research extending from micro to macro levels and may contribute to our understanding of the insurgence of illicit drug use in the United States (Martinez, Rosenfeld, & Mares, 2007). Since this model has been applied, redesigned and debated by researchers for nearly half a century, its ability to conform to a number of research applications makes this theoretical perspective ideal to develop a new model in order to reflect our nation's current societal conditions as a result of the latest recession of 2007-2009 (Browning, 2002; Teasdale, Clark & Hinkle, 2012).

In an attempt to use social disorganization's flexibility as a theoretical framework for this study, social disorganization is exemplified as the inability of a society to achieve social control due to devalued morals and maladaptive behaviors due to illicit drug use (Shoemaker, 2000). Adopted from Sampson and Groves (1989) definition of social disorganization as a neighborhood's inability to attain common goals and sustain effective social control due to low socioeconomic status (SES), racial heterogeneity, high residential mobility, and disruption within the family; this study's scope will be based on American society. This description allows for a larger macrolevel view. With its coverage of illicit drug use rates across several social factors, social disorganization's macro-level view contributes an important aspect towards completely understanding the psychological aspects of substance abuse during a societal crisis (Shaw, 2003). When conceptualized through a microlevel view, such as social learning, a more expansive

analysis of behavioral indicators can be extrapolated to understand illicit drug use in our society (Hayes-Smith, 2009).

Past meta-analyses of macrolevel factors of illicit drug related behaviors have identified several social characteristics consistent and correlated to substance abuse (Çam, 2014; HeavyRunner-Rioux & Hollist, 2010; Pratt & Cullen, 2005). These macrostructural factors, specifically low SES, family disruption, and residential mobility, have an enormously influential effect on illicit drug use (Pratt & Cullen, 2005). As a result, Pratt and Cullen (2005) suggest that many theoretical perspectives, including social disorganization and social learning, overlap in their predictions regarding social and behavioral indicators of substance abuse (Wheeldon, 2009). For example, poverty is an indicator of socioeconomic status, which is an essential aspect of social disorganization and a probable consequence of many micro-level factors, one of which being socially learned substance abuse (Cooper et al., 2009; Cooper, Fox & Rodriguez, 2010). Furthermore, socioeconomic status is germane to an economic recession, which is a primary factor in a working systems model of social disorganization and the health of an economy (Teasdale, Clark, & Hinkle, 2012).

Previous Studies

Akers (2005) suggested that in order to better understand any deficiencies social learning has towards understanding criminal activity, such as illicit drug use, researchers should recognize the impact social structural has on deviant behavior (Akers, 2011). In doing so, these researchers proposed that social learning is the underlying psychological process through which a social structure may promote deviant behavior (Akers, 2011).

Therefore, Akers (2005) emphasized how the structure of a society may provide learning environments where individuals learn what behaviors are acceptable.

Lee, Akers and Borg (2004) tested this paradigm by examining the relationship between social structural variables and deviant behavior. They believed micro-level variables would have a dynamic relationship between macro-level variables and deviant behavior by examining illicit drug use. Through the social learning variables defined by Akers et al. (1979, 1985, 1998), Lee, Akers, and Borg (2004) envisioned four measurements of social structure: (1) differential social organization, (2) differential location in the social structure, (3) theoretically defined criminogenic aspects of the social structure, and (4) differential spatial location. The results suggested that variables stipulated in the process of social learning accounted for a significant amount of an individual's potential to use illicit drugs (Lee, Akers, & Borg, 2004). Moreover, social learning variables arbitrated a considerable amount of the relationship between several of variables in macrolevel models and illicit drug use (Lee, Akers, & Borg, 2004.). This emphasizes the importance of including microlevel variables in macrolevel structured models.

In a more recent study, Kingston, Huizinga and Elliot (2009) found that macro-level structures affected microlevel processes and delinquent opportunities in communities. They found that low SES and an individual's perception of limited opportunities was a strong predictor of delinquent behavior in high-risk communities (Kingston, Huizinga & Elliot, 2009). While this research team had suggestions for offering better opportunities to these individuals, they did not address the underlying

issue of the macrolevel system that influenced the micro-level process variables (Kingston, Huizinga, & Elliot, 2009). Given this gap in the research, this researcher has utilized an ecological model based on social learning and social disorganization that directly addresses a particular macro-level structure (i.e. the health of an economy).

The Economy

The three cornerstones of a functioning economy are: a) production- creating a product from materials, b) distribution- the process of allocating goods and income in a capitalist economy ruled by supply and demand, and c) consumption- the purchase of goods and services (Hart & Sommerfeld, 1998; Landefeld, Seskin, & Fraumeni, 2008; Malehorn, 2011; Mcleod et al., 2012). Today's economy stretches beyond any one region due to the almost instantaneous communication and computerized interconnectivity (Manski, 2015). A web of links creates a world economy where the economy of one country or region can have a dramatic impact on the rest of the world (Manski, 2015). When an economy slows down, it impacts businesses and reduces the goods and services that are sold, which in turn affects people individually and influences their lives (Hinze, 2011; Kitov, 2005; Ritter & Chalmers, 2011). During a recession, the economy shrinks and jobs are lost, and money is not easily available to individuals due to job loss, reduction in hours, and use of savings (U.S. Bureau of Labor Statistics, 2012).

The 2007-2009 recession experienced by a large portion of the world's most financially stable regions has affected people in the recessionary regions and beyond (Treloar, 2010). Research indicates that economic contraction can be linked to increased depression, substance abuse and suicidal behaviors in the population suggesting that a

recession could be linked to increased mental health issues (Goldman-Mellor, Saxton, & Catalano, 2010).

The field of economic psychology has been in existence since the early 20th century. There is a need for this area of study because the force behind economic changes and fluctuations is human behavior, cognition and emotion (Roland-Levy & Kirchler, 2009). In addition, associated with recession are individual issues such as stress, depression, and substance abuse (Goldman-Mellor, Saxton, & Catalano, 2010; Ritter & Chalmers, 2011).

Measuring the Health of an Economy

During a recession, economics dictate that the monetary health of a given State is weak, but how this economic weakness is measured can vary (Hart & Sommerfeld, 1998; Macunovich, 2012; Malehorn, 2011; Mcleod et al., 2012). However, the monetary value of goods and services provided by a country, known as the Gross Domestic Product (GDP), is the benchmark for its economic health (Ivanova, 2013). A nation's GDP takes into account the output of these goods and services produced within any particular market, as well as nonmarket productions provided by that population's government such as defense, education programs, tax collection, regulation, and census surveys (Rapach, 2002; Sanchez & Omar, 2012).

Generally, populations know how their economy is performing by determining if the output of goods and services is thriving or shriveling (Ivanova, 2013; Kitov, 2005). However, since GDP typically formulates a percentage at a current moment, no one can compare separate periods of growth or loss without making an adjustment for inflation

(Hegwood & Papell, 2007). Therefore, the "real" GDP estimates the nominal value of an economy by adjusting for monetary changes, such as inflation, by using a particular year's monetary strength as a standard (Werner, 2013). By using this "base year" researchers are able to ascertain whether output value has increased due to higher production or merely due to prices increasing, according to that particular year, and statistically adjust the GDP from a nominal price to a continuous price (Hart & Sommerfeld, 1998; Sanchez & Omar, 2012; Werner, 2013). This is important because it provides information about how a country's economic stability is performing.

Since the GDP's growth rate can be used to indicate the current and future health of a population's economy, it can also be used as an indicator of the general health of any given economy (Ivanova, 2013). Thus, a nation's economy is measured based on an increase or decrease of real GDP (Manski, 2015). Typically, a growth in GDP signifies an increase in employment because businesses tend to employ more personnel for their production translating in individuals having more currency to spend (Werner, 2013). When GDP is shrinking, as it did during the recession of 2008, unemployment increases led to individuals having less to spend (USBLS, 2012). Moreover, the GDP may be growing, but not quick enough to generate an adequate amount of jobs for individuals seeking employment.

Real GDP growth continuously moves in cycles where the population's economies have periods of strength and weakness. For instance, the United States has experienced six recessions between 1950 and 2011 (Aslanidis & Fountas, 2014). As a result, the consensus amongst economic literature equates annual growth of the GDP as

an increase in humane welfare (Ivanova, 2013; Kitov, 2005). However, although the GDP does measure human welfare indicators such as employment, education, and production, it does not take into account health, family disruption, residential mobility, or crimes (illicit drug use), which are indicators of social disorganization (Sampson & Groves, 1989; Werner, 2013). Thus, by taking into account how a recession, which is reflected by a macro level measure like the GDP, researchers can better gauge recessionary affects from a micro level indicator such as illicit drug use (Kitov, 2005).

Illicit Drugs

This section discusses the three illicit drugs that will be studied: a) cocaine, b) heroin, and c) methamphetamine. The discussion explores the origin of these substances, the metabolic processes that occur upon ingestion and how these substances affect an individual's overall health.

Cocaine

Derived from the South American coca plant, cocaine is an extremely addictive stimulant drug (Gootenberg, 2014). When ingested, cocaine blocks the reuptake of norepinephrine and dopamine increasing the amount of these neurotransmitters at the receptor sites, which induces short-term feelings of euphoria accompanied with higher energy and talkativeness (Agarwal, Srivatsal, & Sen, 2013; Holman, 1994.). The duration of these desired effects, depend largely on the method by which the drug is administered. While sniffing the powdered form of cocaine may last a half hour, smoking or intravenous use may last only 5 to 10 minutes (Vaughn et al., 2010). While these effects may be interpreted as beneficial or pleasurable to the user, the physiological side effects

can lead to serious health issues or death (Buffalari, Baldwin, & See, 2012). These health issues may include pupil dilation, blood vessel constriction, and an increase in body temperature, heart rate and blood pressure (Vaughn et al., 2010). Cocaine use can also lead to severe headaches, heart-tissue damage, cardiac arrest and/or stroke (Lile et al., 2011). Given the short duration of cocaine's "high", users often continuously administer the drug in order to escape the depression and anxiety normally associated with withdrawal and perpetuate the desirable affect for longer periods of time (Buffalari, Baldwin & See, 2012). This binge usage of cocaine inherently leads to addiction, which in turn affects behavior through an uncontrollable desire to use more regardless of the consequences (Mandt et al., 2012).

Cocaine's stimulant properties affect the central nervous system by increasing dopamine levels in brain (Holman, 1994). Dopamine is a neurotransmitter that regulates pleasure interpreted by the brain (Verheij et al., 2008). Usually, neurons release dopamine in response to natural rewards such as the olfactory's recognition of good tasting food and/or sexual gratification (Mandt et al., 2012). Under normal circumstances, dopamine is recycled back into the neurons where equilibrium is achieved by shutting down the signals between neurons. While under the influence of cocaine, dopamine reuptake is prevented (Verheij et al., 2008). As a result, copious amounts of dopamine pile up in the synapse between neurons. This buildup of dopamine intensifies the neurological signal and interrupts normal brain function, which is what produces cocaine's characteristic euphoria (Garavan, Kaufman & Hester, 2008).

As users continue to ingest cocaine, their brain's reward system can become altered towards physiological and psychological addiction (Buffalari, Baldwin, & See, 2012; Decorte, 2001). Given dopamine produces pleasure, addiction of cocaine can be described as a dopaminergic control of reinforcement (Verheij et al., 2008). This leads to behaviors directed solely towards the administration of cocaine. Furthermore, repeated use of cocaine leads to the development of tolerance; therefore, the frequent and consistent cocaine user requires more of the drug to achieve the desired effect (Garavan, Kaufman, & Hester, 2008). In turn, this increases the user's risk of developing pernicious physiological and psychological ailments.

Heroin

Heroin abuse has proven to have a substantial resurgence in the United States over the last decade. During 2003–2012, the occurrence of emergency room heroin overdoses increased from 1.0 to 7.9/100,000 persons, and heroin hospitalization due to overdose increased from 0.7 to 3.5/100,000 which has had a significant affect on the cost of healthcare (Meiman, Tomasallo, & Paulozzi, 2015). Heroin-related deaths were predominantly among urban residents; however, rural fatalities accounted for zero deaths in 2003 but 31 (17%) deaths in 2012 (Meiman, Tomasallo, & Paulozzi, 2015). Despite considerable funding to combat heroin use, the market for the highly addictive narcotic has proven to be resilient which suggests a better understanding of the role economics plays in the heroin market (Heard, Bobashev, & Morris, 2014).

Indigenous to Asia, the opium poppy plant's seed pods are the main ingredient in the pain reliever morphine (National Institute on Drug Abuse, 2015; Strang, Griffiths, &

Gossop, 1997). Synthesized from morphine, heroin is an illicit opinoid drug that appears as either a brown or a white powder in its most potent form (NIDA, 2015). Being a modified form of morphine, heroin is extremely addictive. Since heroin users have no way of knowing the strength or composition of their heroin purchase, the risk of an overdose, poisoning and death is extremely high (Elliot & Chapman, 2000; NIDA, 2015).

Heroin can be ingested intravenously, by sniffing or it can be smoked (NIDA, 2015; Strang, Griffiths, & Gossop, 1997). Regardless of its administration, the delivery of heroin's chemical properties to the brain is extremely rapid. Individuals who sniff or smoke heroin may not experience the initial euphoric state intravenous users do, but the other effects are typically the same (Paolone et al., 2007). This is perhaps the reason why intravenous use is the preferred method of delivery for habitual users.

Habitual heroin use changes the opiate activation of the tegmentostriatal pathway in the brain (Westerink, Kwint & deVries, 1996). The result of this chronic use leads to tolerance and dependence where the user requires more of the drug to experience the desired euphoric effect, and a greater dependence on the drug is required in order to feel "normal" (Eaves, 2004). Habitual use of heroin eventually leads to a physical dependence of the drug since a user's body adapts to having heroin present, and withdrawal symptoms will quickly ensue, usually beginning within hours of the user's last ingestion, if use ends (Preston & Epstein, 2011). While heroin use leads to serious health issues, disease and criminal activity/incarceration, the symptoms of withdrawal include intense bone and muscle pain, restlessness, diarrhea, nausea and vomiting, and cold sweats with goose bumps and typically requires pharmacological treatment (Degenhartdt et al., 2011;

NIDA, 2015). These symptoms are accompanied with the intense craving for more of the drug. Research suggests that proinflammatory molecules released by the activation of neuroglial cells, which are used to maintain homeostasis, are correlated to the dependence and symptoms of withdrawal experienced by heroin users (Ouyang et al., 2012).

Methamphetamine

Similar to an amphetamine, methamphetamine is a Schedule II stimulant drug that affects the central nervous system (Carson et al., 2012). Since methamphetamine is highly addictive, it is only available by a physician's non-refillable prescription (National Institute on Drug Abuse, 2015). Because these low dose prescriptions have few medical purposes, the commonly abused form of methamphetamine originates from foreign and domestic "super-labs" and small illegal laboratories (NIDA, 2015). Methamphetamine is an odorless, white bitter-tasting crystal that is soluble in water and alcohol. Users typically smoke, snort, or inject the drug intravenously (NIDA, 2015).

Methamphetamine takes a similar pathway through the brain as cocaine by increasing the release of dopamine and blocks the reuptake of this neurotransmitter in the brain (Zaitsu et al., 2014). This leads to heightened levels of dopamine and facilitates the mechanism known as the dopaminergic control of reinforcement, which is thought to promote abuse (Zaitsu et al., 2014). As previously mentioned with cocaine, dopamine is a neurotransmitter that is produced from the amino acid tyrosine (Thompson et al., 2004). Located within the synapses between the substantia nigra and basal ganglia, dopamine is associated with motivation, reward, motor function and pleasure (Simmler, Wandeler, &

Liechti, 2013). Given methamphetamine's properties, users are attracted to this rapid release of dopamine that stimulates the reward regions of the brain.

Functional Magnetic Resonance Imaging (fMRI), using high-powered and rapidly oscillating magnetic fields, has shown how habitual methamphetamine abuse changes and significantly alters brain function (Thompson et al., 2004). These changes to the dopamine system have been linked to impaired verbal learning and a reduction in motor skills (Carson et al, 2012). Furthermore, these studies have also shown that these severe functional and structural changes in the brain are associated with cognitive and emotional pathologies, which may account for many of the emotional and cognitive issues found in methamphetamine abusers (Abar et al., 2013). With repeated use, methamphetamine abusers become addicted, which leads to compulsive drug use (Halkitis, 2009). As a result, these maladaptive changes to the brain take years to reverse or may become permanent.

Variables

This section's focus is to inspect the variables that can be influenced by illicit drug use during recessionary years based on factors of social disorganization. Independent variables will be determinants of social disorganization: (a) income, (b) employment, (c) education, (d) family disruption {marriage/single versus divorced}, and (e) residential mobility. The dependent variables will be drug use (use or nonuse) and the Gross Domestic Product (GDP). Age and gender will be analyzed as covariates. Variables within this study represent a longitudinal observation of socio-economic factors

and substance use within the United States. Within this section, a depiction of the variables is discussed.

Demographic Variables

Demographic variables to be addressed as they are related to social disorganization include age, gender and illicit drug use.

Age and illicit drug use. Recently, several studies have expressed a universal trend reporting that individuals are experimenting with illicit drugs at an earlier age (Darke, Kaye, & Torok, 2012). In order to investigate this association between earlier age and illicit drug use, it is important to consider divisions between age groups and psychosocial circumstances (Bailey et al., 2013). For instance, research has suggested that individuals between the age of 18 to 25 are more likely to use illicit drugs due to developmental life stressors such as changes in their environment leading to more independence (i.e. introduction to college and the workforce) (Halkitis, Manasse, & McCready, 2010). This critical developmental period of "emerging adulthood" suggests this age group is more susceptible to illicit drug use due to a lack of transitional ease (Halkitis et al., 2010). However, developmental theories focusing on ecological factors postulates individual traits triggered by environmental factors may also sway the actions and attitudes of adults between the ages of 20 to 39 to use illicit drugs (Fischer, Clavarino, & Najman, 2012). This may explain why each succeeding generation has initiated in the use of illicit drugs at an earlier age than each preceding generation (Darke & Kaye, 2012; Degenhardt, Lynskey, & Hally, 2000). Concurring with this notion, today's middle-aged population, between ages 45 to 65, is part of a growing generation

that will increase the size of the illicit drug user population (Hartel et al., 2006). Thus, it would be prudent to investigate whether an economic stressor affects one or more of these age groups in a similar way. It is important to note, survey questions regarding an individual's earliest age of illicit drug use may experience measurement error due to a lack of accurate recall which is especially true the longer it has been since initial use, especially if use has been chronic (Harris et al., 2008; Johnson, 2014; Johnson & Mott, 2001).

Gender and illicit drug use. In the past, it was considered relatively uncommon to associate widespread illicit drug use with females while treatment and research focused on the needs and experiences of males. However, recent studies have estimated that females make up about one third of all illicit drug users (Chow et al., 2013; Fischer, Clavarino & Najman, 2012; French, Fang & Balsa, 2011). With this in mind, previous research has been somewhat ambiguous on gender correlated illicit drug use (Nguyen & Reuter, 2012). While research has reported that males are considerably more likely to admit using illicit drugs such as cocaine and methamphetamine, other studies have failed to find any gender differences in drug use prevalence (Hartel et al., 2006; NSDUH, 2004). Conversely, when socio-demographic factors are examined, research suggests men use illicit stimulants at a significantly higher rate than females (Lanier & Farley, 2011; McCabe et al., 2005). Furthermore, the latest studies suggest men are heavier consumers and start using illicit drugs at an earlier age than females (Malbergier, 2012; Newcomb et al., 2014). Despite these discrepancies, it is still unclear how males and females may differ with the onset of an economic stressor.

Socioeconomic Variables

Socioeconomic variables are addressed as they are related to social disorganization that includes income and employment.

Income. Supply and demand presumes that as the supply of illicit drugs increases, the cost for those drugs becomes less expensive. Therefore, the income necessary to purchase illicit drugs becomes less problematic. Since the demand for illicit drugs comes from individuals within all socioeconomic levels, drug purchases are not always subsidized by selling drugs but also by legitimate employment and income (Reuter, Pacula & Caulkins, 2011). Bushmueller and Zuvekas (1998) found younger adults, between the ages of 20 to 29, who occasionally participated in illicit drug use performed better at their jobs than nonusers and were positively correlated with higher incomes. However, they also learned that there is a negative correlation between income and drug use among individuals between the ages of 30 and 45 years (Bushmueller & Zuvekas, 1998). This suggests that as these younger employed adults continually use, their addiction requires more time and resources negatively affecting their performance and/or income. Considering this evolution of use, Caulkins and Reuter (1998) suggested that higher illicit drug prices and the need to use more frequently drives users to engage in high risk behavior to obtain drugs and become more efficient with their drug use delivery mechanism (e.g., intravenous vs. smoking or snorting). Therefore, not only do individuals with lower income use illicit drugs more often than individuals with higher income, but also when prices are high lower income users may put their health more at risk (Caulkins & Nicosia, 2010). This suggests that if individuals with higher income levels were “let

go" from their positions or were to have their salaries reduced, their drug use may become more habitual and hazardous. This is congruent with the hypothesis that drug use will increase during recessionary years.

Classic research by Gill and Michaels (1992) suggested that drug use may increase as wages increase but would attain slower wage growth (Gill & Michaels, 1992). This is built on the premise that more income allows drug users to purchase more substances. Later research has found that although most illicit drug users are employed, these individuals tend to be lower wage earners and advance in their careers with reduced speed (DeSimone, 2002; French, Roebuck & Alexandre, 2001; Rivera et al., 2011). As previously stated, many illicit drug users are within the "emerging adult" age group and may have more propensities to use resources to purchase drugs through their allowances, further suggesting there is a positive correlation between drug use and income in younger individuals (Halkitis, Manasse, & McCready, 2010). Considering this and the idea that recessionary years produce budget restraints, mass layoffs, and force individuals to accept part-time employment, Markowitz and Tauras (2006) found that individuals earning income through part-time employment are more likely to use drugs and with more frequency. Therefore, it would be prudent for researchers to extend an investigation into how economic stressors may affect illicit drug use.

Employment. An issue that may occur while considering illicit drug use is how the employment/drug use paradigm may affect wages and productivity in the workplace. Individuals displaying inveterate illicit drug use have a history of unemployment and research suggests that interventions to provide sustainable employment for them are

largely unsuccessful (Carpenedo et al., 2007). Furthermore, employed illicit drug users may undermine businesses attempting to compete, especially during an economically volatile period, by providing less productivity and efficiency on the job (Frone, 2006). However, lifestyle factors relating to societal behaviors of nonconformity, in particular illicit drug use, have not been considered as variables of socioeconomic success (Chow, 2013; Kandel, Chen, & Gill, 1995). Thus, illicit drug associations among employed individuals may be an influential factor to consider. Humensky (2010) suggested that drug use was correlated with a reduced rate of employment according to the economic model of supply and demand. While several studies have shown that low childhood socioeconomic status is associated with illicit drug use in adulthood, there is evidence to suggest illicit drug use may be influenced by price and availability, which is consistent with "supply and demand" (Brook et al., 2011; Humensky, 2010; Onyeka et al., 2013).

Van Ours (2006) investigated how past and present cocaine and marijuana affected employment and productivity in the workplace. Van Ours (2006) found that the rate of securing a job decreased as soon as an individual began using illicit drugs and that an individual's past drug use also affected their likelihood of finding employment. Interestingly, as past demand for marijuana increased, the unemployment rate increased and while past cocaine use increased the unemployment rate decreased (Van Ours, 2006). While this work is certainly valid, other research has postulated there is an inverse correlation with respect to cocaine (Chatterji, 2006). That is, if there were fewer employment opportunities during an economic recession, would an increase of illicit drug use take place?

Psychosocial History Variables

Background variables are addressed as they relate to social disorganization that includes education, family history (marriage), and residential mobility,

Education. While many researchers have studied the correlation between drug use and low-education levels, there is some controversy about how these variables are interconnected (Grant et al., 2012). Thus, the real question is how these variables are interrelated (Chatterji, 2006). While some individuals may become frustrated and less involved with education due to intellectual disabilities, others may become disenfranchised with school due to socioeconomic pressures that lead to drug-influenced ventures (Galea, Nandi & Vlahov, 2004). These individuals are more likely to engage in maladaptive behavior and as a result are less likely to fulfill an educational requirement and more likely to become an illicit drug user (Chatterji, 2006; Grant et al., 2012; Maxwell, Tackett-Gibson & Dyer, 2006). Even though this premise may seem straight forward, there are several extraneous variables to consider before a plausible conclusion can be made (Alameida et al., 2010). For instance, some researchers view education abandonment as a disengagement from a societal norm, thereby increasing an individual's likelihood to become a drug user (Grant et al. 2012; Krohn et al., 1999). Conversely, other researchers hypothesize that many individuals may reduce stress by abandoning education; thereby reducing their incentive to become drugs users (Chatterji, 2006). However, Merline et al. (2004) found that individuals with a college degree were significantly less likely to use illicit drugs than those who had not attended college. Given there are varying thoughts on how an education and the stress of attaining an education

can affect illicit drug use, the exploration of an economic stressor and its correlation to illicit drug use and determinants of social disorganization could reveal how education levels affect stress induced illicit drug use.

Krohn, Thornberry, Collins-Hall, and Lizotte (1995) and Grant et al (2012) utilized several variables associated with education and family demographics to correlate dropout rate, drug use and maladaptive behaviors to a working model design. These researchers were looking to answer how prior delinquency affects drug use and how scholastic dropout affects subsequent delinquency and drug use. While the findings were significant, the researchers believed other variables might be correlated to other predictor values (Grant et al., 2012; Krohn et al., 1995). In fact, Chatterji (2006) built a model designed to measure the correlation between illicit drug use during high school and the number of years of high school completed. Her findings suggested that demands for marijuana and cocaine decrease as an individual's successfully completed grade level increases.

Family history (marriage). In the past, little research existed on the homophily of illicit drug use among married couples (Yamaguchi & Kandel, 1993). However, given a surge in the interest of illicit drug use and health, several studies have suggested marriage prevents health-risk behavior such as illicit drug use, especially for men (Duncan, Wilkerson, & England, 2006). Furthermore, researchers have found that when marriage satisfaction is high there is a decrease in illicit drug use (Homish, Leonard, & Cornelius, 2010). These conclusions are based on the idea that marriage is an institution of societal and social norms that promote healthy living (Duncan, Wilkerson, & England,

2006). However, there are instances where both individuals in a marriage associate with illicit drug users and model their way of life based on these peers attitudes and behaviors (Brook et al., 2009). While these findings are not surprising according to traditional social roles and adaptation of behavior, the issue of either or both individual's mental health can play a large role as a determinant of illicit drug use (Homish, Lenard, & Cornelius, 2010). Additionally, both individuals may be more inclined to use illicit drugs to cope with a stressor even if there is not an existing psychopathology and a traumatic experience is introduced, such as losing employment and/or monetary stability (Marshall et al., 2011). These findings further suggest that an economic "catastrophe" could be construed as traumatic or a stressor that leads to illicit drug use and should be investigated.

Residential mobility. The premise that residential mobility is an aspect of social disorganization is well known, but the idea of residential mobility alone as factor of illicit drug use is not as clear-cut. Often times, residential mobility is considered a positive move towards opportunity and an escalation in quality of life (Cook, 2014; Coulter & van Ham, 2013; Schafft, 2006). However, an abundant amount of research has demonstrated that residential instability harms an individual's ability to find employment, stabilize social ties, and improve community cohesiveness (Chang, Chen, & Somerville, 2003; Cooke et al., 2009; Knies, 2013). This dual view of residential mobility is largely due to an assumption that the changing of one's residence is voluntary and directed towards an investment in improving one's lifestyle (Schafft, 2006). However, it is important to consider that moving from one residence to another can have significant psychological

and sociological effects on an individual, especially if the move is driven by loss of income and/or employment, housing and mortgage markets, and/or the economy as a whole (Pendakur & Young, 2013). For instance, during the housing bubble of the 2007-2009 recession, mortgage finance programs declined due to misguided market policies resulting in consumer illusions of rising housing values (Levitin & Wachter, 2012). This resulted in approximately 220,000 homes being lost to foreclosure by mid 2008, which was three times as many than the previous year, resulting in default-induced mobility (Ferreia, Gyourko, & Tracy, 2010).

With this in mind, it is important to realize that the housing market constitutes a significant portion of the GDP relying on a number of textiles and goods such as wood, steel and other building materials (Leung, 2004). Given that the housing market is such an integral part of the United States macro-economy, it is not surprising that residential mobility is lower among economically stable young adult homeowners (Leung, 2004; Schafft, 2006). This is built on the premise that these individuals typically live in a more permanent residence (i.e. buying versus renting), higher socioeconomic neighborhoods and invest more energy into building relationships to promote social unity and home equity (Chang, Chen & Somerville, 2003; Chen 2013). People who tend to move more often are associated with unstable employment and family structure with a limited investment in community social ties (Chen, 2013).

Considering the preceding information, the relationship between residential instability and illicit drug use appears to complex paradigm. Residential mobility among individuals within the poverty range have been difficult to document due to their vast

number of movers, their frequency of moves and the unconventional means through which many of these individuals change residencies (e.g., moving into established residences of family or friends, squatting, and homelessness) (Phinney, 2013; Schafft, 2006). However, there has been evidence to suggest that individuals living within the range of poverty have moved from settings that are more rural to more urban settings due to economic insecurity (Jirapramukpitak, Prince, & Harpham, 2008; Schafft, 2006). Because these moves are largely influenced by stress related events (e.g., economic and social disruption), the potential for engaging in substance use behavior increases (Jirapramukpitak, Prince, & Harpham, 2008). Therefore, it is important that an investigation of how the 2007-2009 may have influenced residential mobility among the United States population during these years and essential to understanding a possible macroeconomic etiology of illicit drug use.

Anxiety and the Economy

Since 2007, despite the United States government's attempts to stabilize financial markets, millions of Americans have become unemployed, lost their homes, and/or are struggling to sustain their lifestyle (Stein et al., 2011). This downturn in the economy has affected nearly everything placing uncertainty in the minds of people across America (Chitty, 2009). This has led to an influx of anxiety across the social spectrum (Salverda & Grassiani, 2014).

> Anxiety disorders include disorders that share features of excessive fear and anxiety and related behavioral disturbances. Fear is the emotional response to real or perceived imminent threat, whereas anxiety is the anticipation of future threat.

> Obviously, these two states overlap, but they also differ, with fear more often associated with surges of autonomic arousal necessary for fight or flight, thoughts of immediate danger, and escape behaviors, and anxiety more often associate with muscle tension and vigilance in preparation for future danger and cautious or avoidant behaviors. (APA, 2013, pp. 189)

Recent research has shown that employees are concerned about how the recession has affected the performance of office personnel in medical practices (Capko, 2011). The affects of the 2007-2009 recession have also been felt by young professionals with reports of pessimism noted throughout the academic community, stating that graduate students and instructors have become concerned about future endeavors due to economic downturns (Fickey & Pullen, 2011).

During the height of the 2007-2009 recession, physician clinics reported having an exorbitant number of patients, with no prior history of anxiety, complaining of mood and sleep disturbances, over-eating, and substance abuse and reportedly requested medications to alleviate these symptoms (Callan & Howland, 2009). Research has suggested that an economic recession can have significant psychological effects on individuals, negatively affect family cohesiveness and be detrimental to child's life course development and ability to enter adulthood in a psychologically healthy manner (Figlio, 2011; Roche, Haar & Luthans, 2014; Stein et al., 2011). After discussing the growing number of complaints at a staff meeting, one clinic found it necessary to develop a policy and brochure to address what they called "economic anxiety" among their patients (Callan & Howland, 2009). Brochures described cognitive distortions associated

with anxiety due to the latest economic recession, and were provided to patients experiencing psychological symptoms (Callan & Howland, 2009). Similarly, due to the economic crisis in the 1980s, Conger et al. (1999) introduced a family economic stress model to provide psychological guidance and meaning to conditions endured during an economic downturn.

Given the unreliability of our country's current economy and that researchers have been urged to develop economic anxiety models for previous and existing recessions, it is logical to consider what effect an economic depression could have on this country's mental health. For this reason, it is imperative this research study examines the behavioral reaction, in terms of illicit drug use; our society has to an economic recession.

Drug Use and Stress

This section will present information and previous research suggesting that stress from any number of sources that threaten an individual can trigger behaviors that may lead to the use of illicit drugs. This section will also discuss the processes that occur when a stressor is presented and how illicit drug use may become a choice for some individuals. By better understanding the processes that trigger stress, this section looks to explain why illicit drug use may be an issue during a recessionary period.

Although many addiction models have suggested the likelihood of drug use increases with the addition of stress, the mechanism through which this process occurs remains evasive significantly increasing research to investigate the mechanisms of stress and drug use as a coping method (Ambroggi et al., 2009). Creating a singular definition of stress has proven to be difficult. Baum (1990) defines stress as a negative experience

that is associated with threat, harm, or demand. More precisely, stress can be thought of as the processes through which an individual perceives, interprets, responds and adapts to these threats, harms and demands (Carver, Scheier & Weintraub, 1989; Enoch, 2011; Goeders, 2004). In order to conceptualize stress as a whole, one must: 1) identify the stressor, 2) cognitively process possible coping mechanisms, 3) adapt to the biological responses, and 4) consider the consequences of behavioral actions (Jongsma & Peterson, 2006). These factors are linked to specific neuropsychological systems that interact in a complex way to organize the responses an individual experiences (Halkitis, 2009).

Episodes that promote a stress response typically create conditioned and unconditioned responses like fear, anger, economic adversity, anxiety, pleasure and/or excitement (Enoch, 2011). These responses depend on specific variables of any given situation. These variables include appraising the episode, finding and using resources to cope and an individual's emotional state influences their responses (Asensio et al., 2010). The individual's perception of specific stressors relies greatly on how their brain processes information through projections and sensory associations that are generated by cognitive and affective stimuli (Ambroggi et al., 2009). It is through these perceptions that an individual is motivated to reduce stress with any number of coping mechanisms (Enoch, 2011; Goeders, 2004; Piazza & Le Moal, 1998).

The three general types of coping mechanisms are classified: 1) "problem-focused" which involves cognitive and behavioral strategies, 2) "emotion-focused" which involves using emotional management to cope rather than making emotions the cause of stress, and (3) "avoidance" where the individual either gives up coping or refuses to

acknowledge the stressor altogether (Carver et al. 1989; Thoits, 2011). These classifications of stress can be based on self-regulation and an individual's ability to maintain mental and physical homeostasis are key factors in preventing stress from becoming a serious issue (Goeders, 2004; Piazza & Le Moal, 1998; Schwabe, Dickson, & Wolf, 2011). This idea can be applied towards the central issue surrounding drug abuse and addiction. For instance, mild stress can be perceived as a challenge and motivate an individual. The act of having an "exciting" episode may trigger brain functions that are pleasurable and may help an individual to become interested in setting and accomplishing goals (Ambroggi et al., 2009). On the other hand, severe stress may trigger other brain functions, which are too intense and overwhelming for an individual to handle (Wand, 2008). Therefore, the individual may look to chemicals to cope with a stressor depending upon its intensity. With this in mind, people may react to stressors with aggressive or passive aggressive learned behavior, such as substance use, in order to cope (Preston, 2006). This includes any number of economic dilemmas, which may affect their health through socially learned illicit drug use (Bjerregaard & Cochran, 2008).

Most addiction theories state that stress has a significant influence in motivating individuals to abuse drugs with addictive properties (Koob and Le Moal, 2001). This association between stress and substance abuse can be found in the stress-coping model of addiction such as Marlatt's (1985) relapse prevention model, the tension reduction model, and the self-medication hypothesis (Gustafson et al., 2011). These models are based on the premise that severe stress significantly motivates an individual to enhance their mood through a chemical means and may initially be used to regulate stress

(Ambroggi et al., 2009). Nevertheless, when drug use repeatedly succeeds in reducing stress, it becomes the coping mechanism of choice for mood enhancement and stress relief suggesting that both negative and positive reinforcement (eliminating stress and enhancing mood) increase an individual's vulnerability to drug abuse (Feltenstein & See, 2008; Sinha, Shaham & Heilig, 2011)

It has been noted that stress changes the reward circuitry in the brain resulting in one's responsiveness to the reinforcing properties of addictive drugs (Feltenstein & See, 2008). This may increase an individual's motivation to use drugs for stress relief and eventually for stress-free homeostasis (Goeders, 2004). Stress may prepare an individual's brain reward systems to be reinforced by drugs (Goeders, 2004; Piazza & Le Moal, 1998; Schwabe, Dickinson, & Wolf, 2011). While this may help explain why individuals use substances to relieve stress; there is no evidence to suggest exactly what stressors may or may not facilitate these changes in behavior (Goeders, 2004).

Summary

Through the combination and application of psychological and sociological theories, social learning and social disorganization, which are associated with the spectrum of substance abuse, this study attempted to clarify the affect of an economic recession on illicit drug use. Furthermore, through an ecological model with these respective theories, this study applies both psychological/sociological and economic theoretical bases where other research has failed to fill this gap and may splinter under the weight of its own limitations (Bretteville-Jensen, 2011; Punch, 2005; Roland-Lévy & Kirchler, 2009). That is, an ecological model with the application of existing theories to

understand the processes that have influenced and increased illicit drug use within our society during the 2007-2009 recession is necessary for a better understanding of the etiology and prevalence of illicit drug use.

Chapter 3 provides a description of the proposed research design and how the sample was collected. As well, the processes used to collect the data and perform a trend analysis are described. It also provides information pertaining to individuals and materials used to collect data, the validity and reliability of data, procedures and ethical considerations.

Chapter 3: Research Method

Introduction

In this quantitative nonexperimental research, I describe archival data using an ecological model to view addiction as a psychological, sociological, and economic issue. I used the National Survey of Drug Use and Health's data compiled by the SAMHDA. My focuswasto inspect whether a prediction can be made about illicit drug use during recessionary years based on factors of social disorganization. Independent variables are determinants of social disorganization: (a) income, (b) employment, (c) education, (d) family disruption (marriage/single versus divorced), and (e) residential mobility. The dependent variables are drug use (use or nonuse) and the GDP. Age and gender were analyzed as covariates. Variables within this study were used for a trend analysis that is a longitudinal observation of socioeconomic factors and substance use within the United States between the years 2006 and 2010. Within this chapter, I discuss the research design and sample. In addition, I describe the process used to collect the data and run a trend analysis. All data were in the public domain and permission to use the data was not required. However, acknowledgement of the data source is required and presented in the preceding Acknowledgement section. I acknowledge that the SAMHSA and the InterUniversity Consortium for Political and Social Research are not responsible for my use of the data or the interpretations and inferences made based on the results.

Research Design

The research design was a retrospective cross-sectional study over time, with a portion of the study using individual-cohorts by year. The purpose of this design was to

scrutinize the correlation between illicit drug use and an economic indicator in relation to factors of social disorganization over time. This type of study was chosen in order to ascertain whether a predictable relationship exists between the sociodemographic (covariates) and social disorganization determinants, indicated as independent variables, with the presence or absence of drug use and the GDP as dependent variables within an assessed period. Using this explanatory design, I evaluated quantitative archival data compiled from a random sample of over 30,000 different individuals within the United States at or above the age of 18 who are not a part of a protected population and/or within a controlled environment for each year (i.e., 2006-2010) to measure the national GDP effect on illicit drug use. Although surveys were performed and collected from all 50 states, the public access data were compiled to protect all participants from any identifiers based on region and/or location. Due to the nature of this formatted archival data, all participant responses, within the parameters of this study, were calculated and analyzed as a whole by year. SPSS 22 Graduate Pack for Windows was used to analyze the data.

Survey

The United States Department of Health and Human Services (USDHHS) between 2002 and 2011 administered the survey implemented in this study. Its purpose was to investigate illicit drug use history and evaluate the necessity for developing research-based drug treatment facilities within the United States (Hughes et al., 2012). The survey's queries focused on illicit drug use and mental health. Respondents also answered questions relating to demographics, family history, education, and income. The survey was designed to offer researchers monthly and annual estimates of these topics

(Morton et al., 2009). For the purposes of this study, only annual data were interpreted. Although the survey covered legal substances like alcohol and tobacco, I focused on questions related to the following illicit drugs: cocaine, heroin, and methamphetamine. Information evaluated from the survey includes questions regarding age, gender, marital status, education level, income, employment status, and residential mobility. Individuals were palced in two groups: (a) users and (b) nonusers of cocaine, heroin, and/or methamphetamine. The later five determinants were either used individually or in combination as proxies for economic well-being to identify significant variables and to provide a quantitative analysis of social disorganization based on use versus nonuse. (Please see Data Analysis below for combination.) However, age and gender were fixed determinants and may or may not be indicative of economic well-being. Therefore, these two determinants were covariates, and the later five predictors were independent variables.

Sample of Main Study

A coordinated 5-year sample design was developed for the 2005 to 2009 National Surveys on Drug Use and Health (NSDUH). The 2010 sample was an extension of the 5-year sample. The sample design for the 2010 main study, as a subsample of the multiyear study, consisted of a deeply stratified, multistage area probability design. The coordinated 2005 to 2009 design used a 50% overlap in second-stage units (area segments) between each successive year of the 5-year study following completion of the 2005 survey. The 2010 NSDUH continued the 50% overlap by retaining half of the second-stage units from the previous year. The first stage of

the sample selection procedures began by geographically partitioning each state into roughly equal-sized state sampling (SS) regions. These regions were formed as a means of stratification so that each area would yield roughly the same expected number of interviews during each data collection period. This partitioning divided the United States into 900 SS regions made up of counties or groups and parts of counties. The first stage of selection for the 2005 to 2010 surveys was census tracts. This stage of selection was included to contain sample segments within a single census tract to the extent possible. Within each SS region, a sample of 48 census tracts was selected with probabilities proportional to size and with minimum replacement. Because census tracts generally exceeded the minimum dwelling unit (DU) requirement, selected census tracts were subdivided into smaller geographic areas of adjacent census blocks—called segments—that served as the second-stage sampling units. One segment per selected census tract or a total of 48 segments per SS region were selected (with probabilities proportional to size): 24 to field the 5-year study and 24 to serve as backups in case of sample depletion or to field any supplemental studies that the SAMHSA may request. For the 2010 survey, a total of 7,200 segments within the 900 SS regions were selected. Of the total, 3,600 segments were overlap segments used during the 2009 survey, 3,587 were new, and 13 segments were duplicates of segments used in the 2005 to 2009 surveys. For this last category, the same area had been listed previously under a different segment identification number, so the original listing was used instead of relisting the same area. After selecting these

> new areas, the process of counting and listing the DUs within each new segment ensued. Segments to be used in 2010 were listed between April and December 2009. Once all DUs for a particular quarter were listed, the third-stage of the selection process identified sample dwelling units (SDUs) for inclusion in the study. At the final stages of selection, five age-group strata were sampled at different rates. These five strata were defined by the following age-group classifications: 12 to 17, 18 to 25, 26 to 34, 35 to 49, and 50 or older. No race/ethnicity groups were purposely oversampled for the 2010 main study. However, consistent with previous NSDUHs, the 2010 NSDUH was designed to oversample younger age groups by requiring equal sample sizes for the three age groups: 12 to17, 18 to 25, and 26 or older (Center for Behavioral Health Statistics and Quality, 2011, pp.19-20).

SAMHSA reportedly collected data from over 60,000 participants. SAMHSA did not collect data from jailed, homeless, or hospitalized individuals or military persons on active duty. Because these individuals are a part of a protected population and/or are within a controlled environment, these individuals, along with participants under the age of 18, were not included in the public access data set drawn and downloaded for this study at http://www.icpsr.umich.edu/icpsrweb/SAMHDA/browse. Therefore, the number of participants within each year was reduced to approximately 33, 000. Sampling procedures for the public access population used in this study are identical to procedures used for data collected from protected populations who require permission. For a more detailed description of survey methods and questions as well as tables and figures

illustrating regional overlap, please refer to http://www.samhsa.gov/data/population-data-nsduh/reports?tab=32 and click on desired year of inquiry.

Materials

The NSDUH interviews with respondents began with the Computer-Assisted Interview (CAI) Blaise module version 4.6 (Chen et al., 2011). Field interviewers (FI) read computerized questions and entered the respondent's replies into a database (Chen et al., 2011). After completing a Reference Date Calendar used for time identification, the FI provided directions on how to use the computer-assisted self-interviewing (CASI) processor questions (Chen et al., 2011). Employing CASI methods ensured privacy for respondents on personal substance use questions. Sessions began with practice questions to introduce the respondents to the computer before starting the interview (Chen et al., 2011). During the CASI section of the interview, the respondent was provided a specific visual aid (Show Cards) to enhance recall (Chen et al., 2011). Once the CASI section was completed, the FI took control of the computer to ask additional questions pertaining to demographics such as employment and income questions (Chen et al., 2011). During the initial and closing CAPI sections, respondents were provided visual aids to assist in answering specific questions (Chen et al., 2011).

Manuals

Throughout the survey process, the following manuals were used to provide more accurate, valid, and reliable survey results:

- Field Interviewer Manual: This manual is the primary reference for training interviewers and contained detailed information about each interviewer’s

responsibilities and the requirements for interviewing respondents during the survey. Information found in this manual includes CAI instructions and a Show Card Booklet with administration directions. A web-based reference to contact the Case Management System (CMS) was also provided (Chen et al., 2011).

- Field Interviewer Computer Manual: This manual contained instructions for how to use programs associated with the Gateway E475 laptop computers and Hewlett-Packard iPAQ handheld devises. Information for contacting technical support and troubleshoot difficulties with computer hardware and software (Chen et al., 2011).
- Field Supervisor Manual: This manual detailed instruction for conducting a NSDUH interview, managing staff members, and coordinating strategies for counting, listing, and screening respondents. CMS strategy references on how to manage staff members were provided within this package (Chen et al., 2011).
- Field Supervisor Computer Manual: This supervisor manual provided additional instructions for the computers including the portable printer, references and software (i.e., Windows/Microsoft Word/Microsoft Excel, e-mail, FedEx tracking, Chen et al., 2011).
- Regional Supervisor Manual: This supervisor manual provided clear NSDUH guidelines and reporting provisions necessary for these administrators to oversee the regional directors (Chen et al., 2011). Directions for how to manage various stages of the NSDUH study including recruitment, selection, and interviewing

measures (Chen et al., 2011). Regional staff members were provided access to the CMS as a reference to this manual (Chen et al., 2011).

- Counting and Listing Manual: This manual included NSDUH examples and explanations of all counting and listing procedures (Chen et al., 2011). Listing staff members were provided copies of this manual. Management level staff members associated with the counting and listing segment of NSDUH were given access to the CMS reference (Chen et al., 2011).
- Data Quality Coordinator and Consistency Check Manuals: These manuals authenticated and described the processes used to verify and check consistency by the Data Quality Team (Chen et al., 2011).
- Guide to Controlled Access Situations: This manual was made accessible to managing staff members to provide strategies for gaining access in challenging admission situations (Chen et al., 2011).
- NSDUH Best Practices Guidebook: This guidebook provided project information regarding chain of command, email addresses of supervisors and managers, use of the project network and pertinent project-related protocols, procedures, and activities (Chen et al., 2011).

The Research Triangle Institute (RTI) and SAMHSA staff organized these manuals for the NSDUH to supervise the CAI process (Office of Applied Studies, 2009).

Institutional Review Board of Main Study

All tools and procedures were sent to the RTI's Institutional Review Board (IRB) as part of the IRB packet for NSDUH surveys (RTI International, 2012). During the

Institutional Review Board's review of the submission, the IRB called for modifications to the Introduction to the Clinical Interview for the Mental Health Surveillance Study (MHSS; RTI International, 2012). The request was that respondents not divulge their name or any information that might reveal their identity during the interview (RTI International, 2012). The IRB also asked for further records pertaining to MHSS reporting procedures (RTI International, 2012). Once these modifications and procedures were addressed and submitted, IRB approval was granted.

Data Collection of Main Study

The NSDUH staff collected the data used in this study from the 2006 through 2010 survey results. The public access data were obtained through the NSDUH website http://www.icpsr.umich.edu/icpsrweb/SAMHDA/browse and downloaded for analysis. Data were stored on my computer during the dissertation process. At the conclusion of this study, all data outputs and syntax were stored on an external drive and locked in a secured housing unit. Because the entire dataset is public domain, no personal identifiers or residential locations were provided. Thus, all participants were anonymous and no additional precautions were necessary. Based on the NSDUH Codebook for each year, the aforementioned variables were identified based on codes. Given all data had been previously formatted for SPSS analysis, a simple extraction of the necessary variables from the database was performed. The variables that were extracted from the database did not disclose identifiable aspects of any respondent and was compared as part of a trend analysis across all 5 years of data (Office of Applied Studies, 2009). The NSDUH series (formerly titled National Household Survey on Drug Abuse) was formulated specifically

to measure the frequency and possible contributing factors of drug use in the United States (Office of Applied Studies, 2009). For the purposes of this study, all participants (approximately over 60,000 per year) within the public access data file were analyzed for each year. Note that this file excludes regional information and all participants under the age of 18 and other protected populations. All data collected by the NSDUH were prepared under a contract with the RTI, a nonprofit organization that provides research and technical services located in Research Triangle Park, North Carolina (Office of Applied Studies, 2009). Each NSDUH respondent was provided an incentive payment of $30 to participate (Hughes et al., 2002, 2009, 2012). GDP figures for analysis were downloaded from The World Bank GDP data website at http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG.

Contacting Respondents

FIs were consigned explicit "Sample Dwelling Units" (SDUs) to contact respondents with mapping directions shown on the Hewlett-Packard iPAQ handheld devise (SAMHSA, 2007). Each sample was provided separately. Succeeding units were made available as needed, depending on data collection progress (SAMHSA).

Lead Letter

Initial contact was made to respondents through a "lead letter" that presented a brief narrative containing information about the study's methods and purpose. United States Public Health Service/Department of Health and Human Services (DHHS) letterhead was used and each letter was signed by the Substance Abuse and Mental Health Services Administration (SAMHSA), the National Study Director and RTI

management. FIs were provided preprinted letters with the assignment materials and addresses. FIs were required to review these address mailing access, sign the preprinted letters, and mail them in time to coincide with their arrival to the area. All SDUs with completed addresses were mailed letters. Respondents without completed mailing addresses or other delivery issues were given a letter upon making personal contact. A copy of the letter was provided in the materials Showcard Booklet for reference during the interview.

Initial Approach

Each FI identified the assigned respondent for each unit on the iPAQ before initiating contact. Upon making contact, the FI presented his or her RTI identification badge and an authorized letter identifying the FI by name (SAMHSA, 2007). The FI also possessed an assortment of revealing materials in order to introduce themselves and the study survey (SAMHSA).

Introduction to Respondents

Once the initial introduction was made, the FI asked to speak with an adult resident who planned to act as the respondent (United States Department of Health and Human Services, 2002-2011). As characterized on the iPAQ, the FI explained procedural methods and provided the informed consent document for the respondent to inspect and sign. A copy of the Study Description was provided during the description and explained the purpose of the study's data collection (USDHHS, 2002-2011). This document pledged that all information given would be held in strict confidence (USDHHS, 2002-2012). The Study Description also stated the amount of time required to complete the

survey and that respondents could quit the interview at any time (USDHHS, 2002-2012). The study description and informed consent content provided from the iPAQ fulfilled the appropriate requirements for conducting the NSDUH study's interview process (USDHHS, 2002-2012).

Research Questions and Hypotheses

The proposed secondary analysis uses five-year data acquired from the University of Michigan's Substance Abuse and Mental Health Data Archive (SAMHDA). A cross-sectional, time series design was used. By implementing an ecological framework to make associations between recessionary years, demographic and socioeconomic factors and illicit drug use, as it relates to social disorganization, perhaps clinicians and policy makers can develop prophylactic instruments and measures to prevent the proliferation of illicit drug use within our society. Furthermore, if a relationship is found between an economic recession and substance abuse, psychologists will become vital in the goal of identifying determinants vulnerable to exacting socioeconomic factors during a recessionary environment. The outcome of this line of work could provide new policies to eliminate subsidy cuts to facilities during a recession while implementing treatment modalities and preventative intervention strategies for those potentially at risk during a recession. The research hypotheses for this study are indicated below.

Research Question 1

Does an economic recession predict an increase in illicit drug use through socio-demographic indicators defined by age and/or gender?

Research Hypothesis 1

$H_1$1: Age does predict recessionary illicit drug use defined as cocaine, heroin and/or methamphetamine use.

$H_0$1: Age does not predict recessionary illicit drug use defined as cocaine, heroin and/or methamphetamine use.

Research Hypothesis 2

$H_1$2: Gender does predict recessionary illicit drug use defined as cocaine, heroin and/or methamphetamine use.

$H_0$2: Gender does not predict recessionary illicit drug use defined as cocaine, heroin and/or methamphetamine use.

Research Question 2

Will drug use in individuals associated with higher levels of social disorganization increase more than in individuals associated with lower levels of social disorganization during recessionary years?

Research Hypothesis 3

$H_1$3: Social disorganization defined by a composite score of disadvantaged indicators does predict recessionary illicit drug use.

A. income, B. employment, C. education, D. family disruption (marriage), E. residential mobility

$H_0$3: Social disorganization defined by a composite score of disadvantaged indicators does not predict recessionary illicit drug use.

A. income, B. employment, C. education, D. family disruption (marriage), E. residential mobility

Research Question 3

Does the prevalence of illicit drug use increase during an economic recession?

Research Hypothesis 4

$H_1$4: There is a relationship between the annual GDP and the prevalence of recessionary illicit drug use in the United States.

$H_0$4: There is no relationship between the annual GDP and the prevalence of recessionary illicit drug use in the United States.

Research Question 4

Does the prevalence of illicit drug use change over time as predicted by socio-demographics and/or social disorganization in relation to an economic indicator (GDP).

Research Hypothesis 5

$H_1$5: The prevalence of illicit drug use changes over time as predicted by socio-demographics and/or social disorganization in relation to an economic indicator (GDP).

$H_0$5: The prevalence of illicit drug use does not change over time as predicted by socio-demographics and/or social disorganization in relation to an economic indicator (GDP).

Data Analysis

Demographic. socio-economic and psychosocial information were analyzed using descriptive statistics such as means, standard deviations, and frequency counts (Gravetter & Wallnau, 2010). The dependent variable (presence or absence of drug use: defined as

any use of cocaine, heroin, and/or methamphetamine within the period assessed) was calculated and analyzed using descriptive statistics and logistic regression. The logistic regression was chosen because of the binary outcome (use versus no use). Thus, this variable is dichotomous (Gravetter & Wallnau, 2010). Using chi square tests and independent sample t-tests, a bivariate analyses was run between the dependent variable drug use (absent or present), the socio-demographics (covariates age and gender) and the determinants social disorganization (socioeconomic and psychosocial independent variables) with be organized as: a) income based on an ordinal scale, b) employment based on a nominal scale, c) education based on an ordinal scale, d) family disruption [marriage] based on a nominal scale, and e) residential mobility {categorization was determined based on descriptive statistics and the distribution of responses} based on an ordinal scale. Independent sample t-tests were used when the independent variable is continuous and Chi Square tests was used for independent variables consisting of two or more categories (Gravetter & Wallnau, 2010) These analyses tested Research Hypotheses 1 and 2.

For Research Hypothesis 3, a composite score of all the social disorganization variables (income, employment, education, family disruption, and residential mobility) was used. This composite score was analyzed using a nonparametric test (The Mann-Whitney U) to determine if drug users showed different levels of disorganization than non-drug users (Gravetter & Wallnau, 2010).

Research Hypothesis 4 was tested using a logistic regression model predicting drug use from annual GDP. Linear, cubic and quadratic trends were tested for this

research question (Gravetter & Wallnau, 2010). However, the nature of this analysis was not a linear trend. Therefore, a binary logistic regression was used to confirm if a logistic regression model using GDP as a predictor and drug use as the criterion variable shows a significant effect of GDP on drug use. Hence, the relationship was not linear, cubic or quadratic (Gravetter & Wallnau, 2010). Therefore, a binary regression model was used to test GDP as a predictor.

Finally, for Research Hypothesis 5, a trend analysis using binary logistic regression was used to compare all the above socio-demographic and social disorganization predictors over time, as well as the GDP to predict drug use. Only determinants found significant by $p = .05$ or better in bivariate analyses will be included in this final model (Gravetter & Wallnau, 2010). Each year of observation had a unique group of participants. That is, each year had an independent cohort. Overlap described in the sample refers to region and not participants.

Reliability of Instrumentation

NSDUH conducted a reliability study as part of the 2006 sample survey questionnaire. This study re-interviewed 3,136 respondents during 2006 on an average of ten days after the initial interview used for the primary study (Piper, Meyer & Snodgrass, 2006). The interviews executed in the initial reliability study were conducted separately from the main study interviews (Piper, Meyer & Snodgrass, 2006). Results indicated some questions were typical of unreliable responses and were addressed and redesigned to provide greater reliability in future questionnaire surveys (Piper, Meyer & Snodgrass, 2006). The reliability study performed in the 2006 NSDUH main study was applied to

data collected in subsequent years (2007-2010) (Chromy et al., 2010). Sub studies were performed using subsamples from the main studies' sample of over 60, 000 respondents for the Reliability Study to investigate the potential impact a FI might have on reliability (Chromy et al., 2010). The investigation concluded that reliability among questions pertaining to drug use was satisfactory based on Cohen's Kappa (Chromy et al., 2010).

> *Interpreting Cohen's Kappa.* Following Landis and Koch (1977, p. 165), this reliability report used the following benchmarks for assessing the level of agreement based on the estimated kappa: poor agreement for kappas less than 0.00; slight agreement for kappas of 0.00 to 0.20; fair agreement for kappas of 0.21 to 0.40; moderate agreement for kappas of 0.41 to 0.60; substantial agreement for kappas of 0.61 to 0.80; and almost perfect agreement for kappas of 0.81 to 1.00 (SAMHSA, 2010, pg 33).

Results found all questions ranged between 0.4 - 1.0 using this statistic, thus complying with adequate reliability standards (Chromy et al., 2010). Comparisons of the consistency of responses among those who were interviewed by the same versus different FIs at the time of the two interviews showed no significant effect of the interviewer on the reliability of survey responses (Chromy et al., 2010). Analyses showed that questions about factual personal events or characteristics were more reliable than questions that asked for a respondent's personal opinion or intentions or questions that addressed issues that involved perceived discrimination (Chromy et al., 2010).

Survey Validity

Because SAMHSA is a government agency, it is not required to report on factors associated with internal and external validity. Thus, there are no publications which offer any description of issues related to internal and external validity. However, other research using this data appears to have strong content or construct validity and the content factors specific to drug use are consistently related to other substance use in an expected direction: http://www.icpsr.umich.edu/icpsrweb/SAMHDA/series/64. Furthermore, previous NSDUH studies gathered biological samples from 4,000 respondents to test and verify self-reports of previous drug use or nonuse (Center for Behavioral Health Statistics and Quality, 2011). The samples confirmed a cooperation rate of 89 percent by those selected (CBHSQ, 2011). Results found evidence that respondents underreported use of some drugs (CBHSQ, 2011). Nevertheless, an accurate interpretation of these results was not feasible due to the uncertainty of usage periods covered by tests (CBHSQ, 2011). This research and data within these years provided important information suggesting a degree of underreporting found in surveys conducted on the use of illicit drugs (Chromy et al., 2010). Lastly, to the best of this researcher's knowledge, there have been no threats to survey validity as drug policies have not significantly changed during this study's period of observation. (Bohnert, Bradshaw & Latkin, 2009; Bor et al., 2013; Bretteville-Jensen, 2011; Brook, 2009; Capece & Lanza-Kaduce, 2013; Carpenedo et al., 2007; Caulkins & Nicosia, 2010; Cooper et al., 2009; Grant et al., 2012; Harris et al., 2008; HeavyRunner-Rioux & Hollist, 2010; Lanier & Farley, 2011; Marshall et al., 2011; Maxwell et al., 2006; Preston & Epstein, 2011; Reuter, Pacula & Caulkins, 2011; Sinha,

Shaham & Heilig, 2011; Wand, 2008). Furthermore, the different cohorts used each year negate issues such as maturation, retesting or statistical regression.

Ethical Considerations

The preceding data, which is available to the public, will be collected from the Inter-university Consortium for Political and Social Research (ICPSR) and underwent a confidentiality review (SAMHSA, 2007). Any data that may disclose personal information has been redacted. The ICPSR developed a "public use file (PUF)" set of data files, codebooks and statistical software formats specifically designed for public use of the data (SAMHSA, 2007). In addition to these procedures, ICPSR performed the following processing steps for this data collection: 1) consistency checks, 2) standardization of missing values, 3) the creation of an online version with question text, and 4) a check system for undocumented codes (USDHHS, 2002-2011). Walden University was provided an application for IRB approval via email requesting exempt status. A Certificate of Completion (Certification Number 1643891) from The National Institutes of Health (NIH) Office of Extramural Research completed on 1/13/2015 accompanied the application.

Respondents selected for the NSDUH interview were provided an "Introduction and an Informed Consent" draft to introduce all participants to the methods and procedures of the study (SAMHSA, 2007). The interview survey process and procedures were described providing study procedures and details satisfying the Informed Consent agreement (SAMHSA, 2007). Once consent was provided, the FI began the interview in a private location.

Incentive Impact

In 2002, the NSDUH survey began providing a $30 incentive for participating and completing the interview process. An analysis indicated that this incentive increased response rates and reporting accuracy of substance use (Hughes et al., 2002; Hughes et al., 2009; Hughes et al., 2012). Considering the cost of performing a study to establish appropriate incentive rates for redesigned surveys, the Office of Applied Studies simply plans to adjust the incentive by applying an inflation adjustment (Hughes et al., 2002; Hughes et al., 2009; Hughes et al., 2012). This adjustment increased incentives to $40 for 2013 or 2014 surveys due to monetary inflation (Hughes et al., 2002; Hughes et al., 2009; Hughes et al., 2012). Because this study is exploring respondent results for the years 2006-2010, no adjustment for an incentive change is necessary.

Summary

Chapter 3 provided a description of the proposed time series analysis of a sample of individuals over the age of 18 and not part of a protected population for the years 2006-2010. The purpose of this design is to examine if there is a correlation between illicit drug use and an economic recession in relation to factors of social disorganization. As well, the processes used to collect data and perform the analysis were described. All data is public domain and permission to use the data is not required. Furthermore, an acknowledgement of the data source was presented. Lastly, issues concerning ethics, validity and reliability were addressed.

Chapter 4 provides a concise overview of the proposal, followed by the results of the aforementioned analysis. The analysis includes descriptive statistics of the variables,

analysis of significant variables, and a time series regression of how variables correlate to illicit drug use during recessionary years. Furthermore, tables and figures provide a visual quantitative reference for interpretation. IRB approval number is 07-07-15-0020513.

Chapter 4: Results

Introduction

Evidence of illicit drug use has essentially focused on the socioeconomic status and the biological risk factors associated with an individual, but have largely ignored how a macrolevel factor, such as a recession, could influence illicit drug use across the United States (Ritter & Chalmers, 2011). This has raised questions about how the 2007-2009 recession affected substance abuse (Bretteville-Jensen, 2011; Ricaurte & McCann, 2005; Sivagnanam, 2012). Therefore, the purpose of this quantitative analysis was to determine if illicit drug use, within an ecological framework, inrceases due to social disorganization during recessionary years. Through this study, an analysis of individual demographics (age and gender), socioeconomic factors (income, employmen,t and education), family history (sinlge, married, or divorced) and residential mobility were compiled to form a composite and examined to determnine if a macrolevel enviromental change (i.e., a recession) affects social disorganization in order to predict an increase in a microlevel issue (i.e., illicit drug use).

Analysis Variation

The trend analysis completed does signify the prevalence of drug use over time, and answers all research questions and hypotheses. However, based on the research and literature presented in this study, the initial trend analysis proposed for Hypothesis 5 could not be performed. Because the original survey conducted by SAMHSA did not include social disorganization, questions from the survey were compiled to create a new variable for social disorganization. In order to rank social disorganization, it was not

possible to make a continuous variable that would be required for the analysis initially proposed. That said, the trend analysis completed was based on a binary logistic regression. Through this analysis, I was able to compare recessionary versus nonrecessionary years where the proposed dependent variables were distributed based on the original intent of this study. Therefore, because a singular linear time variable to be measured was not feasible, the results of this study were based upon a variation of the originally proposed analysis. Furthermore, additional analyses were conducted. For Hypothesis 3, a biserial correlation was run in order to find a relationship. In addition, for Hypothesis 5, binary logistic regressions were performed on each individual drug.

Data Collection

The NSDUH staff has conducted a multistage area probability sample survey of drug use since 1999. From 2005 to 2009, the NSDUH began conducting a coordinated design that facilitated a 50% overlap of surveyed unit areas to increase precision results between successive years. Survey results from 2010 were a continuation of this coordinated survey design. In this study, I used survey data collected from 2006 through 2010. The public access data were obtained through the NSDUH website http://www.icpsr.umich.edu/icpsrweb/SAMHDA/browse, the World Bank GDP data website http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG and downloaded for analysis. Based on the NSDUH Codebook for each year, the aforementioned variables were identified based on codes. Given all data were previously formatted for SPSS analysis, only simple extraction of pertinent variables from the database was necessary to perform this analysis. Therefore, data collection for this study has remained consistent

and identical to the description purported in Chapter 3, and the variables extracted from the database were compared as part of logistic regressions and a trend analysis across all 5 years of data.

Results

A total of 188,803 participants took part in this 5 year study from 2006 to 2010. The majority of the participants were female (*n* = 100,659, 53.3%). There were 11 age categories in total. The age categories were 18 years old (*n* = 13,249, 7%), 19 years old (*n* = 12,110, 6.4%), 20 years old (*n* = 11,366, 6%), 21 years old (*n* = 11,552, 6.1%), 22 or 23 years old (*n* = 22,513, 11.9%), 24 or 25 years old (*n* = 22,184, 11.7%), 26 to 29 years old (*n* = 13,661, 7.2%), 30 to 34 years old (*n* = 14,702, 7.8%), 35 to 49 years old (*n* = 39,813, 21.1%), 50 to 64 years old (*n* = 17,139, 9.1%), and 65 years or older (*n* = 10,514, 5.6%). Social disorganization was a composite score made from the sum of five different categorical variables, which were personal income, residential mobility, employment status, marital status, and education.

Individuals were asked to report their personal income and categorized as either 0 if they earned over $20,000 a year (*n* = 77,888, 41.3%) and 1 if they earned less than $20,000 a year (*n* = 110,915, 58.7%). Second, residential mobility was categorized as 0 if the individual had moved within the past year (*n* = 120,879, 64%) and 1 if the individual had moved one or more times throughout the past year (*n* = 67,924, 36%). Employment status was also asked and scored as 0 if the individual had a job throughout the past year (*n* = 107,287, 64%), 1 if they did not have a job at some time throughout the past year (*n* = 25,246, 13.4%), and missing if the respondent did not answer (*n* = 56,270, 29.8%).

Fourth, their marital status was scored as 0 if the individual had been married, widowed, divorced, or separated (n = 90,949, 48.2%) and 1 if the individual had never been married (n = 97,854, 51.8%). Lastly, education was scored as 0 if the individual had graduated college (n = 39,548, 20.9%) and 1 if the individual had not graduated college (n = 149,255, 79.1%).

The scores for the 5 categories above were summed together to form a Likert scale score for social disorganization which was counted as the following: 0 (n =15,280, 8.1%), 1 (n = 37,248, 19.7%), 2 (n = 43,729, 23.2%), 3 (n = 50,929, 27.0%), 4 (n = 34,384, 18.2%), and finally 5 (n = 7,233, 3.8%). The respondents were asked about their drug use for three different types of drugs and if they had used one or any combination of drugs over those 5 years 2006 to 2010. The drugs were cocaine, methamphetamine, and heroin. For cocaine, there were a total of 7,163 (3.8%) users and 188,105 (96.2%) nonusers. For methamphetamine, there were a total of 1,210 (.6%) users and 187,593 (99.4%) nonusers. For heroin, there were a total of 698 (.4%) users and 188,105 (99.6%) nonusers. Finally, the respondent's drug using totals were counted for those who used one or any combinations of drugs were 7,990 (4.2%) and those who used no drugs at all were 180,813 (95.8%). These frequencies and percentages are shown in Table 1.

Table 1

Frequencies Percentages and Descriptive Statistics for Respondents Demographics

Demographic	*n*	*%*
Gender		
Female	100,659	53.3
Male	88,144	46.7
Age		
18	13,249	7
19	12,110	6.4
20	11,366	6
21	11,552	6.1
22 to 23	22,513	11.9
24 to 25	22,184	11.7
26 to 29	13,661	7.2
30 to 34	14,702	7.8
35 to 49	39,813	21.1
50 to 64	17,139	9.1
65 and older	10,514	5.6
Income score		
0	77,888	41.3
1	110,915	58.7
Residential mobility score		
0	120,879	64
1	67,924	36
Employment score		
0	107,287	56.8
1	25,246	13.4
Missing	56,270	29.8
Family score		
0	90,949	48.2
1	97,854	51.8
Education		
0	39,458	20.9
1	149,255	79.1
Social Disorganization score		
0	15,280	8.1
1	37,248	19.7
2	43,729	23.2
3	50,929	27

4	34,384	18.2
5	7,233	3.8
Cocaine		
Not used	181,640	96.2
Used	7163	3.8
Methamphetamine		
Not used	187,593	99.4
Used	1210	.6
Heroin		
Not used	188,105	99.6
Used	698	.4
Total drugs used		
None	180,813	95.8
At least one or more	7990	4.2

The social disorganization score had an average score of 2.39 and standard deviation of 1.31. The GDP was recorded by year for this research and produced a mean of .785 and standard deviation of 2.08 (M =.78, SD = 2.08). The means and standard deviations are presented in Table 2.

Table 2

Mean and Standard Deviations of Continuous Variables

Variable	*M*	*SD*
Social Disorganization	2.39	1.31
GDP	.78	2.08

Research Question 1

Does an economic recession predict an increase in illicit drug use through socio-demographic indicators defined by age and/or gender?

Research Hypothesis 1

$H_1$1: Age does predict recessionary illicit drug use defined as cocaine, heroin and/or methamphetamine use.

$H_0$1: Age does not predict recessionary illicit drug use defined as cocaine, heroin and/or methamphetamine use.

Chi square test. To examine Hypothesis 1, a chi square test for independence was conducted to find if there was a significant difference between total drug use by all 11 age groups. Based on the results of the chi square test ($\chi^2 = 2121.510$, $p < .001$, $df = 10$), there was sufficient evidence to reject the null hypothesis and show a significant difference between all the age groups and their total drug use. The results of the chi square test is summarized in Table 3.

Table 3

Pearson Chi-Square Test of Independence for Age Groups by Total Drug Use

	Drug use			
	0		1	
Respondent age group				
Age 18	12,554	[12,688.31]	695	[560.87]
Age 19	11,320	[11,597.51]	790	[512.48]
Age 20	10,625	[10,885]	741	[481]
Age 21	10,748	[11,063.13]	804	[488.87]
Ages 22 and 23	21,072	[21,560.27]	1,441	[952.73]
Ages 24 and 25	20,982	[21,245.19]	1,202	[938.81]
Ages 26-29	12,996	[13,082.88]	665	[578.12]
Ages 30-34	14,196	[14,079.82]	506	[622.17]
Ages 35-49	38,862	[38,128.14]	951	[1,684.85]
Ages 50-64	16,955	[16,413.69]	184	[725.30]
Ages 65 and older	10,503	[10,069.06]	11	[444.94]

Note. ($\chi^2 = 2121.510$, $p < .001$, $df = 10$). Expected cell frequencies enclosed in brackets.

Binomial logistic regression. To examine Hypothesis 1 with a supplementary analysis, a binary logistic regression was conducted with the dependent variable being total drug use, dichotomized to yes or no, and age as the independent variable. The age group for respondents between 35 and 49 years of age was set as the reference because of it being the largest group of respondents. Based on the results of the logistic regression, age proved to be a significant predictor of the likelihood of total drug use and the model proved to have an overall significance ($\chi 2(10)= 2601.8$, $p <.001$).

Predicted probabilities of an event occurring were determined by exponentiating the *B* coefficients (Tabachnick & Fidell, 2012). The age group for 18 years old was found to be significant ($B =.81$, $p < .001$), indicating that inclusion in this group resulted in a 2.26 (exp(.81)) increase in the odds ratio of doing drugs versus not doing drugs in comparison to those in the 35 to 49 age group. The age group for 19 years old was found to be significant ($B =1.04$, $p < .001$), indicating that inclusion in this group resulted in a 2.82 (exp(1.04)) increase in the odds ratio of doing drugs versus not doing drugs in comparison to those in the 35 to 49 age group. The age group for 20 years old was found to be significant ($B =1.04$, $p < .001$), indicating that inclusion in this group resulted in a 2.82 (exp(1.04)) increase in the odds ratio of doing drugs versus not doing drugs in comparison to those in the 35 to 49 age group. The age group for 21 years old was found to be significant ($B = 1.11$, $p = .002$), indicating that inclusion in this group resulted in a 3.03 (exp(1.11)) increase in the odds ratio for doing drugs versus not doing drugs in comparison to those in the 35 to 49 age group. The age group for 22 or 23 years old was found to be significant ($B = 1.02$, $p < .001$), indicating that inclusion in this group

resulted in a 2.77 (exp(1.02)) increase in the odds ratio for doing drugs versus not doing drugs in comparison to those in the 35 to 49 age group. The age group for 24 or 25 years old was found to be significant (B =.85, p < .001), indicating that inclusion in this group resulted in a 2.34 (exp(.85)) increase in the odds ratio for doing drugs versus not doing drugs in comparison to those in the 35 to 49 age group. The age group 26 to 29 years old was found to be significant (B =.73, p < .001), indicating that inclusion in this group resulted in a 2.09 (exp(.73)) increase in the odds ratio for doing drugs versus not doing drugs in comparison to those in the 35 to 49 age group. The age group 30 to 34 years old was found to be significant (B =.37, p <.001), indicating that inclusion with in this group resulted in a 1.46 (exp(.37)) increase in the odds ratio for doing drugs versus not doing drugs in comparison to those in the 35 to 49 age group. The age group 50 to 64 years old was found to be significant (B =-3.15, p < .001), indicating that inclusion with in this group resulted in a .95 (1-exp(-3.15)) increase in the odds ratio for doing drugs versus not doing drugs in comparison to those in the 35 to 49 age group. The age group 65 years and older was found to be significant (B =-.81, p < .001), indicating that inclusion in this group resulted in a .55 (1-exp(-.81)) increase in the odds ratio of doing drugs versus not doing drugs in comparison to those in the 35 to 49 age group. Table 4 shows a summary of the binary logistics regression model. Refer to Appendix A for age predictor model fit details.

Table 4

Summary of Binary Logistic Regression for Age Predicting Drug Use

Variable	*B*	*SE*	*z*-value	*p*	*OR*	*95% C.I. for Exp(B)*	
						Lower	*Upper*
Age 18	0.81	0.05	16.02	<.001*	2.26	2.04	2.5
Age 19	1.04	0.04	21.25	<.001*	2.82	2.58	3.14
Age 20	1.04	0.05	20.85	<.001*	2.82	2.58	2.14
Age 21	1.11	0.04	22.78	<.001*	3.03	2.77	3.36
Age 22-23	1.02	0.04	24.09	<.001*	2.77	2.57	3.03
Age 24-25	0.85	0.04	19.22	<.001*	2.34	2.14	2.55
Age 26-29	0.73	0.05	14.30	<.001*	2.09	1.89	2.31
Age 30-34	0.37	0.05	6.72	<.001*	1.46	1.30	1.62
Age 50-64	-3.15	0.30	-10.03	<.001*	0.95	0.02	0.09
Age 65+	-0.81	0.08	-10.35	<.001*	0.55	0.38	0.56

Note. Items with asterisks have p-values less than .05.

This indicates that the inclusion of age is a significant predictor of drug use, thereby rejecting the null hypothesis.

Research Hypothesis 2

$H_1$2: Gender does predict recessionary illicit drug use defined as cocaine, heroin and/or methamphetamine use.

$H_0$2: Gender does not predict recessionary illicit drug use defined as cocaine, heroin and/or methamphetamine use.

Independent sample *t* test. To examine Hypothesis 1, an independent sample *t* test was conducted to asses if there was a statistically significant difference between average total drugs used between genders. Prior to this analysis, the assumption of homogeneity of variance was assessed using Levene's test. Homogeneity of variance assumes that both groups have equal error variances. If Levene's test is significant, the assumption is violated. The Levene's test was significant ($p < .001$), indicating that the

variance of total drug use is not equal for both genders. Therefore, it is not reasonable to assume equal variances for the statistical analyses. The results of Levene's test are shown in Table 5.

Table 5

Results of Levene's Test for Equality of Variance

Variable	*F*	*P*
Drugs12mos	2,414.47	<.001*

Note. Items with asterisks have *p*-values less than .05.

The results of the independent *t*-test were significant, indicating that there was sufficient evidence to reject the null hypothesis and show a difference in average total drug use between genders ($p = < .001$, $t = 24.06$, $df = 164{,}934.71$). The results are presented in Table 6.

Table 6

Results of Independent t-Test for Difference in Average Drug Use by Gender

	Male		Female			
Variable	*M*	*SD*	*M*	*SD*	*t*	*p*
Drug12mos	0.05	0.23	0.03	0.18	24.06	< .001*

Note. Items with asterisks have *p*-values less than .05.

Binary logistic regression. To also examine hypothesis 2 as a supplementary analysis, a binary logistic regression was conducted with the outcome variable being total drug, dichotomized to yes or no, and gender as the independent variable. The female respondents were set as the reference category for gender since they were the largest group of respondents by gender. Based on the results of the logistic regression, gender proved to be a significant predictor of the likelihood of total drug use due to the overall significance of the model (χ^2 (2) = 596.52, p <.001).

Predicted probabilities of an event occurring were determined by exponentiating the *B* coefficients (Tabachnick & Fidell, 2012). Gender was found to be significant (*B* =.56, $p < .001$) indicating that if you are male this will result in a 1.75 (exp(.56)) increase in the odds ratio for doing drugs versus not doing drugs in comparison to females. Table 7 shows a summary of the binary logistics regression model. Refer to Appendix B for gender predictor model fit details.

Table 7

Summary of Binary Logistic Regression for Gender Predicting Drug Use

Variable	*B*	*SE*	z-value	*p*	*OR*	*95% C.I. for Exp(B)*	
						Lower	*Upper*
Gender (Male)	0.56	0.023	24.14	<.001*	1.75	1.67	1.83

Note. Items with asterisks have *p*-values less than .05.

This indicates that the inclusion of gender is a significant predictor of drug use, thereby rejecting the null hypothesis.

Research Question 2

Will drug use in individuals associated with higher levels of social disorganization increase more than in individuals associated with lower levels of social disorganization during recessionary years?

Research Hypothesis 3

$H_1 3$: Social disorganization defined by a composite score of disadvantaged indicators does predict recessionary illicit drug use.

A. income, B. employment, C. education, D. family disruption (marriage), E. residential mobility

*H*03: Social disorganization defined by a composite score of disadvantaged indicators does not predict recessionary illicit drug use.

A. income, B. employment, C. education, D. family disruption (marriage), E. residential mobility

Binary logistic regression. To examine hypothesis 3, a binary logistic regression was conducted with the outcome variable being total drug use, dichotomized to yes or no with social disorganization as the independent variable. Those that were scored in the 3rd group for social disorganization were set as the reference group due to it being the largest group of respondents.

Predicted probabilities of an event occurring were determined by exponentiating the *B* coefficients (Tabachnick & Fidell, 2012). All the groups of social disorganization were found to be significant. Those that scored 0 for social disorganization were found to be significant (B = -2.17, $p < .001$) indicating that inclusion in this group resulted in a .88 (1-exp (-2.17)) increase in the odds ratio for doing drugs versus not doing drugs in comparison those that scored in group 3. Those who score 1 for social disorganization were found to be significant (B = -1.46, $p < .001$) indicating that inclusion in this group resulted in a .76 (1-exp (-1.28)) increase in the odds ratio for doing drugs versus not doing drug in comparison to those that scored in group 3. Group 2 for social disorganization was found to be significant (B =-.62, $p < .001$) indicating that inclusion in this group resulted in a .46 (1-exp (-.62)) increase in odds ratio for doing drug versus not doing drugs in comparison to that scored in group 3. Group 4 was found to be significant (B =.70, p <.001) indicating that inclusion in this group resulted in a 2.02

(exp(.70)) increase in the odds ratio for doing drugs versus not doing drugs in comparison to those that scored in group 3. Group 5 was found to be significant (B =.39, p < .001) indicating that inclusion in this group resulted in a 1.47 (exp(.39)) increase in the odds ratio for doing drugs versus not doing drugs in comparison to those that scored in group 3. Table 8 shows a summary of the binary logistic regression model. Refer to Appendix C for social disorganization model fit details.

Table 8

Summary of Binary Logistic Regression for Social Disorganization Predicting Drug Use

Variable	*B*	*SE*	z-value	*p*	*OR*	*95% C.I. for Exp(B)*	
						Lower	*Upper*
Social Disorganization 0	-2.17	0.10	-21.03	<.001*	0.88	0.83	0.14
Social Disorganization 1	-1.46	0.05	-29.32	<.001*	0.76	0.71	0.76
Social Disorganization 2	-0.62	0.03	-18.13	<.001*	0.46	0.50	0.57
Social Disorganization 4	0.70	0.04	13.91	<.001*	2.02	1.85	2.20
Social Disorganization 5	0.39	0.03	16.18	<.001*	1.47	1.40	1.56

Note. Items with asterisks have p-values less than .05.

Based on the results of the logistic regression, all social disorganization scores proved to be significant predictors of the likelihood of total drug use due to the overall significance (χ^2 (5) = 3488.2, p <.001). This indicates that social disorganization is a predictor of drug use, thereby rejecting the null hypothesis.

Research Question 3

Does the prevalence of illicit drug use increase during an economic recession?

Research Hypothesis 4

$H_1$4: There is a relationship between the annual GDP and the prevalence of recessionary illicit drug use in the United States.

$H_0$4: There is no relationship between the annual GDP and the prevalence of recessionary illicit drug use in the United States.

Biserial correlation. To examine hypothesis 4, a point biserial correlation and binary logistic regression was conducted. The point biserial correlation (r_{pb}) is appropriate when the research purpose is to evaluate if a relationship exists between a continuous variable and a dichotomous variable, and to find the magnitude of that correlation or the strength of that relationship (Howell, 2010). Correlation coefficients can vary from 0 (no relationship) to +1 (perfect positive linear relationship) or -1 (perfect negative linear relationship). The "variables of analysis" is the continuous variable of annual GDP and the dichotomous variable total drug use. Positive coefficients indicate a direct relationship, so as one variable increases the other variable also increases. Negative correlation coefficients indicate an inverse relationship, so as one variable increases the other variable decreases. The results for the biserial correlation between annual GDP and total drug use was a very small significant positive relationship with rho equaling .01 (ρ= .01).

A further analysis was conducted to asses if annual GDP was a significant predictor in the likelihood of recessionary illicit drug use defined as cocaine, heroin and/or methamphetamine use. To examine this second analysis, a binary logistic regression was conducted with the dependent outcome variable being total drug use, dichotomized as yes or no, and the independent variable being annual GDP.

Predicted probabilities of an event occurring were determined by exponentiating the *B* coefficients (Tabachnick & Fidell, 2012). Annual GDP was found to be significant

(B = .01, p = .037). Table 9 shows a summary of the binary logistics regression model. Refer to Appendix D for GDP model fit details.

Table 9

Summary of Binary Logistic Regression for Annual GDP Predicting Drug Use

Variable	*B*	*SE*	z-value	*p*	*OR*	*95% C.I. for Exp(B)*	
						Lower	*Upper*
Annual GDP	0.01	0.01	2.08	0.04	-	1.00	1.02

Based on the results of the logistic regression, annual GDP proved to be a significant predictor of the likelihood total drug use and the model proved to have overall significance ($\chi^2(1)= 4.376$, p =.03). This indicates that annual GDP is a predictor of drug use, thereby rejecting the null hypothesis.

Research Question 4

Does the prevalence of illicit drug use change over time as predicted by socio-demographics and/or social disorganization in relation to an economic indicator (GDP).

Research Hypothesis 5

$H_1$5: The prevalence of illicit drug use changes over time as predicted by socio-demographics and/or social disorganization in relation to an economic indicator (GDP).

$H_0$5: The prevalence of illicit drug use does not change over time as predicted by socio-demographics and/or social disorganization in relation to an economic indicator (GDP).

To examine hypothesis 5, a trend analysis was conducted using a series of logistics regressions with socio-demographic indicators (Gender and Age), social disorganization score, recessionary years, and annual GDP from 2006 -2010 to find if

these factors influence the trend in prevalence of illicit drug use. Although this study focuses on the factors that influence a trend of illicit drug prevalence over time in relation to total drug use or total non-drug use, supplemental regressions were run and provided to better understand the prevalence of total drug use. Figure 1 shows prevalence of cocaine, heroin, methamphetamine, and total drug use over time 2006 – 2010.

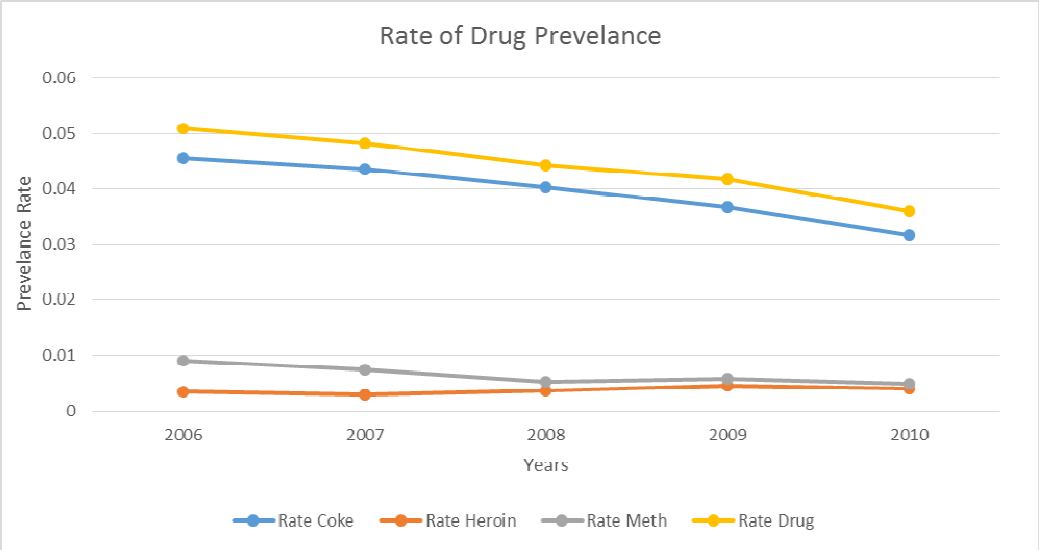

Figure 1. Prevalence of cocaine, heroin, methamphetamine, and total drug use over time, FY2006-2010. Prevalence based on the ratio of total number of users and total number of non-users per drug by year.

Based on Figure 1 some inferences can be made on drug prevalence over time. From the years showing the prevalence of cocaine use, the prevalence decreased from 4.54% in 2006 to 3.17% in 2010, showing an overall decrease in prevalence of 1.37% over time for cocaine. Also, the prevalence of overall drug use in 2006 was 5.1% and decreased to 3.6% in 2010, which was an overall 1.5% decrease in prevalence over time for overall drug use. The only drug to report a significant increase in prevalence over time was heroin. During the years 2007-2009 there was increase in prevalence, with the 2007 prevalence rate for heroin being .28% and rising to .45% prevalence rate in 2009,

indicating a 0.17% increase. In order to better understand what factors influenced the prevalence of drug use over time versus not using drugs, a trend analysis using binary logistic regressions was performed. In order to investigate further, the factors that influence cocaine, heroin, and methamphetamine use over time were analyzed as supplementary additions.

Binary logistic regression (a): Total drug use. To examine the factors that influence the prevalence of total drug use over the time period 2006-2010, a binary logistic regression was conducted with the dependent variable being total drug use, dichotomized as yes or no to any or all drugs (cocaine, heroin, methamphetamine), and the independent variables that were measured over time being social disorganization, age, gender, years (2006-2010), and annual GDP. Based on the results of the logistic regression, almost all the independent variables proved to be significant and to influence the prevalence of total drug use over time and the overall model proved to be significant ($\chi^2(18)= 4789.1$, $p <.001$). Prior to analysis, the years 2006-2010 were grouped into two different groups for recessionary and non-recessionary years. The years 2006 and 2010 were grouped together and set as the reference category. The years 2007-2009 were grouped together as being years of recession. The age group for respondents between 35 and 49 years of age was set as the reference due to it being the largest group. The female respondents were set as the reference category for gender. Those who scored a 3 for social disorganization were set as the reference group.

Predicted probabilities of an event occurring were determined by exponentiation the *B* coefficients (Tabachnick & Fidell, 2012). The age group for 18 years old was found

to be significant (B =-.19, p < .001) indicating that inclusion in this group resulted in a .17 (1-exp(-.19)) increase in the odds ratio for the prevalence of total drug use over time versus not using drugs in comparison to those in the 35 to 49 age group. The age group for 21 years old was found to be significant (B =.16, p =.002) indicating that inclusion in this group resulted in a 1.17 (exp(.16)) increase in the odds ratio for the prevalence of total drug use over time versus not using drugs in comparison to those in the 35 to 49 age group. The age group for 22 to 23 years old was found to be significant (B =.22, p < .001) indicating that inclusion in this group resulted in a 1.25 (exp(.22)) increase in the odds ratio for the prevalence of total drug use over time versus not using drugs in comparison to those in the 35 to 49 age group. The age group for 24 to 25 years old was found to be significant (B =.22, p < .001) indicating that inclusion in this group resulted in a 1.25 (exp(.22)) increase in the odds ratio for the prevalence of total drug use over time versus not using drugs in comparison to those in the 35 to 49 age group. The age group 26 to 29 years old was found to be significant (B =.29, p < .001) indicating that inclusion in this group resulted in a 1.34 (exp(.29)) increase in the odds ratio for the prevalence of total drug use over time versus not using drugs in comparison to those in the 35 to 49 age group. The age group 30 to 34 years old was found to be significant (B =.16, p =.004) indicating that inclusion with in this group resulted in a 1.17 (exp(.16)) increase in the odds ratio for the prevalence of total drug use over time versus not using drugs in comparison to those in the 35 to 49 age group. The age group 50 to 64 years old was found to be significant (B =-3.05, p < .001) indicating that inclusion with in this group resulted in a .95 (1-exp(-3.05)) increase in the odds ratio for the prevalence of total

drug use over time versus not using drugs in comparison to those in the 35 to 49 age group. The age group 65 years and older was found to be significant (B =-.68, p < .001) indicating that inclusion in this group resulted in a .49 (1-exp(-.68)) increase in the odds ratio for the prevalence of total drug use over time versus not using drugs in comparison to those in the 35 to 49 age group. The age groups for 19 and 20 were not found to be significant in influencing the prevalence of total drug use over time. Gender was found to be significant (B =.56, p < .001) indicating that if you are male this will result in a 1.76 (exp(.56)) increase in the odds ratio for the prevalence of total drug use over time versus not using drugs in comparison to females.

All the groups of social disorganization were found to be significant. Those who scored 0 for social disorganization was found to be significant (B = -1.92, p < .001) indicating that inclusion in this group resulted in a .85 (1-exp (-1.92)) increase in the odds ratio for the prevalence of total drug use over time versus not using drugs in comparison to those that scored in group 3. Those who scored 1 for social disorganization was found to be significant (B = -1.28, p < .001) indicating that inclusion in this group resulted in a .72 (1-exp (-1.28)) increase in the odds ratio for the prevalence of total drug use over time versus not using drugs in comparison to those that scored in group 3. Those who scored 2 for social disorganization was found to be significant (B =-.48, p < .001) indicating that inclusion in this group resulted in a .382 (1-exp (-.48)) increase in the odds ratio for the prevalence of total drug use over time versus not using drugs in comparison to those who scored in group 3. Those who scored a 4 for social disorganization was found to be significant (B =.69, p <.001) indicating that inclusion in this group resulted in a 1.99

(exp(.69)) increase in the odds ratio for the prevalence of total drug use over time versus not using drugs in comparison to those that scored in group 3. Those who scored a 5 for social disorganization was found to be significant (B =.38, p < .001) indicating that inclusion in this group resulted in a 1.49 (exp(.38)) increase in the odds ratio for the prevalence of total drug use over time versus not using drugs in comparison to those who scored in group 3. The recessionary years 2007-2009 were found to be significant (B =.15, p < .001) indicating that recessionary years resulted in a 1.16 (exp(.15)) increase in the odds ratio for the prevalence of total drug use over time versus not using drugs in comparison to non recessionary years 2006 and 2010. Annual GDP was also found to be significant (B =.03, p <.001) indicating an influence on the prevalence of total drug use. This indicates that the inclusion of Social Disorganization Score, Age, Gender, Annual GDP, and Years (2006-2010) as predictors significantly improved the model's ability to distinguish the trend in prevalence of total drug use from no drug use, thereby rejecting the null hypothesis. Table 10 shows a summary of the binary logistics regression model. Refer to Appendix H for social disorganization, age, gender, annual GDP, and year (2006-2010) model fit for total drug use details.

Table 10

Summary of Binary Logistic Regression for Age, Gender, Social Disorganization, Recessionary Years, and Annual GDP Predicting Prevalence of Total Drug Use

Variable	*B*	*SE*	z-value	*p*	*OR*	*95% C.I. for Exp(B)*	
						Lower	Upper
Age 18	-0.19	0.06	-3.53	<.001*	0.17	0.13	0.92
Age 19	0.01	0.05	0.21	.83	-	0.91	1.12
Age 20	0.03	0.05	0.72	.47	-	0.93	1.15
Age 21	0.16	0.05	2.99	.002*	1.17	1.05	1.30
Age 22-23	0.22	0.05	4.81	<.001*	1.25	1.14	1.37
Age 24-25	0.22	0.05	4.78	<.001*	1.25	1.14	1.37
Age 26-29	0.29	0.05	5.55	<.001*	1.34	1.21	1.49
Age 30-34	0.16	0.06	2.85	.004*	1.17	1.05	1.31
Age 50-64	-3.05	0.08	-8.41	<.001*	0.95	0.26	0.95
Age 65+	-0.68	0.30	-10.07	<.001*	0.49	0.43	0.59
Sex (male)	0.05	0.02	24.1	<.001*	1.76	1.68	1.85
Social Disorganization 0	-1.92	0.11	-18	<.001*	0.85	0.12	0.87
Social Disorganization 1	-1.28	0.05	-23.5	<.001*	0.72	0.25	0.81
Social Disorganization 2	-0.48	0.04	-13.1	<.001*	0.38	0.27	0.66
Social Disorganization 4	0.38	0.03	13.5	<.001*	1.99	1.83	2.18
Social Disorganization 5	0.69	0.04	15.6	<.001*	1.49	1.39	1.56
Year (2007-2009)	0.15	0.03	4.63	<.001	1.16	1.09	1.24
GDP	0.03	0.01	4.98	<.001*	-	1.02	1.05

Note. Items with asterisks have p-values less than .05.

Binary logistic regression (b): Cocaine use. To examine the factors that influence the prevalence of cocaine use over the time period 2006-2010, a binary logistic regression was conducted with the outcome variable being cocaine use, dichotomized as yes or no, and the independent variables that were measured over time being social disorganization, age, gender, recessionary years (2006-2010), and annual GDP. Based on the results of the logistic regression, almost all the independent variables proved to be significant and to influence the prevalence of cocaine use over time and the overall model proved to be significant ($\chi^2(18)= 4366.5$, $p <.001$). Prior to analysis the years 2006 -2010

were grouped into two different groups for recessionary and non-recessionary years. The years 2006 and 2010 were grouped together and set as the reference category. The years 2007-2009 were grouped together as being the years of recession. The age group for respondents between 35 and 49 years of age was set as the reference due to it being the largest group. The female respondents were set as the reference category for gender. Those that scored a 3 for social disorganization were set as the reference group.

Predicted probabilities of an event occurring were determined by exponentiating the *B* coefficients (Tabachnick & Fidell, 2012). The age group for 19 year olds was found to be significant (B =.15, p = .006) indicating that inclusion in this age group would results in a 1.16 (exp(.15)) increase in the odds ratio for the prevalence of cocaine use over time versus not using cocaine in comparison to those in the 35 to 49 age group. The age group for 20 year olds was found to be significant (B = .18, p =.001) indicating that inclusion in this age group would result in a 1.2 (exp(.18)) increase in the odds ratio for the prevalence of cocaine use over time versus not using cocaine in comparison to those in the 35 to 49 age group. The age group for 21 year olds was found to be significant (B = .28, p < .001) indicating that inclusion in this age group would result in a 1.32 (exp(.28)) increase in the odds ratio for the prevalence of cocaine use over time versus not using cocaine in comparison to those in the 35 to 49 age group. The age group for 22 to 23 was found to be significant (B =.33, p < .001) indicating that inclusion in this age group would result in a 1.4 (exp(.33)) increase in the odds ratio for the prevalence of cocaine use over time versus not using cocaine in comparison to those in the 35 to 49 age group. The age group for 24 to 25 years old was found to be significant (B =.30, p < .001)

indicating that inclusion in this age group would result in a 1.35 (exp(.30)) increase in the odds ratio for the prevalence of cocaine use over time versus not using cocaine in comparison to those in the 35 to 49 age group. The age group for 26 to 29 was found to be significant (B =.35, p < .001) indicating that inclusion in this group would result in a 1.42 (exp(.35)) increase in the odds ratio for the prevalence of cocaine use over time versus not using cocaine in comparison to those in the 35 to 49 age group. The age group for 30 to 34 was found to be significant (B =.18, p =.002) indicating that inclusion in this group would result in a 1.2 (exp(.18)) increase in the odds ratio for the prevalence of cocaine use over time versus not using cocaine in comparison to those in the 35 to 49 age group. The age group for 50 to 64 was found to be significant (B =-.69, p < .001) indicating that inclusion in this group would result in a .50 (1-exp (-.69)) increase in the odds ratio for the prevalence of cocaine use over time versus not using cocaine in comparison to those in the 35 to 49 age group. The final age group 65 years or older was found to be significant (B =-2.99, p < .001) indicating that inclusion in this group would result in a 0.94 (1-exp (-2.99)) increase in the odds ratio for the prevalence of cocaine use over time versus not using cocaine in comparison to those in the 35 to 49 age group. The 18 year old age group was not significant. The gender of the respondents was found to be significant (B =.59, p < .001) indicating that if you were a male it would result in a 1.8 (exp (.59)) increase in the odds ratio for the prevalence of cocaine use over time versus not using cocaine in comparison to females.

All the groups of social disorganization proved to be significant. Those who scored 0 for social disorganization proved to be significant (B =-1.75, p < .001)

indicating that inclusion in this group would result in a .82 (1-exp (-1.75)) increase in the odds ratio for the prevalence of cocaine use over time versus not using cocaine in comparison to those who scored a 3. Those who scored 1 for social disorganization proved to be significant (B =-1.19, $p < .001$) indicating that inclusion in this group would result in a .69 (1-exp (-1.19)) increase in the odds ratio for the prevalence of cocaine use over time versus not using cocaine in comparison to those who scored a 3. Those who scored 2 for social disorganization was found to be significant *(*B =-.42, $p < .001$) indicating that inclusion in this group would result in a .34 (1-exp (-.42)) increase in the odds ratio for the prevalence of cocaine use over time versus not using cocaine in comparison to those who scored a 3. Those who scored 4 for social disorganization proved to be significant (B =.38, $p < .001$) indicating that inclusion in this group would result in a 1.47 (exp (.38)) increase in the odds ratio for the prevalence of cocaine use over time versus not using cocaine in comparison to those who scored a 3. Those who scored 5 for social disorganization proved to be significant (B =.69, $p < .001$) indicating that inclusion in this group would result in a 2.01 (exp (.69)) increase in the odds ratio for the prevalence of cocaine use over time versus not using cocaine in comparison to those who scored a 3. The recessionary years (2007-2009) were found to be significant (B =.18, $p < .001$) indicating that recessionary drug use would result in a 1.19 (exp(.18)) increase in the odds ratio for the prevalence of cocaine use over time versus not using cocaine in comparison to non-recessionary years 2006 and 2010. The annual GDP was also found to be significant (B =.04, $p < .001$) indicating an influence on the prevalence of cocaine use. This indicates that the inclusion of Social Disorganization, Age, Gender,

Annual GDP, and Years (2006-2010) as predictors significantly improved the model's ability to distinguish the trend in prevalence of cocaine use from non-cocaine use. Table 11 shows a summary of the binary logistics regression model. Refer to Appendix E for social disorganization, age, gender, annual GDP, and years (2006-2010) model fit for cocaine details.

Table 11

Summary of Binary Logistic Regression for Age, Gender, Social Disorganization, Recessionary Years, and Annual GDP Predicting Prevalence of Cocaine Use

Variable	*B*	*SE*	z-value	*p*	*OR*	*95% C.I. for Exp(B)*	
						Lower	*Upper*
Age 18	-0.09	0.05	-1.64	.100	-	0.80	1.01
Age 19	-0.15	0.05	2.71	.006*	1.16	1.04	1.31
Age 20	0.18	0.05	3.14	.001*	1.20	1.07	1.34
Age 21	0.28	0.05	4.97	<.001*	1.32	1.18	1.48
Age 22-23	0.33	0.05	6.81	<.001*	1.40	1.27	1.54
Age 24-25	0.30	0.05	6.05	<.001*	1.35	1.22	1.49
Age 26-29	0.35	0.06	6.28	<.001*	1.42	1.27	1.59
Age 30-34	0.18	0.06	2.98	.002*	1.20	1.06	1.35
Age 50-64	-0.69	0.08	-7.87	<.001*	0.50	0.02	0.09
Age 65+	-2.99	0.32	-9.4	<.001*	0.94	0.91	0.99
Sex (male)	0.59	0.02	23.7	<.001*	1.80	1.72	1.89
Social Disorganization 0	-1.75	0.10	-16.1	<.001*	0.82	0.74	0.82
Social Disorganization 1	-1.19	0.05	-20.8	<.001*	0.69	0.57	0.73
Social Disorganization 2	-0.42	0.03	-10.9	<.001*	0.34	0.31	0.35
Social Disorganization 4	0.38	0.03	12.7	<.001*	1.47	1.43	2.19
Social Disorganization 5	0.69	0.05	15.	<.001*	2.01	1.38	2.56
Year (2007-2009)	0.18	0.03	5.23	<.001*	1.19	1.12	1.28
GDP	0.04	0.01	5.45	<.001*	-	1.03	1.06

Note. Items with asterisks have p-values less than .05.

Binary logistic regression (c): Heroin use. To examine the factors that influence the prevalence of heroin use over the time period 2006-2010, a binary logistic regression was conducted with the outcome variable being heroin use, dichotomized as yes or no,

and the independent variables that were measured over time being social disorganization, age, gender, recessionary years (2006-2010), and annual GDP. Based on the results of the logistic regression, almost all the independent variables proved to be significant and to influence the prevalence of heroin use over time and the overall model proved to be significant ($\chi^2(18)= 606.02$, $p <.001$). Prior to analysis the years 2006 -2010 were grouped into two different groups for recessionary and non-recessionary years. The years 2006 and 2010 were grouped together and set as the reference category. The years 2007-2009 were grouped together as being the years of recession. The age group for respondents between 35 and 49 years of age was set as the reference due to it being the largest group. The female respondents were set as the reference category for gender. Those who scored a 3 for social disorganization were set as the reference group.

Predicted probabilities of an event occurring were determined by exponentiation the *B* coefficients (Tabachnick & Fidell, 2012). The age group of 18 years old was found to be significant (*B* =-.40, *p* = .020*)* indicating that inclusion in this age group would results in a .33 (1-exp(-.40) increase in the odds ratio for the prevalence of heroin use over time versus not using heroin in comparison to those in the 35 to 49 age group. The age group of 19 years old was found to be significant (*B* = -.38, *p* =.029) indicating that inclusion in this age group would result in a .32 (1-exp(-.38)) increase in the odds ratio for the prevalence of heroin use over time versus not using heroin in comparison to those in the 35 to 49 age group. The age group of 20 years old was found to be significant (*B* =-.48, *p* =.009) indicating that inclusion in this age group would results in a .38 (1-exp(-.48)) increase in the odds ratio for the prevalence of heroin use over time versus not using

heroin in comparison to those in the 35 to 49 age group. The age groups of 21 years old, 22 or 23 years old, 24 or 25 years old, between 26 and 29 years old, between 30 and 34 years old, and finally 65 and older were all not significant factors influencing prevalence heroin use over time versus not doing heroin. The age group between 50 and 64 proved to be significant (B = -.2.01, p =.004) indicating that inclusion in this group would result in a .86 (1-exp (-2.01)) increase in the odds ratio for the prevalence of heroin use over time versus not using heroin in comparison to those in the 35 to 49 age group. Being a male was found to be significant (B =.68, p < .001) indicating that being male would results in a 1.99 (exp (.68)) increase in the odds ratio for the prevalence of heroin use over time versus not using heroin in comparison to females.

All levels of the unstable predicting variable were found to be significant. Those who scored a 0 for social disorganization were significant (B =-3.09, p < .001) indicating that inclusion in this group would result in a .95 (1-exp (-3.09)) increase in the odds ratio for the prevalence of heroin use over time versus not using heroin in comparison to those who scored a 3. Those who scored a 1 for social disorganization were found to be significant (B =-2.33, p <.001) indicating that inclusion in this group would result in a .90 (1-exp (-2.33)) increase in the odds ratio for the prevalence of heroin use over time versus not using heroin in comparison to those who scored a 3. Those who scored a 2 for social disorganization were found to be significant (B =-1.08, p < .001) indicating that inclusion in this group would results in a .66 (1-exp (-1.08)) increase in the odds ratio for the prevalence of heroin use over time versus not using heroin in comparison to those who scored a 3. Those who scored a 4 for social disorganization were also found to be

significant (B =.77, p <.001) indicating that inclusion in this group would result in a 2.16 (exp (.77) increase in the odds ratio for the prevalence of heroin use over time versus not using heroin in comparison to those who scored a 3. Those who scored a 5 for social disorganization were found to be significant (B =.34, p < .001) indicating that inclusion in this group would result in a 1.4 (exp (.34)) increase in the odds ratio for the prevalence of heroin use over time versus not using heroin in comparison to those who scored a 3. Recessionary years 2007-2009 proved to be significant (B =-.32, p =.006) indicating that recessionary years were cause of a .28 (1-exp (-.32)) increase in the odds ratio for the prevalence of heroin use over time versus not using heroin in comparison non-recessionary years. Annual GDP was also found to be significant (B =-.09, p < .001) indicating an influence on the prevalence of heroin use. This indicates that the inclusion of Social Disorganization, Age, Gender, Annual GDP, and Years (2006-2010) as predictors significantly improved the model's ability to distinguish the trend in prevalence of heroin use from non-heroin use. Table 12 shows a summary of the binary logistics regression model. Refer to Appendix F for social disorganization, age, gender, annual GDP, and years (2006-2010) model fit for heroin details.

Table 12

Summary of Binary Logistic Regression for Age, Gender, Social Disorganization, Recessionary Years, and Annual GDP Predicting Prevalence of Heroin Use

Variable	*B*	*SE*	z-value	*p*	*OR*	*95% C.I. Exp(B)*	
						Lower	Upper
Age 18	-0.40	0.17	-2.32	.020*	0.33	0.31	0.93
Age 19	-0.38	0.17	-2.17	.029*	0.32	0.32	0.96
Age 20	-0.49	0.18	-2.61	.009*	0.38	0.32	0.88
Age 21	-0.11	0.17	-0.67	0.49	-	0.63	1.24
Age 22-23	-0.17	0.15	-1.11	0.26	-	0.61	1.14
Age 24-25	0.02	0.15	0.12	0.89	-	0.75	1.38
Age 26-29	0.24	0.17	1.42	0.15	-	0.91	1.79
Age 30-34	-0.01	0.19	-0.07	0.93	-	0.66	1.45
Age 50-64	-2.01	0.23	-0.27	.004*	0.86	0.73	0.94
Age 65+	-0.06	0.71	-2.81	0.78	-	0.59	1.48
Sex (male)	0.68	0.07	8.00	<.001*	1.99	1.70	2.31
Social Disorganization 0	-3.09	0.51	-6.05	<.001*	0.95	0.71	0.95
Social Disorganization 1	-2.33	0.23	-9.87	<.001*	0.90	0.61	0.95
Social Disorganization 2	-1.08	0.13	-8.07	<.001*	0.66	0.26	0.74
Social Disorganization 4	0.77	0.09	3.77	<.001*	2.16	1.67	2.80
Social Disorganization 5	0.34	0.13	5.83	<.001*	1.40	1.17	1.67
Year (2007-2009)	-0.32	0.12	-2.73	.006*	0.28	0.27	0.91
GDP	-0.09	.026	-3.64	<.001*	-	0.86	0.95

Note. Items with asterisks have p-values less than .05.

Binary logistic regression (d): Methamphetamine use. To examine the factors that influence the prevalence of methamphetamine use over the time period 2006-2010, a binary logistic regression was conducted with the dependent variable being methamphetamine use, dichotomized as yes or no, and the independent variables that were measured over time being social disorganization, age, gender, recessionary years (2006-2010), and annual GDP. Based on the results of the logistic regression, almost all the independent variables proved to be significant and to influence the prevalence of methamphetamine use over time and the overall model proved to be significant ($\chi^2(18)=$

776.33, p <.001). Prior to analysis the years 2006 -2010 were grouped into two different groups for recessionary and non-recessionary years. The years 2006 and 2010 were grouped together and set as the reference category. The years 2007-2009 were grouped together as being years of recession. The age group for respondents between 35 and 49 years of age was set as the reference due to it being the largest group. The female respondents were set as the reference category for gender. Those who scored a 3 for social disorganization were set as the reference group.

Predicted probabilities of an event occurring were determined by exponentiation the *B* coefficients (Tabachnick & Fidell, 2012). The age group for 18 years old was found to be significant (B =-.62, p <.001) indicating that inclusion with in this group would result in a .47 (1-exp(-.62)) increase in the odds ratio for the prevalence of methamphetamine use over time versus not using methamphetamine in comparison to those in the 35 to 49 age group. The age group for 19 years old was found to be significant (B =-.62, p < .001) indicant that inclusion in this group would result in a .46 (1-exp(-.62)) increase in the odds ratio for the prevalence of methamphetamine use over time versus not using methamphetamine in comparison to those in the 35 to 49 age group. The age group for 20 years old was significant (B =-.61, p < .001) indicating that inclusion in this group would result in a .45 (1-exp (-.61)) increase in the odds ratio for the prevalence of methamphetamine use over time versus not using methamphetamine in comparison to those in the 35 to 49 age group. The age group for 21 years old was found to be significant (B =-.48, p < .001) indicating that inclusion in this group would result in a .39 (1-exp(-.48)) increase in the odds ratio for the prevalence of methamphetamine use

over time versus not using methamphetamine in comparison to those in the 35 to 49 age group. The 22 or 23 years old age group was found to be significant (B =-.29, p =.007) indicating that inclusion in this group would result in a .25 (1-exp(-.29)) increase in the odds ratio for the prevalence of methamphetamine use over time versus not using methamphetamine in comparison to those in the 35 to 49 age group. The 50 to 64 years old age group was found to be significant (B =-3.73, p < .001) indicating that inclusion with in this age group resulted in a .97 (1-exp(-1.01)) increase in the odds ratio for the prevalence of methamphetamine use over time versus not using methamphetamine in comparison to those in the 35 to 49 age group. The age group for 65 years or was found to be significant (B =-1.01, p < .001) indicating that inclusion with in this group would result in a .63 (1-exp(-1.01)) increase in the odds ratio for the prevalence of methamphetamine use over time versus not using methamphetamine in comparison to those in the 35 to 49 age group. The age groups 24 and 25 years old, between 26 and 29 years old, and between 30 and 34 were not significant. Gender was found to be significant (B =.26, p < .001) indicating that if you are male this would result in a 1.29 (exp (.26)) increase in the odds ratio for the prevalence of methamphetamine use over time versus not using methamphetamine in comparison to females.

All the groups of social disorganization were found to be significant. Those who scored 0 for social disorganization were found to be significant (B =-2.66, p < .001) indicating that inclusion in this group resulted in a .93 (1-exp (-2.66)) increase in the odds ratio for the prevalence of methamphetamine use over time versus not using methamphetamine in comparison to those who scored a 3. Those who scored a 1 for

social disorganization were found to be significant (B =-1.56, $p < .001$) indicating inclusion with in this group resulted in a .79 (1-exp (-1.56)) increase in the odds ratio for the prevalence of methamphetamine use over time versus not using methamphetamine in comparison to those who scored a 3. Those who scored a 2 for social disorganization were found to be significant (B =-.65, $p < .001$) indicating that inclusion in this group resulted in a .48 (1-exp (-.65)) increase in the odds ratio for the prevalence of methamphetamine use over time versus not using methamphetamine in comparison to those who scored a 3. Those who scored a 4 for social disorganization were found to be significant (B =.94, $p < .001$) indicating that inclusion in this group would result in a 2.58 (exp (.94)) increase in the odds ratio for the prevalence of methamphetamine use over time versus not using methamphetamine in comparison to those who scored a 3. Those that scored a 5 for social disorganization were found to be significant (B =.48, $p < .001$) indicating that inclusion in this group would result in a 1.63 (exp (.48)) increase in the odds ratio for the prevalence of methamphetamine use over time versus not using methamphetamine in comparison to those who scored a 3. The recessionary years (2007-2009) were not significant. Annual GDP was found to be significant (B =.060, p =.002) indicating an influence on the prevalence of methamphetamine use. This indicates that the inclusion of Social Disorganization, Age, Gender, Annual GDP, and Years (2006-2010) as predictors significantly improved the model's ability to distinguish the trend in prevalence of methamphetamine use from non-methamphetamine use. Table 13 shows a summary of the binary logistics regression model. Refer to Appendix G for social

disorganization, age, gender, annual GDP, and years (2006-2010) model fit for methamphetamine details.

Table 13

Summary of Binary Logistic Regression for Age, Gender, Social Disorganization, Recessionary Years, and Annual GDP Predicting Prevalence of Methamphetamine Use

Variable	*B*	*SE*	z-value	*p*	*OR*	*95% C.I. for Exp(B)*	
						Lower	*Upper*
Age 18	-0.62	0.13	-4.74	<.001*	0.47	0.41	0.69
Age 19	-0.62	0.13	-4.64	<.001*	0.46	0.41	0.69
Age 20	-0.61	0.13	-4.66	<.001*	0.45	0.41	0.71
Age 21	-0.48	0.13	-3.66	<.001*	0.39	0.37	0.79
Age 22-23	-0.29	0.11	-2.66	.007*	0.25	0.24	0.92
Age 24-25	-0.17	0.11	-1.62	.105	-	0.67	1.03
Age 26-29	0.07	0.12	0.58	.55	-	0.85	1.36
Age 30-34	0.09	0.12	0.71	.475	-	0.85	1.40
Age 50-64	-3.73	0.22	-4.64	<.001*	0.97	0.003	117
Age 65+	-1.01	1	-3.72	<.001*	0.63	0.37	0.65
Sex (male)	0.26	0.06	4.52	<.001*	1.29	1.16	1.45
Social Disorganization 0	-2.66	0.34	-7.80	<.001*	0.93	0.83	1.13
Social Disorganization 1	-1.56	0.14	-11.18	<.001*	0.79	0.15	0.87
Social Disorganization 2	-0.65	0.09	-7.01	<.001*	0.48	0.43	0.62
Social Disorganization 4	0.94	0.07	6.82	<.001*	2.58	2.12	3.17
Social Disorganization 5	0.48	0.10	9.155	<.001*	1.63	1.41	1.87
Year (2007-2009)	0.07	0.08	0.88	.377	-	0.92	1.26
GDP	0.06	0.02	2.97	.002*	-	1.02	1.10

Note. Items with asterisks have p-values less than .05.

Summary

Chapter 4 provided a brief overview of this study's purpose and data collection, followed by the results of the analyses conducted to answer the research questions and hypotheses. This included the descriptive statistics of the variables, analysis of significant variables, and a trend analysis using logistic regression of how variables correlate to

illicit drug use during recessionary years. Results were accompanied with appropriate tables to provide a quantitative reference for interpretation.

Chapter 5 provides a concise illustration of the study's purpose, variations in the analysis conducted, and a concise interpretation of the results with tables and comparisons to research. Before concluding the study, recommendations and implications for positive social change are addressed.

Chapter 5: Summary, Recommendations, and Conclusions

Introduction

The purpose of this quantitative analysis was to determine if illicit drug use, within an ecological framework, inrceases due to social disorganization during recessionary years. Through this study, an analysis of individual demographics (age and gender), socioeconomic factors (income, employment, and education), family history (sinlge, married, or divorced) and residential mobility were compiled to form a composite (social disorganization) and was examined to determnine if a macrolevel enviromental change (i.e., a recession) affects social disorganization in order to predict an increase in a microlevel issue (i.e., illicit drug use). Based on the analyses, the covariates and variables were found to be significant predictors of illicit drug use. Although methamphetamine was not significant for prevalence over time, total drug use, cocaine, and heroin were prevalent over time based on predictors.

Interpretations

Research Question 1

Does an economic recession predict an increase in illicit drug use through socio-demographic indicators defined by age and/or gender?

Research Hypothesis 1

$H_1 1$: Age does predict recessionary illicit drug use defined as cocaine, heroin and/or methamphetamine use.

$H_0 1$: Age does not predict recessionary illicit drug use defined as cocaine, heroin and/or methamphetamine use.

Based on the results of the statistical analyses, age was shown to be a predictor of illicit drug use. First, a chi square test for independence was conducted to determine if all 11 age groups were significantly different for the likelihood of illicit drug use. Results indicated that $p < .001$, which was significant for age as a predictor for illicit drug use between years 2006 to 2010. These findings are consistent with literature provided on age and drug use. Researchers have suggested that individuals between the ages of 18 to 25 are more likely to use illicit drugs due to developmental life stressors such as changes in their environment leading to more independence (Halkitis et al., 2010). The probability of 18, 19-20, 21, 22-23, 24-25, 26-29, and 30-34 year olds using drugs between 2006 to 2010 increases significantly more than older age groups in this study when compared to the reference group of drug users between 2006 to 2010. Theorists focusing on environmental factors suggest individual traits may trigger the behavior of adults between the ages of 20 to 39 to use illicit drugs (Fischer et al., 2012). The probability of individuals aged between 50 and 64 and 65 or older for using drugs between 2006 to 2010 increases by .95 and .55 respectively when compared to 35 to 49 year old drug users between 2006 to 2010. This collaborates with research that has suggested individuals between the ages of 45 to 65 have become a growing drug use population (Hartel et al., 2006). However, the results indicated this age demographic is the least likely to use illicit drugs when compared to 35 to 49 year olds.

Research Hypothesis 2

$H_1 2$: Gender does predict recessionary illicit drug use defined as cocaine, heroin and/or methamphetamine use.

$H_0$2: Gender does not predict recessionary illicit drug use defined as cocaine, heroin and/or methamphetamine use.

Based on statistical analyses, the variance of drugs used by men is not equal to the variance of drugs used by women. An independent sample *t* test showed a difference in average drug use between genders ($p = < .001$, $t = 24.06$, $df = 164{,}934.71$). Analysis through binary logistic regression indicated that the probability for males using drugs between 2006 to 2010 was significantly greater when compared female drug users between 2006 to 2010. Previous researchers have suggested women were not associated with extensive illicit drug use with research focused primarily on males, but recent studies have estimated that females make up about one third of all illicit drug users (Chow et al., 2013; Fischer et al., 2012; French et al., 2011). While researchers have reported that males are considerably more likely to admit using illicit drugs such as cocaine and methamphetamine, other studies have failed to find any gender differences in drug use prevalence (Hartel et al., 2006; NSDUH, 2004). Considering drug use prevalence could be defined as the use of any number of substances and that two of the three drugs defined as illicit drug use in this study are represented in these findings, the previous indication that males are more likely to use illicit drugs is congruent with this study's findings. This suggests that the inclusion of gender as a predictor significantly improved the ability to distinguish the nondrug users from the respondents who used drugs.

Research Question 2

Will drug use in individuals associated with higher levels of social disorganization increase more than in individuals associated with lower levels of social disorganization during recessionary years?

Research Hypothesis 3

$H_1$3: Social disorganization defined by a composite score of disadvantaged indicators does predict recessionary illicit drug use.

A. income, B. employment, C. education, D. family disruption (marriage), E. residential mobility

$H_0$3: Social disorganization defined by a composite score of disadvantaged indicators does not predict recessionary illicit drug use.

A. income, B. employment, C. education, D. family disruption (marriage), E. residential mobility

Based on the statistical analysis, all groups of social disorganization were found to be significant. The analysis clearly indicated that individuals with higher levels of social disorganization were more likely to use drugs between the years 2006 and 2010 than those with lower levels of social disorganization. This indicates that the inclusion of social disorganization as a predictor significantly improved my ability to distinguish the nondrug users from the respondents who used drugs and is compatible with previous studies stating that determinants of illicit drug related behaviors can be identified and correlated to substance abuse (Çam, 2014; HeavyRunner-Rioux & Hollist, 2010; Pratt & Cullen, 2005). Hence, the contention that social disorganization based on socioeconomic

and psychosocial factors, specifically low SES, family disruption, and residential mobility, have an extremely influential effect on illicit drug use (Pratt & Cullen, 2005).

Research Question 3

Does the prevalence of illicit drug use increase during an economic recession?

Research Hypothesis 4

$H_1$4: There is a relationship between the annual GDP and the prevalence of recessionary illicit drug use in the United States.

$H_0$4: There is no relationship between the annual GDP and the prevalence of recessionary illicit drug use in the United States.

In this study, I found there is a statistically significant relationship between annual GDP and illicit drug use, but the positive correlation found is very small. Although small, this does correlate with the idea that when the economy is negatively impacted, the people's behaviors are affected (Hinze, 2011; Kitov, 2005; Ritter & Chalmers, 2011). According to the correlation analysis, relationship between annual GDP and illicit drug use, based on scores ranging from -1 to 1, was .01. The 2007-2009 recession affected many people throughout the United States (Treloar, 2010). That said, it was hypothesized that a stronger correlation would have been found because stress leads to the employment of a coping mechanism (Enoch, 2011; Goeders, 2004; Piazza & Le Moal, 1998). Moreover, previous researchers have suggested that substance abuse can be associated with economic anxiety (Goldman-Mellor et al., 2010). However, these claims are more strongly corroborated based on regression analysis. GDP was found to be significant with a $p = .037$, indicating annual GDP can be used as a predictor of illicit drug use.

Research Question 4

Does the prevalence of illicit drug use change over time as predicted by socio-demographics and/or social disorganization in relation to an economic indicator (GDP).

Research Hypothesis 5

$H_1$5: The prevalence of illicit drug use changes over time as predicted by socio-demographics and/or social disorganization in relation to an economic indicator (GDP).

$H_0$5: The prevalence of illicit drug use does not change over time as predicted by socio-demographics and/or social disorganization in relation to an economic indicator (GDP).

In order to investigate if illicit drug use changed over time between 2006 and 2010 as predicted by sociodemographics and social disorganization in relation recessionary years based on the GDP, years 2006 and 2010 were grouped and set as the reference category. Years 2007 to 2009 were grouped and set to be recessionary years. Reference groups for age, gender, and social disorganization were set according to frequency, the same as the preceding analyses.

For total drug use, age groups for 19 and 20 years were not significant. The group consisting of 18 year olds were found to be the least likely to show a prevalence of drug use over time versus not doing drugs followed by the 65 and older group. The group consisting of 26 to 29 year olds were found to be the most likely to have a prevalence of drug use over time versus not doing drugs followed by 22-23 and 24-25 year olds. Individuals between 20 and 34 years of age and 21 years old were both equally as likely to have a prevalence of drug use over time versus not doing drugs. These findings are

relatively inconsistent with previous research, suggesting that individuals between the ages of 18 to 25 are more likely to use illicit drugs due to developmental life stressors such as changes in their environment leading to more independence (Halkitis et al., 2010). It may be possible that the lack of parental economic resources in the 18-year-old group prevented them from being able to afford illicit drugs during this period. When investigating the increased likelihood of prevalent drug use over time versus not doing drugs for each individual drug, heroin and methamphetamine had five and three groups respectively that were not significant. Furthermore, for those that were significant for heroin and methamphetamine, the increased likelihoods were considerably smaller than their cocaine counterparts were. A reasonable explanation for the lack of increases in heroin and methamphetamine prevalence would be that these individuals were already using during these researched years and that a recession did not drive individuals to use these drugs as a coping mechanism. This suggests that the methamphetamine and heroin users become addicted prior to the years investigated in this study, which leads to a mere continuation of use impervious to economic factors (Halkitis, 2009; Heard et al., 2014). Conversely, the increased likelihood of cocaine prevalence in nearly all ages suggests that cocaine may have had a fluctuation in market value during this period. It may also be that the energetic euphoria cocaine delivers made it a viable coping mechanism for those who may not routinely use illicit drugs (Agarwal et al., 2013; Buffalari et al., 2012) A summary of these results are presented in Table 14.

Table 14

Summary of Age Likelihoods (rho) for Prevalence of Using Drugs vs. Not Using Drugs over Time (2006-2010)

Age group	Increased likelihood of total drug use	Increased likelihood of cocaine drug use	Increased likelihood of heroin drug use	Increased likelihood of meth drug use
Age 18	.17	-	.33	.47
Age 19	-	1.16	.32	.46
Age 20	-	1.20	.38	.45
Age 21	1.17	1.32	-	.39
Age 22-23	1.25	1.40	-	.25
Age 24-25	1.25	1.35	-	-
Age 26-29	1.34	1.42	-	-
Age 30-34	.1.17	1.20	-	-
Age 50-64	.95	.50	.86	.97
Age 65+	.49	.94	-	.63

Note. Items with a dash are not significant.

Based on the analysis to test for gender, the odds ratio increased 1.7 for the prevalence of total drug use over time. For cocaine, heroin, and methamphetamine, the odds ration increased 1.8, 1.99, and 1.29 respectively for the prevalence of drug use over time versus not doing drugs. This concurs with previous research suggesting males are more likely to admit using cocaine and methamphetamine than females and contradicts studies that suggest there are no gender differences in illicit drug use (Hartel et al., 2006; Nguyen & Reuter, 2012; NSDUH, 2004). However, because previous researchers have suggested that males make up nearly two thirds of the illicit drug using population, these results are in congruence with previous research (Chow et al., 2013; Fischer et al., 2012; French et al., 2011). Because the likelihood of male prevalence to use illicit drugs versus

not using drugs increased during this period, it is probable that men do use illicit drugs more than women do and even more during this period.

Based on ranked groups of social disorganization, analyses clearly indicated that individuals with higher levels of social disorganization had an increased prevalence of drug use over time versus not doing drugs than those associated with lower levels of social disorganization. Researchers have suggested that there is a link between drug use and communities stricken with higher levels of social disorganization (Martínez, Rosenfeld, & Mares, 2008; Mosher, 2001). The results in this suggest that this period increased the likelihood that individuals with higher levels of social disorganization are more prevalent to use drugs versus not use drugs. Although all levels indicated an increase in likelihood of prevalence, those with levels higher than the reference group were consistently higher across total drug use and all individual drugs (cocaine, heroin, and methamphetamine). Again, this is in congruence with previous studies stating that large-scale social determinants of illicit drug related behaviors can be identified and correlated to substance abuse (Çam, 2014; HeavyRunner-Rioux & Hollist, 2010; Pratt & Cullen, 2005). Moreover, in this study, I have shown that over this period of time, those with higher levels of social disorganization had an increased prevalence of using drugs versus not using drugs. Hence, the contention that social disorganization based on structural factors, specifically low SES, family disruption, and residential mobility, have an enormously influential effect on illicit drug use (Pratt & Cullen, 2005). Table 15 illustrates the increases in likelihood among ranked groups of social disorganization.

Table 15

Summary of Social Disorganization Likelihoods (rho) for Prevalence of Using Drugs vs. Not Using Drugs over Time (2006-2010)

Ranking of social disorganization	Increased likelihood of total drug use	Increased likelihood of cocaine drug use	Increased likelihood of heroin drug use	Increased likelihood of meth drug use
Social Disorganization 0	.85	.82	.95	.93
Social Disorganization 1	.72	.69	.90	.79
Social Disorganization 2	.38	.34	.66	.48
Social Disorganization 4	1.99	1.47	2.16	2.58
Social Disorganization 5	1.49	2.01	1.40	1.63

Lastly, when viewed simply as the number of individuals that used drugs from 2006 to 2010 (as seen in Figure 1), heroin was the only drug to show an increase in use. This coincided with the notion that heroin is resilient to economic factors (Heard et al., 2014). However, based on the analyses performed with the addition of significant predictors, recessionary years showed an increase in the likelihood for prevalent drug use over time versus not using drugs when compared to nonrecessionary years for total drugs, cocaine, and heroin. Methamphetamine was not significant. Furthermore, with the addition of significant predictors, annual GDP showed to influence the prevalence of total drug, cocaine, heroin and methamphetamine use. This indicates that the addition of demographic indicators, determents of social disorganization, and annual GDP as predictors of total drug, cocaine, heroin, and methamphetamine use helped to show a

trend in the prevalence of drug use versus nondrug use. Although GDP was significant with predictors for the prevalence of methamphetamine use, recessionary years were not. This result contradicts the notion that GDP does not measure certain aspects of social disorganization such as family disruption, residential mobility, and crime (Sampson & Groves, 1989; Werner, 2013). However, these results match previous reports that drug use has increased within the United States over the last decade (Meiman et al., 2015; SAMHSA, 2013; Thomas, 2012).

Limitations

The results of this particular study lacked an aspect of social disorganization (i.e., ethnic heterogeneity). The results from this data set were limited by the definition of substance use set by the Substance Abuse and Mental Health Services Administration (SAMHSA). This study was dependent on data being reported by the individual states and compiled as a whole. Thus, the public access data being used has some data removed or modified to protect the identity of respondents, which could influence this study. The study may not be as accurate as assumed, as an underlying belief is that all respondents were honest with their responses. SAMHSA did not collect data from jailed, homeless, hospitalized individuals or military persons on active duty. Because these individuals are a part of a protected population and/or are within a controlled environment, these individuals were not included in the public access data set. SAMHSA answers a series of questions not created by the researcher, and were not designed to specifically answer the research questions being examined. However, questions within the survey are exhaustive and the hypotheses were derived based on the questions asked on the survey. Thus, the

questions align perfectly with answering the proposed research questions thereby preserving construct validity. Because SAMHSA is a government agency, validity and reliability of all materials used to conduct the survey and gather data are considered adequate.

Recommendations

This study proposes two recommendations for future research into substance abuse: 1) internet availability of illicit drugs and its effect on the economy, and 2) the proliferation of "legal highs" during recessionary years.

In recent years, the availability and growth of illicit drug sales has found its way to the internet with sales online predicted to grow exponentially due to new technological availability to the internet and social media (Buxton & Bingam, 2015; Van Hout, 2015). Known as the "Silk Road", this online illicit drug marketplace conducted business on the "Dark Net" until the FBI shut it down in October 2013 (Dolliver, 2015). However, with its dependable and steadily growing worldwide consumer base, Silk Road 2 was opened through the Tor Network to replace its predecessor (Dolliver, 2015). Because providers and consumers are given anonymity, the Dark Web has become a safe haven for drug trafficking from law enforcement and potentially violent competitors (Buxton & Bingham, 2015; Van Hout, 2015). Furthermore, while current enforcement technologies are capable of surveying sites on the Dark Web, the speed of new technologies used by trafficking sites is slow and in some cases prevent authorities from hacking into their data bases to build sufficient cases against them (Soukup-Baljak et al., 2015).

Research conducted on Silk Road 2 found that the United States is the number one provider and consumer of illicit drugs sold on this online network (Dolliver, 2015). While this issue will certainly be the problem of the near future, the popularity and convenience of new synthetic drugs have already begun to become a serious problem.

The emergence of synthetic marijuana and stimulants, commonly known as "incense" and "bath salts" respectively, rose in popularity during 2008 and were legally sold in gas stations and convenient stores (Jerry, Collins & Streem, 2012). This insurgence of unregulated psychoactive compounds is unparalleled in the chronicles of drugs abuse (Rosenbaum, Carreiro & Babu, 2012). Based on data compiled from the American Association of Poison Control Centers' National Poison Data System between January 1, 2009, and April 30, 2012, there were 7467 "bath salt" cases reported and 11,561 "incense" cases reported (Wood, 2013). More telling is the increase of reports made for each following year. Individuals reporting "bath salt" intoxication in 2009 were 0, but had risen to 298 and 6062 in years 2010 and 2011 respectively (Wood, 2013). Similarly, the increase of "incense" intoxication reports rose from 14 cases in 2009 to 2821 and 6255 in 2010 and 2011 respectively (Wood, 2013).

These newly discovered compounds that exhibit effects similar to traditional illicit drugs are technically legal and easily obtained and have been dubbed "legal highs" (Maxwell, 2014). Although commonly labeled "not for human consumption" to avoid drug laws, "bath salts" typically contain the compounds MDPV (a dopamine and norepinephrine reuptake inhibitor) and mephedrone (a derivative of phenethaylamine) which mimic the effects of cocaine and amphetamines respectively (Jerry, Collins &

Streem, 2012). Although the United States government made it illegal to sell or possess these substances on September 7, 2011, it is merely a temporary restraint to allow the Drug Enforcement Agency to collect reports and information to control these substances indefinitely (Jerry, Collins & Streem, 2012). However, attempts to outlaw these substances are often thwarted by rouge chemists creating new compounds that are named synthetic legal intoxicating drugs (SLIDs) (Jerry, Collins & Streem, 2012). Law enforcement officials in Europe identified 41 new SLIDs in 2010 alone. Most of these new drugs are synthetic compounds resembling marijuana, cocaine/amphetamines stimulants and opioids (Rosenbaum, Carreiro & Babu, 2012). Because the exponential-like rate of "incense" and "bath salt" use could put a severe strain on emergency rooms, drug rehabilitation centers and law enforcement agencies as well as the family and friends of users, it is recommended these substances be studied further.

Implication for Positive Social Change

Since the dawn of the 21st century, several researchers have found that the use of illicit drugs has become a moderately customary part of late adolescent and young adult social life (Duff, 2003; Parker, Aldridge, & Measham, 1998; Parker, Williams & Aldridge, 2002). Given these findings, many of these researchers believe the focus of illicit drug use should be placed on policy rather than devising new preventions and punishments for recreational use of illicit drugs (Duff, 2005).

The International Development Program (IDP) is a consortium devised to promote the modernization and development of economies, governance, and social organization for many nations, but populations within these nations suffering from

inequality, poverty, and health disparities have thwarted efforts worldwide (Singer, 2008). That said, policy makers and personnel have recently recognized that in order for these issues to be resolved a better understanding of how illicit drug use affects social and economic development is required (Singer, 2008).

In 2003, the President of the United Nations General Assembly exclaimed, "Drug abuse is a global problem. . . Drug abuse furthers socio-economic and political instability, it undermines sustainable development, and it hampers efforts to reduce poverty and crime" (Singer, 2008, p. 468). Because no significant changes have been made over the past ten years, the availability and growth of illicit drug sales has found its way to the internet with sales online predicted to grow exponentially due to new technological availability to the internet and social media (Buxton & Bingam, 2015; Van Hout, 2015). Therefore, this study can be a driving force for changes in Drug Policy and an initiative for positive social change.

Current drug laws are asserted on the premise that imprisonment serves as a disincentive to use illicit drugs (Keefer & Loayza, 2010). Despite the fact that most law-abiding citizens agree with the current policy of criminalization, this policy does not appear to be working (Gray, 2010). Research suggests that imprisoning drug users may exacerbate drug-related problems (Stevens, 2012). Similar studies among different researchers have not revealed a viable relationship between intense enforcement of the law and the prevalence of drug use (Degenhardt, 2008; Gray, 2010; Keefer & Loayza, 2010). Moreover, the Global Commission has reported that criminalizing drug use and

small quantity possession has promoted health concerns and social disorder (Global Commission on Drug Policy, 2014).

> Global drug prohibition has not only failed to achieve its original stated objectives, it has also generated alarming social and health problems. Alternative policies are emerging aimed at safeguarding the health and safety of communities, and strengthening security, human rights, and development. (Global Commission on Drug Policy, 2014, p. 11).

By reducing or eliminating the current legal punishment applied to minor drug offences and drug users, law enforcement agencies could allocate more resources towards disrupting illegal drug traffic and funding substance abuse facilities (Gray, 2010; Keefer & Loayza, 2010). The need for resources is already evident. In July of 2015, The Washington Post published an article describing a man by the name of Shawn Cross and his desperation to seek treatment for heroin addiction in Portland, Maine. The only treatment facility that would accept him was Mercy Recovery Center, the state's largest treatment facility, but it was full. Furthermore, because of inadequate state funding and poor reimbursement rates from Medicaid, medical facilities have no interest in providing long-term rehabilitation for substance abuse (Fisher, 2015). This left Mr. Cross with only one option, the state-funded facility that had an 18-month wait list. In June 2015, Mercy was forced to close due to a deflation in reimbursement rates from insurance companies (Fisher, 2015). Moreover, the Maine's governor, Paul LePage, proposed to end state funding for methadone treatment in order to save $1.6 million over the next two years

(Fisher, 2015). This is a clear indication that economics play a large role in the substance abuse problem facing our nation.

It has been suggested that city-level drug related arrests are disproportionate in areas of disadvantage and perceived social disorganization (Mosher, 2008). Given the results of this study and the current social unrest throughout the United States, which has focused on how law enforcement agencies treat individuals, perhaps the aforementioned policy change could be a part of the solution towards social organization and positive social change. A more proactive approach to the enforcement of laws against illicit drug markets to ensure individuals with substance abuse issues that their communities will protect them from harm and provide reliable and accessible rehabilitation facilities for needed care. Therefore, if local, state and federal governments reprioritized funds used to prosecute and imprison non-violent and minor drug offenders towards rehabilitation centers and criminalizing the most disruptive and severe aspects of the drug trade, perhaps a real change in social order will emerge.

Conclusion

In conclusion, this study has provided groundbreaking evidence that age, gender and social disorganization are instrumental in providing evidence for the prevalence of illicit drug use. Future research should be conducted with the thought that socio-demographics and determinants of social disorganization can predict the prevalence of illicit drug use. Therefore, it is assumed these findings will be instrumental in discovering new information about illicit drug use and policies from the recommendations provided.

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Appendix A: Age Predictor Model Fit for Total Drug Use

Model	AKAIKE INFORMATION CRITERION	-2*Loglikelihood	χ^2	*df*	*p*
Intercept only	66175.96	66173.96	-	-	-
Final	63594.16	63572.16	2601.8	10	<0 .001*

Note. Items with asterisks have *p*-values less than .05.

Appendix B: Gender Predictor Model Fit for Total Drug Use

Model	AKAIKE INFORMATION CRITERION	-2*Loglikelihood	χ^2	*df*	*p*
Intercept only	66175.96	66173.96	-	-	-
Final	65581.44	65577.44	596.52	2	< .001*

Note. Items with asterisks have *p*-values less than .05.

Appendix C: Social Disorganization Predictor Model Fit for Total Drug Use

Model	AKAIKE INFORMATION CRITERION	-2*Loglikelihood	χ^2	*df*	*p*
Intercept only	66175.96	66173.96	-	-	-
Final	62697.73	62685.73	3488.2	5	< .001*

Note. Items with asterisks have *p*-values less than .05.

Appendix D: GDP Predictor Model Fit for Total Drug Use

Model	AKAIKE INFORMATION CRITERION	-2*Loglikelihood	χ^2	*df*	*p*
Intercept only	66175.96	66173.96	-	-	-
Final	66173.58	66169.58	4.376	1	.03

Note. Items with asterisks have *p*-values less than .05.

Appendix E: Social Disorganization, Age, Gender, Annual GDP, and Years (2006-2010)

Model Fit for Cocaine

Model	AKAIKE INFORMATION CRITERION	-2*Loglikelihood	χ^2	*df*	*p*
Intercept only	60924	60922.2	-	-	-
Final	56594	56555.64	4366.5	18	< .001*

Note. Items with asterisks have *p*-values less than .05.

Appendix F: Social Disorganization, Age, Gender, Annual GDP, and Years (2006-2010)

Model Fit for Heroin

Model	AKAIKE INFORMATION CRITERION	-2*Loglikelihood	χ^2	*df*	*p*
Intercept only	9213.35	9211.35	-	-	-
Final	8643.3	8605.3	606.02	18	< .001*

Note. Items with asterisks have *p*-values less than .05.

Appendix G: Social Disorganization, Age, Gender, Annual GDP, and Years (2006-2010)

Model Fit for Methamphetamine

Model	AKAIKE INFORMATION CRITERION	-2*Loglikelihood	χ^2	*df*	*p*
Intercept Only	14635.43	14633.43	-	-	-
Final	13895.1	13857	776.33	18	< .001*

Note. Items with asterisks have *p*-values less than .05.

Appendix H: Social Disorganization, Age, Gender, Annual GDP, and Years (2006-2010)

Model Fit for Total Drug Use

Model	AKAIKE INFORMATION CRITERION	-2*Loglikelihood	χ^2	*df*	*p*
Intercept only	66175.96	66173.96	-	-	-
Final	61422.88	61384.88	4789.1	18	< .001*

Note. Items with asterisks have *p*-values less than .05.