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EXAMINING THE RELATIONSHIP BETWEEN CHILDHOOD VICTIMIZATION,
HEALTH RISK BEHAVIORS, AND ADULT PHYSICAL HEALTH OUTCOMES
AMONG WOMEN ON PROBATION AND PAROLE

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A Dissertation submitted to the Faculty of the Kent School of Social Work in Partial
Fulfillment of the Requirements for the Degree of

Doctor of Philosophy in Social Work

Kent School of Social Work

University of Louisville

Louisville, KY

May 2015

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A Dissertation Approved on

April 13, 2015

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DEDICATION

This dissertation is dedicated to:

1. Chris, Isaiah, and Levi

who encouraged me to enjoy the simple things in life and
reminded me to laugh throughout this journey.

2. The mentors who guided me along the process, specifically

Drs. Seana Golder and Pamela Yankeelov.

ABSTRACT

EXAMINING THE RELATIONSHIP BETWEEN CHILDHOOD VICTIMIZATION, HEALTH RISK BEHAVIORS, AND ADULT PHYSICAL HEALTH OUTCOMES AMONG WOMEN ON PROBATION AND PAROLE

Tanya R. Renn

April 13, 2015

This study aims to begin to identify and describe the pathways through which childhood victimization negatively affects adult physical health. In particular, the proposed research will examine the relationship among childhood victimization, health risk behaviors and adult physical health in a population of criminal justice involved women. Previous research has depicted a relationship between childhood victimization, and physical health outcomes, but there is scant research that examines why this relationship exist. Among the most frequent health risk behaviors are alcoholism, smoking, illicit drug use and sexual risk behaviors. Health risk behaviors are highly intertwined with the bio-psycho-social factors that result from childhood victimization and directly contribute and complicate adult health outcomes. In general, research has shown that early adversities, including victimization, poverty, parental substance abuse and poor family functioning, have long-term impacts on one's health and well-being in adulthood (Springer, Sheridan, Kuo, & Carnes, 2003). Researchers and theorists agree that the leading causes of morbidity and mortality have been directly linked to health behavior and lifestyle factors, with current research showing that victimization and other childhood experiences contribute to the development of these health risk behaviors.

Specifically, women involved in the criminal justice system demonstrate higher rates of and more extensive childhood victimization histories when compared to women in the general population (Brier & Jordan, 2004; Brown, Miller, & Maguin, 1999; Covington, 2003; McDaniels-Wilson & Belknap, 2008; Tripodi & Pettus-Davis, 2013). Histories of early trauma among women offenders has been shown to increase the likelihood of future violence, chronic addiction, criminal activity, homelessness and health problems, both physical and mental health (Anderson, Rosay, & Saum, 2002; Bloom, Owen, & Covington, 2004; Grella, Stein, & Greenwell, 2005; Haller & Miles, 2004; Messina et al., 2003; Messina & Grella, 2006).

The present sample consisted of 406 women on probation and parole with a history of childhood victimization in Jefferson County, Kentucky. Structural equation modeling was utilized to examine the relationship between the constructs. Results of the final model ($\chi^2 = 26.459$, $p = .090$; TLI = .976; CFI = .985; RMSEA = .038; SRMR = .0505) provided good fit to the data. The findings of the model indicate that there is a direct effect of childhood victimization on perception of physical health, with every one unit of increase in childhood victimization resulting in .014 increase in worse health perception, when controlling for health risk behaviors. Additionally, childhood victimization had an effect on health risk behaviors, there was a .10 increase in health risk behaviors for every one unit of increase in childhood victimization. In terms of the relationship between the health risk behavioral pathway and perception of physical health, for every unit of increase for health risk behaviors there was a .02 increase in negative health perception when controlling for childhood victimization. Lastly, the findings indicate partial mediation, with health risk behaviors accounting for 12.5% of the variance in the

relationship between childhood victimization and health perception. Implications for policy and treatment practice in the public health and healthcare arenas are discussed, including increased access to services, screening procedures, interdisciplinary service teams and integration of drug and mental health treatment in the criminal justice system.

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CHAPTER I INTRODUCTION

The fundamental beginnings of adult illness are commonly linked to developmental and biological disruptions occurring during the earliest years of life (Shonkoff, Boyce, & McEwen, 2009). Previous research has shown that adult survivors of childhood victimization frequently have higher rates of physical health conditions, such as pain, hypertension, diabetes, asthma, heart disease, obesity, infectious disease and poor general health (Springer, Sheridan, Kuo, & Carnes, 2003). Additionally, adults who experienced childhood victimization have increased rates of primary care visits and high annual health care costs as compared to individuals who did not experience this type of victimization (Hulme, 2000; Tang et al., 2006; Walker et al., 1999; Widom, Czaja, Bentley, & Johnson, 2012). Kendall-Tackett, the preeminent scholar in the area of trauma and women's health, notes that, "...childhood abuse makes people sick. The next logical question to ask is 'Why?'" (Kendall-Tackett, 2013; p.xiii). Said differently, while it is understood that there is a relationship between childhood victimization and physical illness, there is a major gap in understanding the mechanisms through which this relationship occurs. Understanding these mediating mechanisms of the relationship between childhood victimization and adult health outcomes would provide insight into more effective interventions that can be developed and used to protect the health of this highly vulnerable population.

Thus, the overall aim of this research is to begin to identify and describe the pathways through which childhood victimization negatively affects adult physical health. In particular, the proposed research will examine the relationship among childhood victimization, health risk behaviors¹ and adult physical health, as seen in Figure 1, in a population of criminal justice involved women. Conducting this research with criminal justice involved women, allows for a nuanced examination of the relationship between the constructs. Additionally, women involved in the criminal justice system have higher rates of childhood victimization, engagement in health risk behaviors and worse physical health outcomes (Bloom et al., 2004; Brown, Miller & Maguin, 1999; Singer, Bussy, Song, & Lunghofer, 1995). Within this research, health risk behaviors are defined as any behavioral activity undertaken by individuals with a frequency or intensity that increases risk of disease or injury and physical health as it pertains to the well-being, “not merely the absence of disease or infirmity”, of the body and its bodily needs. (Step toe & Wardle, 2004; Ware, 1987). Specifically, tobacco use, alcohol and drug use, and high risk sexual behaviors have been identified as health risk behaviors that contribute considerably to mortality rates in the US (Step toe & Wardle, 2004). Further, health behaviors are considered to be one of the five determinants of health² by the CDC and from their estimations account of approximately 20% of population health (See Figure 2) (“Determinants of health”, 2014). By identifying health risk behaviors as mediators in the

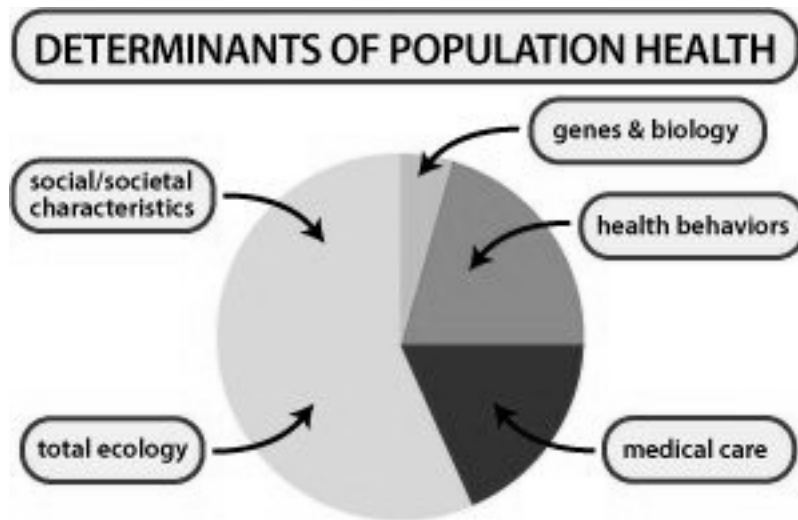
¹ Health risk behaviors are a subset of behaviors from Kendall-Tackett’s behavioral pathway linking childhood victimization to physical health outcomes (Kendall-Tackett, 2013). This will be fully expanded upon in chapter two.

² As defined by the CDC (2014), determinants of health are “factors that contribute to a person’s current state of health”. The five determinants are: (1) genes/biology, (2) health behaviors, (3) social environment/social characteristics, (4) physical environment/total ecology, and (5) health services/medical care.

relationship between childhood victimization and adult physical health outcomes, practitioners have target areas for primary prevention towards reducing negative health outcomes in a victimized population.



Figure 1. The proposed relationship between childhood victimization, health risk behaviors and adult physical health.



(“Determinants of health”, 2014)

Figure 2. Determinants of population health.

The following sections of Chapter One will include a discussion of childhood victimization in the US, the relationship between childhood victimization and health

outcomes, risk factors experienced across the life-course that affect health outcomes, and an overview on criminal justice involved women.

Childhood Victimization

The victimization of children is a serious social problem that has long-term effects on the life of the victims, as well as greater society. In 2011, child protective services (CPS) received approximately 3.7 million referrals of abuse and neglect, translating to 9.1 per 1,000 children in the US being victimized (“Childhood Maltreatment”, 2012). While these statistics are alarming, non-CPS studies estimate 80 percent of all children have reported being victimized, inclusive of neglect, at least once, with physical victimization being the highest at 61.1% (Finkelhor, Turner, Ormond, & Hamby, 2009). The Adverse Childhood Experience study, which comprised its sample from volunteer Kaiser Permanente patients who were seeking routine health screenings, is the current gold-standard for researching the effects of childhood victimization. Within their sample of 9,376 women, 27.0% had experienced physical abuse, 24.7% sexual abuse, and 13.1% emotional abuse, with the remainder (35.2%) not experiencing any of the three abuse subsets (Felitti et al., 1998).

Childhood victimization is conceptualized as an experience of involuntary physical, sexual or emotional injuries or loss by another individual occurring before the age of 18 (Finkelhor & Dziuba-Leatherman, 1995; Lewit & Baker, 1996). The perpetrators of the victimization may be adults, family members, strangers, and/or other children (Finkelhor & Dziuba-Leatherman, 1995). Most childhood victimization cases (80%) identify a family member as the perpetrator (“Child Maltreatment”, 2012). Except for sexual abuse, at the time of first victimization most children were 2 or under (“Child

Maltreatment”, 2012). Experiencing victimization at an extremely early age places children at a high risk of further victimization and potential developmental delays. In the case of sexual victimization, the most prominent age range was 12-14 (26.3%) (“Child Maltreatment”, 2012). Further conceptualization of childhood victimization is enhanced through an examination of the sub-types of abuse.

Physical Victimization

Physical victimization is defined by the CDC (2008, p. 2) as “the intentional use of physical force by a parent or caregiver against a child that results in, or has the potential to result in, physical injury.” Examples of this include punching, slapping, kicking, and burning. In 2012, 18.3% of children were physically abused (“Child Maltreatment”, 2012).

Sexual Victimization

A widely accepted definition of childhood sexual victimization is the following, “(A) the employment, use, persuasion, inducement, enticement, or coercion of any child to engage in, or assist any other person to engage in, any sexually explicit conduct or simulation of such conduct for the purpose of producing a visual depiction of conduct; or (B) the rape, molestation, prostitution, or other form of sexual exploitation of children, or incest with children” (Child Abuse Prevention and Treatment Act (CAPTA) of 2003). For the purposes of this research the second part of the definition is most relevant, but understanding the complete definition as provided by CAPTA gives great insight into the variety of the forms of child sexual abuse. In 2011, childhood sexual victimization was reported in 9.3% cases (“Child Maltreatment”, 2012).

Psychological Victimization

Psychological victimization is defined as “a repeated pattern of caregiving behavior or extreme incident(s) that convey to children that they are worthless, flawed, unloved, unwanted, endangered, or only of value in meeting another’s needs” (American Professional Society on the Abuse of Children, 1995, p. 2). The following are common subtypes of psychological victimization: rejecting, degrading, terrorizing, isolating, exploiting, denying emotional responsiveness, and neglect (American Professional Society on the Abuse of Children, 1995; Greenfield & Marks, 2010; Sedlak et al., 2010). Psychological victimization was the most prevalent form of victimization (78.3%) in a national report from 2012 (“Childhood Maltreatment”, 2012).

Although debate exists over the definitions of these subtypes of victimization, these definitions provide a strong understanding of all the multiple forms of victimization that a child may experience before the age of 18. It is important to note the type and age at the time of victimization as there are different sequelae and health outcomes linked to these specific victimization characteristics (Widom, 2000; Widom, Czaja, & Dutton, 2008). In many situations childhood victimization sets individuals on a cycle that contains: poor health, increased engagement in health risk behaviors, poor psychological health, low social capital³, increased involvement in the criminal justice system, increased substance use, and higher rates of future victimization (Spatz, Widom, Marmorestein, & Raskin, 2006; Widom, 1999; Widom, 2000; Widom & Kuhns, 1996;

³ Social capital is tangible circumstances, situations and relationships that affect the daily lives of people. The major premise is that relationships matter and social networks are valuable to the individual, and help form reciprocal social relations. (Bourdieu, 1983; Putnam, 2000; Field, 2003).

Widom, Czaja, & Dutton, 2008). As it has been highlighted, the victimization of children occurs at high rates with serious consequences associated with the victimization experiences.

Negative Health Outcomes Associated With Childhood Victimization

Since the 1990s researchers have been examining the connection between childhood victimization and negative health outcomes (Felitti, 1998; Widom, 1999; Widom & Kuhns, 1996). In general, research has shown that early adversities, including victimization, poverty, parental substance abuse and poor family functioning, have long-term impacts on one's health and well-being in adulthood (Springer, Sheridan, Kuo, & Carnes, 2003). When examining the connection between childhood victimization and negative health outcomes, the greatest amount of research has previously focused on sexual victimization. Health conditions, such as ischemic heart disease, cancer, stroke, diabetes and hepatitis, have been found to exponentially affect survivors of childhood victimization. Further, childhood victimization has been known to affect functional disability and general health ratings in individuals (Kendall-Tackett, 2013). An extensive list of the literature can be found in Table 1.

Table 1

Victimization and Associated Physical Health Outcomes Divided by Type of Victimization

<u>Victimization Type</u>	<u>Details of Sample</u>	<u>Study Specifics</u>	<u>Health Outcome(s)</u>
Sexual			
Chartier, Walker & Naimark (2007)	Female & Male	Controlled for age, sex, marital status and low income	Multiple health outcomes (listed two medical conditions) OR=1.39 Pain that interferes with activities OR=1.68
Dong, et al. (2004)	Female & Male	Adjusted for age, sex, race and ed.	Ischemic heart disease OR=1.4
Dong, Dube, Felitti, Giles & Anda (2003)	Female & Male	Adjusted for age, sex, race and ed.	Liver Disease OR=1.5
Chartier, Walker & Naimark (2009)	Female & Male		Obesity OR=1.61
Rohde et al. (2008)	Female	Adjusted for age and race	Obesity OR=1.84
Alexander et al (1998)			Fibromyalgia
Heitkemper et al (2001)			Irritable bowel syndrome
Rich-Edwards, et al. (2010)	Female; Evaluated abuse for unwanted sexual touching, 1 episode of forced sexual activity and repeated forced sex	Adjusted for age, race, body type at age 5, parental ed. and history of diabetes	Type II Diabetes: Unwanted sexual touching HR= 1.16; 1 episode of forced sexual activity HR=1.34; Repeated forced sex HR=1.69
Van Oudenhove, et al (2011)	Female & Male		Gastric Discomfort Threshold (p<.001)
Felitti (1991)	Female & Male		Obesity (p<.001)

Paras, et al (2009)	Female & Male		Gastrointestinal disorders OR= 2.43; Non-specific chronic pain OR= 2.20; Chronic pelvic pain OR=2.73; Psychogenic seizures OR=2.96
Hulme (2004)	Female		Physical symptoms X ² =5.44-27.40
Widom, Czaja, Bentley & Johnson (2012)	Female & Male	Prospective study; Adjusted for age, gender and race	Malnutrition (OR=2.16); Hepatitis C (OR=2.76)
			Physical
Chartier, Walker & Naimark (2007)	Female & Male	Controlled for age, sex, marital status and low income	Disability due to physical health outcomes OR=1.34; Pain that interferes with activities OR=1.34
Springer, Sheridan, Kuo & Carnes (2007)	Female & Male	Controlled for age and sex; Controlled for all family background and childhood adversity	Medical diagnose 21% increase; Physical symptoms 22% increase; Medical diagnoses 15% increase; Allergies OR=1.38; Arthritis/Rheumatism OR=1.34; Asthma OR=1.64; Bronchitis/Emphysema OR=1.49; Circulation Problems OR=1.47; High Blood Pressure OR=1.43; Heart troubles OR=1.50; Liver troubles OR=2.67; Ulcers OR=1.84; Cardiopulmonary symptoms OR=1.42; Constitutional symptoms OR=1.33; Musculoskeletal symptoms OR=1.29
Dong, et al. (2004)	Female & Male	Adjusted for age, sex, race and ed.	Ischemic heart disease OR=1.5

Dong, Dube, Felitti, Giles & Anda (2003)	Female & Male	Adjusted for age, sex, race and ed.	Liver Disease OR=1.4
Walsh, Jamieson, MacMillan & Boyle (2007)	Female		Chronic Pain OR=1.1.7
Rohde et al. (2008)	Female	Adjusted for age and race	Obesity OR=2.05
Rich-Edwards, et al. (2010)	Female; Evaluated abuse at mild, moderate and severe physical abuse	Adjusted for age, race, body type at age 5, parental ed. and history of diabetes	Tyle II Diabetes Mild HR= 1.03 Moderate HR= 1.26 Severe HR= 1.54
Van Oudenhove et al (2011)	Female & Male	Compared to non-victimized group	Gastric discomfort threshold (p=.004) Gastric emptying (p=.003)
Widom, Czaja, Bentley & Johnson (2012)	Female & Male	Prospective study Adjusted for age, gender and race	Malnutrition (OR=2.39); Albumin (p<.05); Blood Urea Nitrogen (p<.001); Hemoglobin A1C (OR=2.35)

Psychological/Emotional

Dong et al. (2004)	Female & Male	Adjusted for age, sex, race and ed.	Ischemic heart disease OR=1.7
Dong, Dube, Felitti, Giles & Anda (2003)	Female & Male	Adjusted for age, sex, race and ed.	Liver Disease OR=1.6

ACE

Felitti, et al. (1998)	Female & Male	There was a range based on the number of ACE (1->4) categories	Severe obesity OR=1.1-1.6; Ischemic heart disease OR= .9-2.2; Any cancer OR=1.2-1.9; Stroke OR=.9-2.4; Chronic bronchitis OR=1.6-3.9; Diabetes OR=1.0-1.6; Hepatitis OR=1.1-2.4; Fair/poor self-rated
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			health OR=1.2-2.2
Dube, Fairweather, Pearson, Felitti, Anda & Croft (2009)	Female & Male		Autoimmune diseases increased risk of 70-100%
Anda, Tietjen, Schulman, Felitti, & Croft (2010)			Frequent headaches OR=2.1
Anda, Brown, Dubem Bremner, Felitti & Giles (2008)			Chronic obstructive pulmonary disease OR=2.6
Brown, Anda, Felitti, Edwards, Malarcher, Croft & Giles (2010)	Female & Male		Lung Cancer: Hospital Records RR=3.18; Mortality Records RR=3.55
Combination			
Scott et al (2008)	Female & Male; Included: physical abuse, sexual abuse and other childhood family adversities;US and international sample		Asthma HR= 1.24-1.71 (dependent on number of adversities; 1, 2, 3 or more)
Batten et al. (2004)	Female; Physical & sexual abuse	Adjusted for age, ethnicity, marital status, education and income	Cardiovascular Disease OR= 8.79
Girder et al. (2007)	Female; Physical & sexual abuse		Premenstrual Dysphoric Disorder: Lower plasma NE F(1,63)=5.3, p<.05; HR levels F(1,63)=4.0, p<.05
Bonomi et al (2008)	Female; Physical & sexual abuse	Adjusted for age and income	Physical symptoms PR=1.33-2.78; Fair/poor health PR=1.84; Lower SF-36 Scores PR=3.15-5.40

Wegman & Stetler (2009)	Female & Male; Physical & sexual abuse	General symptoms Effect size=.20; # surgeries/hospitalization s Effect size=.18; Cardiovascular problems Effect size=.66; Respiratory problems Effect size= .71; Gastrointestinal problems Effect size=.63; Metabolic disorders Effect size=.37; Neurological problems Effect size=.94; Musculoskeletal problems Effect size=.81
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Prevalence Ratio= PR; Odds Ratio= OR; Hazard Ratio= HR

In the context of sexual victimization, when controlling for age, sex, marital status and low income, Chartier, Walker and Naimark (2007) found that childhood victimization has been linked to individuals reporting more negative health outcomes (i.e. diabetes, cancer, asthma) (OR=1.39). Additionally, those who were sexually abused had a higher likelihood of pain interfering with their activities (OR=1.68) (Chartier, Walker, & Naimark, 2007). In conjunction with this literature, previous research has shown a strong connection between childhood victimization and pain (Alexander et al., 1998; Paras et al., 2009). For example, Paras et al. (2009) found that men and women who experienced childhood sexual abuse are more than twice as likely to report experiencing non-specific chronic pain and nearly three times more likely to experience chronic pelvic pain. When evaluating the relationship between childhood sexual victimization and obesity previous

research has repeatedly demonstrated that those who experience childhood sexual victimization are over 150% more likely to be obese (Chartier, Walker & Naimark, 2009; Felitti, 1991; Rohde et al., 2008). Further, gastrointestinal health outcomes have been researched with this population repeatedly, with findings showing higher rates of irritable bowel syndrome (IBS), gastric discomfort threshold, and gastrointestinal disorders (Heitkemper et al., 2001; Paras et al., 2009; Van Oudenhove et al., 2011). Additional diseases of specific organ systems have also been linked to childhood sexual victimization, such as liver disease, breast problems, and ischemic heart disease (Dong et al., 2004; Dong, Dube, Felitti, Giles, & Anda, 2003; Hulme, 2004). Lastly, a study by Rich-Edwards et al. (2010) looked at individuals who had experienced childhood sexual victimization and had type II diabetes in adulthood and found escalated hazard ratios (HR) associated with unwanted sexual touching (HR=1.16), a single issue of forced sexual activity (1.34), and repeated forced sex (HR=1.69).

Physical victimization in childhood has shown similar findings as sexual victimization. In a large study conducted by Springer, Sheridan, Kuo, and Carnes (2007), an increased rate of physical health symptoms (22% increase) and medical diagnosis (21% increase) were found in those who experienced physical victimization in childhood. Further, when controlling for childhood adversity and family background, twelve specific health outcomes were found to have an increased likelihood in adult survivors of physical victimization, including liver troubles (OR=2.67), cardiopulmonary symptoms (OR=1.42), arthritis/rheumatism (OR=1.34) and asthma (OR=1.64) (Springer, Sheridan, Kuo, & Carnes, 2007). Additional research has shown ischemic heart disease (OR=1.5), liver disease (OR=1.4) and chronic pain (OR=1.7) to be associated with childhood

physical victimization (Dong et al., 2004; Dong, Dube, Felitti, Giles, & Anda, 2003; Walsh, Jamieson, MacMillan, & Boyle, 2007). Significant findings around the gastrointestinal system have been found in survivors of childhood physical abuse, such as gastric discomfort threshold and gastric emptying (Van Oudenhove & Aziz, 2013). In relation to type II diabetes, Rich-Edwards et al. (2010) found that if one had experienced childhood physical victimization their HR was increased for being diagnosed with a more severe case of the disease, with the highest HR being for severe type II diabetes (HR= 1.54). In survivors of childhood physical victimization, an individual was two times more likely to be diagnosed obese (Rohde et al., 2008). Finally, Chartier, Walker & Naimark (2007) found a 134% increase in the likelihood of disability due to physical health and 134% increase in pain that interferes with activities in survivors of childhood physical abuse.

Additional to the above studies that specially examined either sexual victimization or physical victimization and the physical health outcomes, there is an abundance of literature that looks at those who were both physically and sexually victimized or who were victimized in either fashion but the study did not specify outcomes by type of victimization. In a comprehensive study completed by Wegmen and Stetlar (2009), six different bodily systems, general symptomology, and number of surgeries/hospitalizations were examined in relation to the experience of childhood physical and/or sexual abuse. Concerning general symptomology and number of surgeries/hospitalizations, effect sizes of .20 and .18 were found (Wegmen & Stetlar, 2009). When specifically examining different bodily systems, effect sizes ranged from .37 to .94 (Wegmen & Stetlar, 2009). In a different study, Scott et al. (2008) found higher

HRs for asthma, when controlling for depression and anxiety, in child survivors of victimization no matter the amount of victimization encounters and other family adversities (HR= 1.21-1.71). The highest HR in all cases were found associated with the greatest amount of victimization experiences and family adversities (HR=1.50-1.71) (Scott et al., 2008). Another study showed those who were victimized were nearly 9 times more likely to have cardiovascular disease (Batten et al., 2004). Lastly, Bonomi et al. (2008) found in a sample of survivors of childhood victimization higher prevalence of negative physical symptoms (PR= 1.33-2.78), ratings of fair/poor health (PR=1.84), and lower physical functioning scores (PR=3.15-5.40).

In comparison to childhood sexual and physical victimization, minimal research has been conducted solely on psychological victimization during this stage in life. Specific to psychological childhood victimization, Dong et al. (2004) found an increased likelihood of ischemic heart disease (OR=1.7) and Dube, Felitti, Dong, Chapman, Giles, and Anda (2003) discovered higher rates of liver disease (OR=1.6). Although, this research is limited it tells a part of the poignant story of the relationship between childhood victimization and adult health outcomes.

Of comparable importance to the above research, the Adverse Childhood Experience (ACE) study, which focuses on connecting childhood trauma with health, social and economic risk, has released numerous findings examining the health outcomes of individuals who have experienced childhood victimization along with other adverse childhood experiences, such as drug abuse in the household (Felitti et al., 1998). Based on the responses given by the subject, a cumulative “ACE score” is given, with higher scores indicating higher amount of adverse childhood experiences. Although these

studies do not factor out childhood victimization, they still give insight into the relationship between negative experiences in childhood and the potential long-term health effects. Similar health outcomes as above have been assessed. Early in the research, Felitti et al. (1998) found individuals with an ACE score of one or greater to have an increased likelihood of experiencing severe obesity, any type of cancer, diabetes and stroke (OR=1.1-3.9) over those who had no adverse experiences in childhood. Additionally, those with an ACE score of even one had a greater likelihood of rating their health fair/poor over those with no adverse experiences (Felitti et al., 1998). More recent research published from the ACE study data has demonstrated an increased risk of autoimmune diseases, frequent headaches, lung cancer and chronic obstructive pulmonary disease (Anda et al., 2008; Anda, Tietjen, Schulman, Felitti, & Croft, 2010; Brown et al., 2010; Dube et al., 2009).

From the above review of the literature it is evident there is a connection between childhood victimization and adult health status and outcomes. Along with this we also know that an individual is not made up of discrete circumstances, but rather a culmination of what is experienced in one's life, the difficult and beneficial. The next section will discuss other potential risk factors one may experience in their life that could impact their health trajectory.

Additional Risk Factors across the Life Course That May Affect One's Health

It is imperative to acknowledge that victimization is not the only risk factor experienced by children in our society, rather the path to adulthood holds the potential for one to face many risk factors. Inclusive in the list of risk factors are poverty, violence, family dissonance, illness, involvement in the criminal justice system, and substance

abuse (Zolkoski & Bullock, 2012). Additionally, over time these factors can place an individual at a higher accumulated risk of experiencing negative life outcomes, including poor physical health (Brooks, 2006; Masten, 2001; Resnick, 2000). Specifically, risk factors are commonly associated with under-achievement in the school systems, lower self-efficacy, chronic illnesses and lower satisfaction with life (Brooks, 2006; Masten, 2001; Resnick, 2000; Zolkoski & Bullock, 2012). In some cases these outcomes become risk factors for other negative outcomes further down the life course.

One of the most frequently identified risk factors is an individual's socio-economic status (SES) (Winkleby, Jatulis, Frank, & Fortmann, 1992). SES is a combined measure of an individual's economic and sociological status. Commonly included to construct SES is one's work experience and economic and social position in relation to others, which is based on income, education and occupation. In similar fashion, poverty is a common risk factor that places individuals at a disadvantaged state. Research has shown that SES and poverty, independently, can place individuals at an increased risk to experience victimization and negative health outcomes (Turner, Finkelhor, & Ormrod, 2006).

The family dynamic is an additional influential factor on the individual's life course. Specific aspects that have been shown to put an individual at an elevated risk for negative life outcomes are parental divorce, substance abuse by a parent, and violence in the household. Research has demonstrated that children of divorce have exhibited lower levels of well-being in adulthood than those who had parents who were continuously married (Amato & Keith, 1991; Amato & Sobolewski, 2001). Significant effects between parental divorce and well-being were found around psychological adjustment,

behavior/conduct and educational attainment (Amato & Keith, 1991). Further, Bloch et al. (2007) discovered that divorce, independent of other life factors, at an early age could have long-term effects on the development of the hypothalamic-pituitary-adrenal (HPA) axis and cortisol levels, which are similar findings to survivors of childhood victimization.

Lastly, parental alcohol abuse (mother only, father only or both parents) has been linked to negative outcomes in child and adulthood, affecting the mental and physical health of the individual (Dube et al., 2001). Anda et al. (2002) found that those who lived in a household with parental alcohol abuse were more likely to be alcoholics themselves and experienced depression at higher levels. Furthermore, the ACE study has found that children who witnessed intimate partner violence (IPV) in the household had more negative physical and mental health outcomes than a control group, with odds ratios ranging 2 to 6 times higher (Dube et al., 2002). Additionally, there was a positive exponential relationship between the witnessing of IPV and alcoholism, illicit drug use, IV drug use and depressed affect (Dube et al., 2002).

Although this list is not exhaustive of other factors influencing an individual's life, it highlights some of the most relevant in relationship to the proposed research. One group that is most commonly affected by the experience of childhood victimization and these other risk factors early in their life course, as well as having worse health outcomes than the general female population, is women involved with the criminal justice system. Prior research has indicated that women have unique pathways leading to their involvement in the criminal justice system (Chesney-Lind & Pasko, 2004; Daly, 1992; Salisbury & Van Voorhis, 2009). Known as the gendered pathways perspective, this

approach recognizes that women who are involved with the criminal justice system often have pasts characterized by poverty, mental illness, unstable home environments, numerous victimization experiences, chronic substance use, lack of social support and poor physical health (Covington, 2007; Hall, Golder, Conley, & Sawning, 2013; Salina et al., 2007; Salisbury & Van Voorhis, 2009; Widom & Ames, 1994).

Women Involved in the Criminal Justice System

Women represent the fastest growing segment of the criminal justice (CJ) population in the United States, with approximately 1.3 million women being under corrections a year (Minton, 2013; Pew Center on the States, 2009). This means that 1 in 89 women in the United States is involved with the criminal justice system (Glaze & Bonczar, 2009; Pew Center on the States, 2009; Sabol & Couture, 2008). Further, eighty-five percent of women, or approximately 1 million women in the US, are sanctioned by the criminal justice system to live in our communities through probation and parole sentencing (Greenfield & Snell, 2000). Thus, although women represent a much smaller percentage of the criminal justice involved population in the US, they make up for 25% of supervised probationers in the US (Glaze & Bonczar, 2011). Women involved with the criminal justice system are characteristically poor, lower educational attainment, limited vocational training and young (median age is 35 years) (Bloom, Owen, & Covington, 2003; Covington, 2007; Freudenberg, 2002; Greenfield & Snell, 1999). Further, women of color are disproportionately represented in the criminal justice system (Covington, 2007; Freudenberg, 2002).

Specifically, women involved in the criminal justice system demonstrate higher rates of and more extensive childhood victimization histories when compared to women

in the general population (Brier & Jordan, 2004; Brown, Miller, & Maguin, 1999; Covington, 2003; McDaniels-Wilson & Belknap, 2008; Tripodi & Pettus-Davis, 2013). Histories of early trauma among women offenders has been shown to increase the likelihood of future violence, chronic addiction, criminal activity, homelessness and health problems, both physical and mental health (Anderson, Rosay, & Saum, 2002; Bloom, Owen, & Covington, 2004; Grella, Stein, & Greenwell, 2005; Haller & Miles, 2004; Messina et al., 2003; Messina & Grella, 2006). These life disadvantages and social conditions construct the gendered pathways perspective, which states that women mainly follow distinctive pathways towards criminal justice involvement (Salisbury & Van Voorhis, 2009). Furthermore, the gendered pathways perspective states that women's involvement in the criminal justice system is often due to one of the following: (1) risk factors that are not seen in men; (2) factors are seen in men but occur more frequently with women; and (3) factors have comparatively equal frequency, but there are distinct effects for women (Salisbury & Van Voorhis, 2009). Based on the gendered pathways perspective, childhood victimization has been one of the most significant predictors of women's involvement in the criminal justice system, as well as has implications on physical health (Bloom et al., 2004; Salisbury & Van Voorhis, 2009).

In terms of physical health, women involved in the criminal justice system enter with many medical problems, inclusive of chronic disorders (i.e. asthma, diabetes, hypertension, anemia, seizures and ulcers) (Covington, 2007; Dumont, Brockmann, Dickman, Alexander, & Rich, 2012; Smith, Simonian, & Yarussi, 2006). Additionally, drug-dependent women offenders have a greater likelihood than their male counterparts to be diagnosed with tuberculosis, hepatitis, anemia, diabetes, hypertension and obesity

(Messina & Grella, 2006). Females also are at higher risk than their male counterparts to enter prison with sexually transmitted disease and HIV/AIDS (Covington, 2007).

Previous research has suggested that there is a strong likelihood that the relationship between childhood victimization and physical health, as well as mental health, in adulthood will be more prominent among female offenders due to their elevated histories of trauma, chronic substance use and HIV risk behaviors in comparison to the general population (Bloom et al., 2004; Browne, Miller, & Maguin, 1999; Chesney-Lind & Pasko, 2004; Jordan et al., 1996; Singer, Bussy, Song, & Lunghofer, 1995).

Each component of the criminal justice system (jail, prison, probation and parole) has a distinctive influence on the health of the involved women (Freudenberg, 2002). Research has shown that involvement with the criminal justice system does not help manage or diminish the effects of the negative life course experiences, but rather adds and exacerbates their effect by often leading to a cycle of economic dependence, social isolation, substance abuse and negative mental and physical health outcomes (Freudenberg, 2002). Upon women leaving correctional facilities, while often still being involved with the criminal justice system through probation and parole, they return to communities that have limited, and often inadequate, resources (i.e. education, housing and employment) (Currie, 1994; Freudenberg, 2002; Hagan & Coleman, 2001; Richie, 2001). Lastly, since involvement with the criminal justice system is commonly associated with negative long-term health outcomes and minority women have higher rates of criminal justice involvement, it may be that the system is worsening health disparities between racial and ethnic groups (Dumont et al., 2012; Iguchi, Bell, Ramchand, & Fain, 2005; Massoglia, 2008a; Massoglia, 2008b; Wideman, 2011). Conducting research that

helps get at some of the fundamental relationships that exist between these vulnerability factors (i.e. childhood victimization, criminal justice involvement) is imperative to address poor health in marginalized populations and the role the criminal justice system can play in responding to health disparities in minority women.

Conclusion

Research has demonstrated that there is a known relationship between childhood victimization and physical health outcomes in adulthood, but there remains a major gap in understanding the mechanisms through which this association occurs. One of the hypothesized mechanisms for the relationship between childhood victimization and adult health outcomes is health risk behaviors. Thus, the current research study seeks to examine if the relationship between childhood victimization and health outcomes in adulthood is mediated by health risk behaviors in a sample of criminal justice involved women. Conducting this research with criminal justice involved women provides a nuanced examination of the connection between the factors.

Chapter I has outlined the study aims and research question and provided an introduction to childhood victimization and associated health outcomes. Additionally, there was a discussion on vulnerability factors related to negative health outcomes in adulthood and criminal justice involved women. Chapter II reviews the theoretical perspective used to understand the relationship between childhood victimization, health risk behaviors and adult health outcomes. Chapter III describes the methodology used to conduct the present study and Chapter IV will present the research findings. Lastly, Chapter V will discuss the findings, implications for practice and policy and directions for future research.

CHAPTER II

THEORETICAL PERSPECTIVE

This chapter presents Kathleen Kendall-Tackett's five theoretical pathways that aid in the understanding of the relationship between childhood victimization and adult health outcomes, with specific focus on the behavioral pathway. The behavioral pathway is inclusive of multiple health risk behaviors (i.e. substance use and high-risk sexual behavior) relevant to the current research.

Kendall-Tackett's Pathways Model

As stated in Chapter One, previous studies have established that childhood victimization makes people ill. In order to address this complex relationship, multiple disciplines have examined the possible mechanisms by which victimization could influence an individual's health. To synthesize this multi-disciplinary research, Kendall-Tackett proposes a five pathways model. This model provides a comprehensive way to understand the "why" of how child victimization makes individuals sick (Kendall-Tackett, 2013). The proposed five pathways are the following: physiological, cognitive, social, emotional and behavioral (Figure 3). As is the case with a majority of theoretical models, the model components (i.e. the five pathways) are not exclusive from each other and it would be typical for a survivor of childhood victimization to experience several of the pathways during their life course (Kendall-Tackett, 2013). Identifying and targeting these five pathways is a step towards reducing the physical health effect of early trauma

on the individual and designing comprehensive adult disease prevention programs. While the current proposed research is guided heavily by Kendall-Tackett's theoretical model (2013) on the relationship between childhood victimization and physical health in adulthood, it is unique in that it works to empirically test one of the five (behavioral) pathways. Additionally, the research is being conducted in criminal justice involved women, which provides a nuanced application of Kendall-Tackett's model. Below is a detailed overview of each of the theoretically defined pathways.

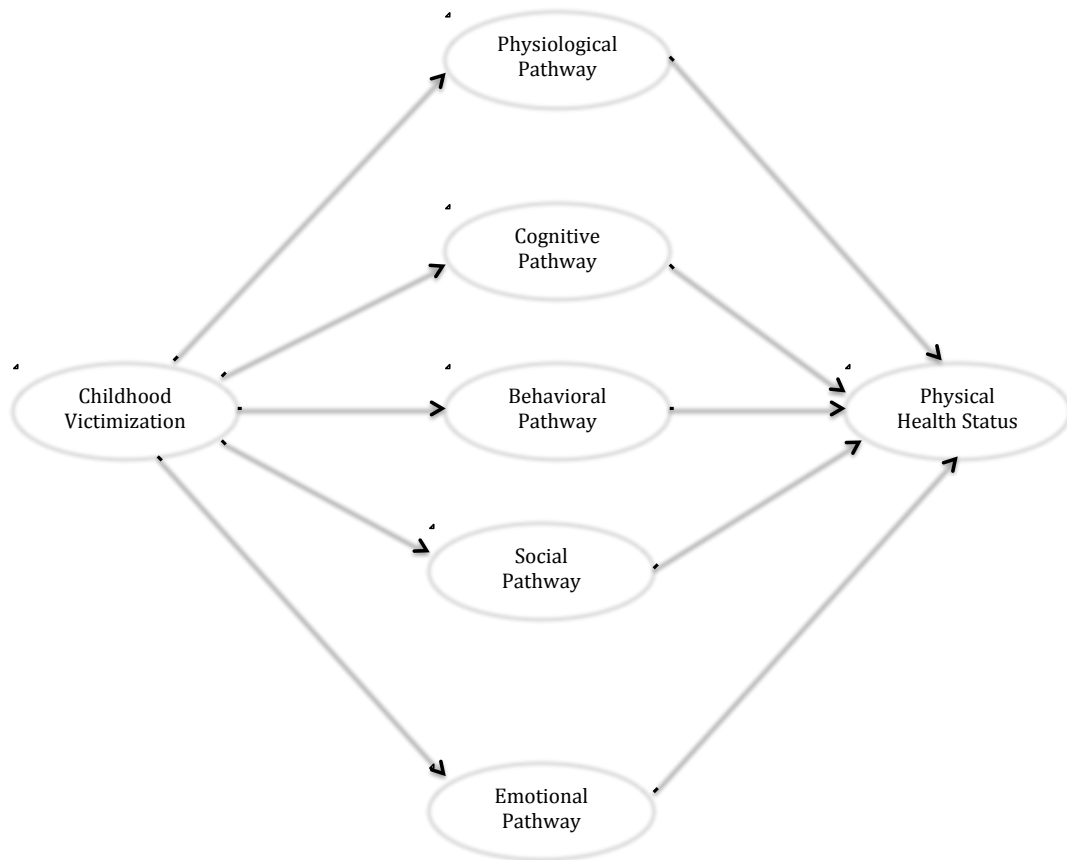


Figure 3. Theoretical pathways connecting childhood victimization to physical health status.

Physiological Pathway

Research has demonstrated that the experience of childhood victimization has a physiological effect on the body. The majority of these physiological changes occurring in the body due to the experience of childhood victimization are related to the body's allostatic load. Allostatic load⁴, which represents the wear and tear on the body due to stress and continual allostatic responses being triggered, tells how the body will physiologically respond to real or interpreted threat based on the brain's evaluation of the threat (Juster, McEwen, & Lupien, 2010; McEwen, 2007). The allostatic mechanisms consist of the sympathetic-adrenal-medullary (SAM) axis and the hypothalamic-pituitary-adrenal (HPA) axis, which are both located in the brain and are responsible for secreting hormones in response to stress. An individual's allostatic load, which determines one's resiliency to stress, is determined by personal differences in three areas: (1) constitutional factors (genetics, development, and experience); (2) behavioral factors (coping and health habits); and (3) historical factors (trauma/abuse, major life events, stressful environments) (Juster, McEwen, & Lupien, 2010; McEwen, 2007; McEwen, 1998). While one's allostatic load is adaptive, chronic over-activation results in physiological systems overcompensating and ultimately collapsing themselves. This collapsing of systems leaves the individual susceptible to illnesses and stress-related disease. Specific physiological areas that have shown to be affected by childhood victimization, a form of stress and trauma, are hormonal levels (i.e. stress response), brain development (i.e. neural pathways and neural plasticity) and the immune system (e.g. Corwin & Pajer,

⁴ Allostasis is the "process whereby an organisms maintains physiological stability by changing parameters of its internal milieu by matching them appropriately to environmental demands." (Juster, McEwe & Lupien, 2010, pg 2)

2008; De Bellis, Spratt, & Hooper, 2011; Heim & Nemeroff, 2009; Sherin & Nemeroff, 2011; Teicher, 2002). Further, the physiological pathway includes the lower pain threshold experienced by adult survivors of childhood victimization.

Hormone Levels

There are numerous physiological issues associated with the experience of childhood victimization and negative health outcomes in adulthood, with a majority surrounding the endocrine system. The endocrine system is responsible for releasing more than 20 major hormones that instruct bodily functions, such as the stress response and metabolism, and works with the other internal systems in the body to maintain homeostasis (“Pathophysiology”, 2009). Thus, if the endocrine system is not functioning correctly the body may under or over produce hormones, which in turn can result in metabolic disorders, diabetes, lack of stress response and chronic pain (“Pathophysiology”, 2009). The following section will discuss research studies that have empirically connected childhood victimization to the functioning of the endocrine system.

The largest amount of research that has linked childhood victimization and the endocrine system together has surrounded the hormone cortisol, commonly known as the stress hormone. In a normal functioning body, the release of cortisol can enhance one’s initial response to stress, but research has depicted that the over-activation of the neural and endocrine system, due to severe or chronic stress, may result in the body’s equilibrium not being restored for the duration of the individual’s life (Mulvihill, 2005; Perry, 2001). Attenuation, or the gradual decrease in response, of cortisol in adults who experienced victimization during childhood is more common than in the general

population (Rodriguez-Srednicki, & Twaite, 2006). Heim, Ehlett, & Hellhammer (2000) found that adults with histories of childhood victimization frequently have lower baseline cortisol levels and weakened cortisol responses to life stressors. Likewise, Trickett, Noll, and Putnam (2011) found the normative developmental course of cortisol response was altered due to sexual abuse in childhood. Specifically, the findings showed higher levels of cortisol (hyper-cortisol) in childhood and lower levels of cortisol (hypocortisol) by early adulthood (Trickett, Noll, & Putnam, 2011). These findings support the attenuation hypothesis (Susman, 2006), arguing that early and severe stress initially results in a heightened stress response, but in turn the stress response via the release of cortisol ends up suppressed over time (Trickett, Noll, & Putnam, 2011).

Additional research has shown that an attenuated response has been associated with PTSD, immune and cardiovascular functioning, and chronic fatigue syndrome (Heim, Ehlert, & Hellhammer, 2000; Miller, Chen, & Zhou, 2007; Mulvihill, 2005; Raison & Miller, 2003). Importantly, non-standard levels of cortisol have been linked to an extended list of negative physical health outcomes, weight gain, heart disease, and bone density, as well as negative mental health outcomes, such as depression (Heim, Ehlert, & Hellhammer, 2000; Mulvihill, 2005; Raison & Miller, 2003; Trickett, Noll, & Putnam, 2011).

Another part of the endocrine system that is affected by childhood victimization is the hypothalamic-pituitary-adrenal (HPA) system. Research by Trickett, Noll, and Putnam (2011) found that there was a breakdown of the HPA system through attenuated plasma ACTH and a robust plasma cortisol response to ovine corticotrophin-releasing hormone (oCRH) stimulation. Meaning that when oCRH (a hormone emitted from the

hypothalamus in response to stress) is released it is sent to the brain allowing an individual to respond to the stressful situation and return to a healthy hormonal state. When deviation from the original state of oCRH occurs, cortisol is not being released at the standard level, resulting in the individual remaining in a stressful disposition with a heightened hormonal state for a prolonged period of time. The reduction of the HPA system response results in a lack of proper stimulation under stressful situations and can affect health behaviors. Specifically, such behaviors as smoking, the consumption of alcohol, and risky sexual behaviors are commonly increased as they are often used as coping mechanisms for stress (Trickett, Noll, & Putnam, 2011). Furthermore, a breakdown in the HPA system often leads to prolonged engagement of these health risk behaviors, as there is a failure to manage stress over weeks, months and years.

An additional physiological effect related to the endocrine system focuses on the release of endogenous opioids and builds on Selye's Stress Adaptation model⁵. Perry (1998) demonstrated that victimized children experience a mixture of hyperarousal and dissociation during stressful life events, resulting in the increased rate of endogenous opioids being released into the body. When functioning correctly the endogenous opioids aid in diminishing the impact of stress through attenuating multiple physiological responses (i.e. emotional and affective states) and decrease hyperarousal of the body (Drolet et al., 2001). Conversely, when endogenous opioids are released at a heightened level, due to consistently being in a stressful state, they can result in reduced pain awareness, lowered heart rate and low blood pressure in an individual (Child Trauma

⁵ Selye's Stress Adaptation model gives a scientific explanation for biological stress and identifies the General Adaptation Syndrome (GAS) to stress. Further, it outlined the specifics of the HPA system and how it prepares the body to cope to stress.

Academy, 2004; Mulvihill, 2005; Perry, Pollard, Blakely, Baker, & Vigilante, 1995; Southwick, 2003). Experiencing these health outcomes over time can be detrimental to an individual's health and can be linked to other negative physical health outcomes (i.e. coronary artery disease).

Brain Functioning

Brain development is another physiological impairment that has been linked to childhood victimization and negative health outcomes in adults, with research suggesting that trauma and stress impact the brain for a lifetime (Corso et al., 2008). Generally speaking, experiences of neglect and/or abuse can physically alter the structure of the brain, as well as the processes that occur within it, resulting in a premature physiological aging of the body and increased vulnerability to diseases during the life course (Corso et al., 2008). In the developing brain, elevated levels of catecholamines and cortisol, both stress-related hormones, may lead to adverse brain maturation and development (De Bellis, Spratt, & Hooper, 2011). Specifically, research has shown brain development being affected through the mechanisms of accelerated loss of neurons (De Bellis, Spratt, & Hooper, 2011; Sapolsky, 2000; Simantov et al., 1996; Smythies, 1997), delays in myelination (Dunlop, Archer, Quinlivan, Beazley, & Newnham, 1997), abnormalities in developmentally appropriate pruning (Lauder, 1988; Todd, 1992), and/or the inhibition of neurogenesis (De Bellis, Spratt, & Hooper, 2011; Gould, McEwen, Tanapat, Galea, & Fuchs, 1997; Gould, Tanapat, McEwen, Flugge, & Fuchs, 1998; Tanapat, Galea, & Gould, 1998)⁶. Furthermore, neuroimaging studies in adult survivors of childhood

⁶ These steps in brain development are vital towards an individual making appropriate neural connections, which result from life experiences, and increasing the efficiency of

victimization have shown hyperresponsiveness in the medial prefrontal brain regions and over-activation of the amygdala, which are responsible for executive functions and emotional responses (Lanius et al., 2002; Shin et al., 2006).

When examining the brain structures and processes there is an evident relationship with childhood victimization. During traumatic experiences, the activation of key neural systems, such as the HPA system, occurs resulting in adaptive changes in emotional, behavioral and cognitive functioning (Teicher, 2000). This activation commonly causes hyper-vigilance, focus on threat-related cues, behavioral impulsivity and anxiety in an individual. In addition, the corpus callosum has shown to be significantly smaller in a victimized sample of children, resulting in less integration of the two halves of the brain. This results in a lack of stability of one's mood (Andersen et al., 2008). Likewise, there is evidence supporting that the size of the cerebrum (or cortex) is affected by childhood victimization. This section of the brain is instrumental in rational thinking and decision-making, which are important in allowing an individual to make wise decisions in regards to the behaviors they engage in and utilization of services related to their health (Teicher et al., 1997). Lastly, research found brain development to be a mediator between victimization during childhood and cognitive abilities, decision-making skills and other predictors of negative health (Watts-English, Fortson, Gibler, Hooper, & De Bellis, 2006).

the brain. This directly can affect an individual's learning, executive functions and decision making abilities.

Immune System

The immune system has shown to be affected by the experience of childhood victimization. The thymus gland, a primary organ of the immune system, has been found to be significantly smaller in a victimized sample of children (Fukunger, Mizou, Yamashita, Yamada, Yamamoto, Tatsono et al., 1992). The implication of this smaller than normal thymus gland is the depreciated rate one is able to produce the needed amount of T-lymphocytes, which defend the body against potentially damaging and deadly pathogens (i.e. viruses or bacteria). This results in an individual having a depressed immune system and one is at an elevated risk for many negative health outcomes.

As seen above, the implications of childhood victimization on the healthy development of the physiological pathway are vast and can impact lifestyle choices, as well as general physical health. Understanding the interconnection of all these areas of the physiological pathway can help improve the health of survivors of childhood victimization. Further, understanding the physiological pathway in relation to the other potential mediating pathways between childhood victimization and adult health outcomes allows for a clear understanding of the multi-dimensional effect that occurs within the individual due to early trauma.

Cognitive Pathway

Due to trauma experienced in childhood, individuals may experience more negative beliefs about themselves and others and these beliefs form the cognitive pathway. Beliefs and attitudes such as these shape an individual's day-to-day experiences and can have significant impact on one's health. Broadly, the cognitive pathway can be

divided into beliefs about oneself and beliefs about others, and is inclusive of the internal working model of one's perception of health (Dickerson, 2011; Kendall-Tackett, 2013). Specifically, this pathway contains the effects of shame, self-blame, cognitive appraisal, locus of control, self-esteem and self-efficacy, which all relate back to the individuals' belief about themselves and others and how they select to relate to their outside world (e.g. Dickerson, 2011; Persons, Kershaw, Sikkema, & Hansen, 2010; Phanichrat & Townshend, 2010; Schuck & Widom, 2001; Simoni, & Ng, 2002).

Beliefs about Self

When examining the beliefs about self, there are six that have been previously researched and are considered here. These beliefs are: shame, self-blame, attributional style, health perception, self-esteem and self-efficacy (Kendall-Tackett, 2013; Koss, 1990; Persons et al., 2010; Webb, Heisler, Call, Chikering, & Colburn, 2007). All of these beliefs guide an individual's actions and aids in considering and weighing the correct factors in the decisional balance process. Additionally, we know that all of these beliefs can be altered by childhood victimization, as survivors often view themselves as weak, out of control and frightened instead of healthy, strong and in control of their life (Coleman, 2003; Koss, 1990; Macmillan, 2001). Thus, if people perceive they are not worthy of life and that they have no control over their health then their health will be affected, along with increased involvement in health risk behaviors and lack of engagement of health-enhancing behaviors (Kendall-Tackett, 2013).

Shame and self-blame. Shame is a response to a negative social evaluation or rejection and threatens the "social self" through damaging one's self-respect. It often results in a person feeling vulnerable, exposed and/or "defective", and with an individual

concluding they have lost social value (Kessler & Bieschke, 1999; Persons et al., 2010). Shame can develop due to exposure to early victimization and can reduce health-related quality of life (Kessler & Bieschke, 1999; Persons et al., 2010). Further, research has demonstrated that continued exposure to social threat (i.e. victimization experiences) could increase in the risk of adverse health outcomes (Dickerson, Gruenewald & Kemeny, 2004). Previous studies have found psychological and sexual victimization has been linked to higher levels of shame (Feiring, Rosenthal, & Taska, 2000; Hoglund & Nicholas, 1995; Kim, Talbot, & Cicchetti, 2009; Webb, Heisler, Call, Chikering, & Colburn, 2007; Whiffen & MacIntosh, 2005). Shame from childhood may be carried into adulthood and become part of their permanent belief of oneself and often results in isolating behavior and lack of establishing close relationships (Kendall-Tackett, 2013; Kim, Talbot, & Cicchetti, 2009; Webb et al., 2007). In studies on the health effects of victimization, often grouped with shame is self-blame. Both of these beliefs increase vulnerability to re-victimization, PTSD, depression and eating disorders. Additionally, they directly impact diagnoses of other diseases and utilization of care for health complications that have a strong connection to one's health.

Individuals who self-blame undervalue their own thoughts and feelings about a scenario, while being self-critical and employing a low self-evaluation (Ali et al., 2000). The result of self-blame is demonstrated through the increased propensity to take responsibility for negative events. Sexual and psychological victimization in childhood have been linked to heightened rates of self-blame, as well as higher levels of illnesses such as chronic pain and gastrointestinal illness (Ali et al., 2000; Peroott, Morris, Martin & Romans, 1998).

Attributional style. The way in which individuals interpret events is known as one's attributional style. There are two attributional styles that classify individuals: pessimist (mainly negative) and optimist (mainly positive) (Arata, 1999; Barker-Collo, 2001; Gold, 1986; Kendall-Tackett, 2013; Phanichrat & Townshend, 2010; Phanichrat & Townshend, 2010). Those with a pessimistic attributional style make internal, global and stable⁷ attribution towards the occurrence of negative life events. Research has shown that childhood victimization, specifically sexual, can affect attributional style and leads to more pessimistic attributional style characteristics (Arata, 1999; Barker-Collo, 2001; Gold, 1986). This is important in examining the relationship between childhood victimization and health outcomes because having a negative attributional style has been negatively linked to immune system function and recovery from sickness (Kendall-Tackett, 2013; Segerstrom, Taylor, Kemeny, & Fahey, 1998). Additionally, those with a pessimistic attributional style are more likely to cognitively appraise a situation as negative (Moore, Varra, Michael, & Simpson, 2010; Phanichrat & Townshend, 2010), allow a negative event to become more central to one's identity (Lancaster, Robriguez & Weston, 2011; Robinaugh & McNally, 2011) and permit a longer timespan of rumination about negative events (Conway, Mendelson, Giannopoulos, Csank, & Holm, 2004; Phanichrat & Townshend, 2010). Reversely, optimism has shown to have many positive health effects (i.e. belief one can change a health behavior and lower bodily inflammation) (Danner, Snowden, & Friesen, 2001; Ikeda et al., 2011; Segerstrom,

⁷ Internal: the cause of the negative event is within the individual's control; Global: that a negative event in one part of an individual's life will impact other areas; Stable: attributions do not change over time or circumstance

Taylor, Kemeny, Reed, & Visscher, 1996; Taylor, Kemeny, Reed, Bower, & Gruenewalk, 2000).

Health perception. Health perception is a belief the individual holds that indicates whether one considers himself or herself to be healthy and is a significant predictor of mortality (Kendall-Tackett, 2013; Mossey & Shapiro, 1982; Wiest, Schuz, Webster, & Wurum, 2011). In addition to mortality, health perception has been linked to disability levels, chronic disease, psychosomatic symptoms and adult daily living activities (Kendall-Tackett, 2013; Simon van de Mheen, Van der Meer, & Mackenbach, 2000). All forms of victimization have been linked to worse perceptions of physical health (Golding, Cooper, & George, 1997; Kendall-Tackett, Marshall & Ness, 2000). In considering health perception, it is also beneficial to consider the role of health locus of control (HLC). Like other locus of control measures, HLC examines the individual's sense of control over their health. Childhood victimization has been linked to one believing that they have no control over their health, rather it is in the control of others. This often results in the lack of health-engaging behaviors and compliance with treatment regimens (Evan, Ferrando, Rabkin, & Fishman, 2000; Simoni & Ng, 2002). It is evident from the literature, that the results of having a negative health perception not only affect quality but quantity of life as well.

Self-esteem and self-efficacy. Both self-esteem and self-efficacy are affected by childhood victimization and go on to impact one's physical health into adulthood. Self-efficacy is an individual's belief about how competent they feel they are (Bandura, 1999). Beliefs on one's efficacy can affect the behaviors one engages in, the amount of effort put forward towards a certain behavior, how long they engage in the behavior, and the

amount of accomplishment (Bandura, 1999). Self-esteem is the worth one gives to themselves (Kendall-Tackett, 2013). All victimization forms have been linked to lower levels of self-esteem (Gutierrez & Todd, 1997; Lopez & Heffer, 1998; Schuck & Widom, 2001). Similarly so, self-efficacy was impacted by all victimization forms across multiple populations (Brown, Lourie, Zlotnick, & Cohn, 2000; Oliver & Paull, 1995; Sachs-Ericsson, Cromer, Hernandez, & Kendall-Tackett, 2009; Toth & Cicchetti, 1996). Self-efficacy and self-esteem has been linked to two specific areas of health: health behaviors (i.e. substance use or compliance to a medicine regiment) and health outcomes. Research has demonstrated that those with lower self-efficacy and/or self-esteem are less likely to engage in positive health behaviors (Kitzman-Ulrich, Wilson, Van Horn, & Lawman, 2010; Nouwen et al., 2011). In relation to health outcomes, disease burden, disease severity, heart rate and blood pressure were linked to lower self-esteem and/or self-efficacy (Kaplan, Ries, Prewitt, & Eakin, 1994; Sanz & Villamarin, 2001; Sarkar, Ali, & Whooley, 2007).

Beliefs about Others

An individual's belief about others affects one's relationships and in the end the individual's health. This internal working model provides a major contributor to how an individual considers the beliefs others have about them; therefore, it is vital in an individual's attachment to others and the stability of these relationships (Kendall-Tackett, 2013; Liem & Boudewyn, 1999). The model influences the aspects of relationships that a person pays attention to, the interpretation of other's behaviors, and the response given to the external environment (Liem & Boudewyn, 1999). Hostility and religiosity are linked

to the internal working model and are examined below to understand the relationship between childhood victimization and adult health outcomes.

Hostility. Hostility is an umbrella term that includes interpersonal mistrust, suspiciousness, cynicism and a heightened tendency to interpret other's actions as aggressive in nature (Kendall-Tackett, 2013; Kubzansky & Kawachi, 2000; Lewis et al., 2009). Survivors of childhood victimization have shown elevated levels of hostility when compared to their counterparts (Gauthier, Stollak, Messe, & Aronoff, 1996; Harter & Vanecek, 2000; Roy, 2001). Further, hostility has shown to have a direct relationship with cardiovascular disease (Beckham, Flood, Dennis, & Calhoun, 2009; Low, Matthews, Kuller, & Edmundowicz, 2011; Mezick et al., 2010; Roy, Janal, & Roy, 2010; Smith, 2006; Smith & Ruiz, 2002), diabetes and other metabolic disorders (Lewis et al., 2010; Niaura et al., 2000; Raikkonen, Matthews, & Salomon, 2003), pulmonary functioning (Jackson, Kubzansky, Cohen, Jacobs, & Wright, 2007), generalized stress (Diong & Bishop, 1999; Kubzansky, Kawachi, & Sparrow, 1999), cognitive functioning (Barnes et al., 2009) and inflammation (Stewart, Janicki-Deverts, Muldoon, & Kamarck, 2008; Suarez, Lewis, Krishan, & Young, 2004; Suarez, 2003; Suarez, 2006).

Religiosity. Religiosity consists of applying religion as a guiding point for one's daily decisions, as well as finding meaning in suffering, forgiveness, hope and existential questions (i.e. why God allows suffering) through activities such as prayer and church attendance (Hill et al, 2000). It is no shock that these constructed beliefs have an impact on physical health. Previous research has depicted that experiences of victimization, all subtypes, can negatively affect religiosity (Finkelhor, Hotaling, Lewis, & Smith, 1989; Kendall-Tackett, 2013; Lawson, Drebing, Berg, Vincelle, & Penk, 1998). Specific

religious areas affected include level of engagement, spiritual injury, less stability of religious behaviors and minimal use of spiritual coping behaviors (Finkelhor, Hotaling, Lewis, & Smith, 1989; Gall, 2006; Lawson, Drebing, Berg, Vincelle, & Penk, 1998). Further, religiosity has been correlated with physical health. Correlated areas include: mortality (Clark, Friedman, & Martin, 1999; Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000), taking part in protective health behaviors (Chandy, Blum, & Resnick, 1996; Strawbridge, Shema, Cohen, & Kaplan, 2001) and overall health rating (Nicholson, Rose, & Bobak, 2010). The cognitive pathway provides insight into the relationship between childhood victimization and poor health outcomes in adulthood through demonstrating how beliefs about self and others often inhibits one's engagement in health promoting behaviors and increases rates of disease and illness.

Social Pathway

Adult survivors of childhood victimization have increased difficulty in establishing and maintaining personal relationships across the lifespan, as well as the decreased capacity for social functioning⁸. Theory and research have identified the formation of social relationships as an essential component to the health and wellbeing of individuals (Eisenberger & Cole, 2012; Jensen-Campbell & MacDonald, 2011). Additionally, the ability to interact within the different levels and structures of society is vital towards an individual meeting some of their most basic needs, such as the ability to access needed services for health and wellness. Generally speaking, the impact on social factors can be external (using aggression towards others) and/or internal (poor self-

⁸ Defined as the ability to construct representations of the relations between oneself and others, and to use those representations flexibly to guide social behavior (Adolphs, 2001).

concept) for the individual with all of them typically leading to a certain level of social isolation. Inclusive components of this pathway are revictimization, social isolation, marital status, attachment and interpersonal style (Eisenberger & Cole, 2012; Hulme, 2000; O’Leary, Cooney, & Eaton, 2010; Sandberg, Suess, & Heaton, 2010; Ullman, Najdowski, & Phillipas, 2009).

Social Connectivity

Social relationships, support, and networks are all vital to one’s well-being and these connections have profound consequences on physical health. Social connection has found to have an almost equal impact on an individual’s health as low cholesterol levels and partaking in the smoking behavior (Spiegel, 1999). Further, research in neuroscience has shown that human bodies process relational threats as threats to our survival (Jenson-Campbell & MacDonald, 2011). Thus, it is important, if not necessary, to consider one’s social connection to others in order to fully understand an individual’s current health status.

Attachment. Childhood victimization has been directly correlated with poor social connection, due to the lack of ability to form and maintain relationships throughout the life course (Briere & Elliot, 1994; Kendall-Tackett, 2013; MacDonald, Borsook, & Spielmann, 2011; Sandberg, Suess, & Heaton, 2010) and this in turn has negative physical health implications into adulthood (Dickerson, 2011; Eisenberger, 2011).

Attachment theory provides a framework for examining the quality of social relationships for an individual. Victimization in childhood can disrupt the development of the normal level of trust, resulting in insecure attachment with the primary caregiver (Roche, Runtz, & Hunter, 1999; Styron & Janoff-Bulman, 1997). This insecure attachment can continue

into adulthood inhibiting the formation and maintenance of close, stable relationships (Styron & Janoff-Bulman, 1997). Specifically, individuals with insecure attachment, may exhibit avoidant behaviors or distort general perceptions of threat (MacDonald, Borsook, & Spielmann, 2011; Sandberg, Suess, & Heaton, 2010). This poor interpersonal relationship style has been linked to health risk behaviors and health outcomes. Research has shown that this style has been associated with poor health behaviors and low adherence to doctor's instructions (Helgeson & Fritz, 1996; Helgeson, 1993). Further, there has been an identified relationship between poor interpersonal style and physical health outcomes, such as cardiovascular disease and conditions defined by pain (McWilliams & Bailey, 2010). This poor interpersonal style often leads to other social complications, such as higher rates of marital strife, divorce, and social isolation (Hulme, 2000).

Marital strife. There are multiple health implications of marital strife on an individual's health, especially for women. Past research has depicted that childhood victimization has been connected with poor marital quality and negative family interactions, attacking some of the most foundational relationships experienced throughout the life course (Kendall-Tackett, 2003; Shaw & Krause, 2002). These social factors have shown to adversely affect adult health status, for example negative family interactions partially influenced the effect of childhood physical abuse and adult chronic health problems (i.e. cardiovascular disease) (Shaw & Krause, 2002). Marriages with high levels of stress increase the risk of heart disease, high blood pressure, heart attacks and hypertension (Gallo et al., 2003; Miller, Smith, Turner, Guijarro, & Hallet, 1996; Orth-Gomer et al., 2000). Additionally, other research has connected marital strife with

slow wound healing, less effectiveness of vaccines, and higher rates of infectious disease (Kiecolt-Glaser & Newton, 2001). The lack of support coupled with the additional stress due to marital strife, has implications on the physical health on the individual, most importantly around the cardiovascular system.

Supporting relationships. Going outside of the primary relationship in adulthood, social isolation can hurt one's physical health, as well as increase the rate of negative health risk behaviors. Specifically, social isolation⁹ has been linked to higher rates of cardiovascular disease, heart attack and premature death in survivors of childhood victimization (Loucks, Berkman, Gruenwald, & Seeman, 2005; Smith & Ruiz, 2002; Myers & Smith, 2000). In addition, in a review of the relevant literature, House, Landis, and Umberson (1988) stated that social isolation is comparable to high blood pressure, smoking and limited physical activity in the effects they have on increasing mortality risk. It is evident that social support on all levels is important to maintaining good health and victimization in childhood can create relationship difficulties throughout the life course and place an individual on an unhealthy trajectory both socially and physically.

Revictimization

The revictimization of the women is a specific social factor that is strongly correlated with childhood victimization and adult physical health outcomes is. Women, as well as men, who are victimized in childhood are at an increased risk of revictimization as an adult (Messman & Long, 1996; Thompson, Arias, Basile, & Desai,

⁹ Social isolation has been identified as less than five friends, low perceived social support and less frequent interactions.

2002; Tjaden & Thoennes, 1998; Tjaden & Thoennes, 2000). Whitfield, Anda, Dube, and Felitti (2003) investigated the relationship of childhood physical, sexual abuse, and/or growing up with a battered mother to the risk of being a victim of intimate-partner violence (IPV) and discovered that all three of the childhood experiences had a two-fold increase on the risk of IPV. Additionally, research identified a graded relationship between the number of childhood violent experiences and the risk of IPV; with a woman who experienced all forms of violent experiences as a child being 3.5 times more likely to be a victim of IPV (Whitfield, Anda, Dube, & Felitti, 2003). Research has also shown women victimized as children were more likely to live with a partner with a drug or drinking problem, which increases the risk of violence occurring (Schilling, Aseltine, & Gore, 2007). This understanding of the increased risk of victimization in adulthood is of importance because research has shown that IPV has further negative implications on health and it plays a compounding effect on the already increased likelihood of negative health outcomes of a woman who was victimized as a child. Specifically, women who experienced IPV were more likely to have an increased risk of poor health, depressive symptoms, HIV, developing a chronic disease (i.e. cardiovascular disease and diabetes), injury, and chronic mental illness (Campbell et al., 2002; Coker et al., 2002; Kendall-Tackett & Marshall, 1999; Lovallo, 1997; Tjaden & Thoennes, 1998;). Childhood victimization often places an individual on a lifelong trajectory of vulnerability through a lack of social support and stability, as well as future experiences of victimization. These social scenarios can influence health in negative ways that are often times irreversible (Coker et al., 2002).

The social pathway exemplifies that physical health is partially a product of a person in their environment, with the focus being on the interaction between an individual and those around them. Childhood victimization affects an individual's relationships, and security within them, throughout the lifecourse, with implications for longevity and quality of life.

Emotional Pathway

Multiple psychological conditions have been identified as common sequelae of adult survivors of childhood victimization. Specifically, psychological conditions such as posttraumatic stress disorder (PTSD) and depression have been identified not only as outcomes of victimization, but as potential mediators between childhood victimization and health outcomes (e.g. Heim & Nemeroff, 2009; Salovey, Rothman, Detweiler & Steward, 2000; Shakespeare-Finch & De Dassel, 2009; Zlotnick, Mattia & Zimmerman, 2001).

Research has shown a long line of correlations between childhood victimization, mental health, and physical health, with specific mental health diagnosis being PTSD, chronic stress, eating disorders, and depression (Heim, Owens, Plotsky, & Nemeroff, 1997; McCauley et al., 1997). Further, research has shown that childhood physical abuse is associated with chronic mental health conditions, along with alcohol and drug use and lower perceived health (Thompson, Arias, Basile, & Desai, 2002). Goodwin et al. (2003) identified mental health as a pathway connecting childhood physical abuse to a variety of physical health outcomes, such as stomach problems and migraines. Additionally, this research made a significant connection between childhood physical abuse and alcohol and substance abuse mediated by mental health (Goodwin et al., 2003). Springer (2009)

found that those that were victimized as children, versus those who were not, had poorer mental health and that this poor mental health was not only an outcome, but was also a mediator for decreased physical health. Additional research has shown that there is a graded relationship in a victimized population, where the amount of victimization as a child had a direct relationship on the individual being diagnosed with depression, anger, and anxiety (Springer, Sheridan, Kuo, & Carnes 2007).

PTSD has been a popular contender as a possible mediator between childhood victimization and adult health outcomes (Mulvihill, 2005). In the realm of this disorder, childhood victimization can be defined as an extreme stressor that can pose an actual or perceived threat to the child, thus activating an extreme stress response (Mulvihill, 2005; Perry, 1999; Pfefferbaum, 1997). Previous research has shown that over 30% of children who experience victimization each year receive a clinical diagnosis of PTSD (Daane, 2003; Southwick, 2003). In addition, PTSD has been identified as a contributing factor in general health problems, while also having a strong relationship to habit disorders such as smoking and substance use (Dube, Felitti, Dong, Chapman, Giles, & Anda, 2003; Southwick 2003). It is at this junction that one can see how PTSD is closely related and often causing health problems in a population who has experienced victimization in childhood. The intersectionality of childhood victimization, mental health and physical health is undisputable, often time resulting in higher rates of health risk behaviors and negative implications on health.

Behavioral Pathway

Adult survivors of childhood victimization have an increased likelihood of engaging in harmful, high-risk behaviors. In addition, current research has begun to examine the lack of health enhancing activities engaged in by adult survivors of childhood victimization. These behaviors, specifically those that are high-risk, will be covered fully in relationship to childhood victimization and adult health outcomes, and are the focus of the proposed research study. Obtaining an in-depth understanding of the behavioral pathway will assist practitioners in creating comprehensive interventions that consider the bio-psycho-social aspects of the individual, thus helping individuals achieve a higher quality and quantity of life. Additionally, in the realm of public health, understanding the behavioral pathway gives insight into the decision making of individuals who were previously victimized and into the development of primary prevention measures, verses secondary and tertiary care.

Researchers and theorists agree that the leading causes of morbidity and mortality have been directly linked to health behavior and lifestyle factors, with current research showing that victimization and other childhood experiences contribute to the development of these health risk behaviors. This relationship between childhood victimization and health risk behaviors allows an opportunity for understanding and discovery and also potentially some of the most basic causes of morbidity and mortality (Felitti et al., 1998). Specifically, Felitti et al. (1998) were able to demonstrate that prevalence and risk increased for smoking, severe obesity, physical inactivity, alcoholism and use of illicit drugs when the number of adverse childhood experiences increased. Similar findings were discovered for sexual health behaviors. In particular, the number of

intercourse partners and risk for sexually transmitted diseases increased with an increased amount of adverse childhood experiences (Felitti et al., 1998). Felitti et al. (1998) suggest that the increase in health risk behaviors is due to those behaviors being sought out as coping devices, either consciously or unconsciously, when faced with any form of stress. These mechanisms generally include behavioral strategies to cope with memories of violence (i.e. smoking), emotional and psychological responses (i.e. depression and anxiety), and secondary stressors (i.e. poor adult relationships) (Pearlin, 1989; Springer, 2009). Additionally, to the degree that these behaviors are helpful in handling stress they can be chronically used. Below is an overview of each of the suggested health-risk behaviors as proposed by Kendall- Tackett (2013).

Substance Abuse (Alcohol and Illegal Drugs)

Adult survivors of childhood victimization are at an elevated risk of abusing substances, both alcohol and drugs. In the examination of alcohol use, a 74 to 490 percent increase has been seen in survivors of childhood victimization (Chartier, Walker, & Naimark, 2009; Diaz, Simantov, & Rickert, 2002; Felitti et al., 1998). Hulme (2000) found that individuals who had experienced victimization were more likely to report heavy drinking than those with no history of abuse. Likewise, Kendler et al. (2000) found that childhood sexual abuse (CSA), that included intercourse, substantially increased the rate of alcohol use (OR=4.01) in a population-based sample. Further, in a national survey of American women (n=1,099), those who were sexually abused as children were more likely to report higher rates of alcohol abuse behaviors (i.e. recent intoxication, drinking-related problems, symptoms of alcohol dependence) compared to women with no abuse history (Wilsnack, Vogeltanz, Klassen, & Harris, 1997).

Similar to alcohol use, illicit drug use has higher prevalence rates in survivors of childhood victimization. Previous research has shown 74 to 930 percent increase in the odds of a survivor of childhood victimization using illicit drugs in adulthood (Briere & Runtz, 1987; Diaz, Simantoc, & Rickert, 2002; Dube et al., 2003; Felitti et al., 1998). In a primary care sample, men and women with a history of victimization had an increased likelihood of using intravenous (IV) and recreational drugs (Kendall-Tackett, Marshall, & Ness, 2000). Specific to sexual victimization, those with a history were found to be more drug dependent (OR=5.7). Both alcohol and illicit drug use have short and long-term implications on an individual's health. Some of the short-term effects are commonly danger of accident, injury or violence, both as the perpetrator or perpetrated (Trezza & Popp, 2000). Long-term effects of substance abuse include heart and liver disease and disability (Trezza & Popp, 2000). Lastly, there is a high comorbidity of alcohol and illicit drug use with other health risk behaviors, specifically smoking and high-risk sexual activity (Kilpatrick, Acierno, Saunders, Resnick, Best, & Schnurr, 2000; Molnar, Buka, & Kessler, 2001; Widom & White, 1997).

Obesity & Eating Disorder

Obesity is commonly seen at a higher rate in adult survivors of childhood victimization. In a study by Felitti (1991), 25% of survivors of childhood victimization reported being more than 100 pounds overweight in comparison to the 6% reported by the control group.

Obesity and eating disorders both influence an individual's health. Individuals who are obese are at an elevated risk for heart disease, diabetes, stroke, hyperlipidemia, gall bladder problems and hypertension (Campos, Saguy, Ernsberger, Oliver, & Gaesser,

2006; Flynn, McNeill, Maloff, Mutasingwa, Wu, Ford, & Tough, 2006). Further, several forms of cancer have been linked to excess dietary fat (i.e. breast, colon, prostate and lung) (Stice, 2000). Likewise, eating disorders can impact health and commonly do through diagnoses such as hypotension, osteoporosis, cardiac arrhythmias and even death (DeAngelis, 2002; Kendall-Tackett, 2013). Both mortality and morbidity risks are substantial when discussing eating disorders. Childhood victimization survivors are more vulnerable to both obesity and eating disorders often leaving them disproportionately affected by the associated health outcomes (Fosse, Holen, 2006; Messina & Grella, 2006; Oppenheimer, Howells, Palmer, & Chaloner, 2013; Springer, Sheridan, Kuo, & Carnes, 2007).

Suicide

In adult survivors of childhood victimization suicide attempts and ideations occur at an escalated rate. While the health effects of suicide are obvious, the implications of suicide attempts on health are less evident. Drug overdose and physical injury, common ways suicide is attempted, often lead to long-term complications or disability (Widom, 1994; Finkelhor, 2008). Further, suicide attempts often co-occur with other health risk behaviors, such as substance abuse, eating disorders, and high-risk sexual behavior.

High-risk sexual behavior. High-risk sexual behavior is the most researched form of harmful behavior in adult survivors of childhood victimization. Specifically, a majority of the research examines the connection between the experience of sexual victimization and later engagement in high-risk sexual behavior (Bartholow et al., 1994; Felitti et al., 2001). Further, findings have shown survivors of childhood victimization having elevated odds of increased number of sexual partners and unprotected sexual intercourse of 60 to 280

percent (Chartier, Walker, & Naimark, 2009; Felitti et al., 1998; Hills, Anda, Felitti, & Marchbanks, 2001). Individuals who engage in high-risk sexual behavior are disproportionately exposed to sexually transmitted diseases and HIV/AIDS, resulting in negative ramifications on health.

Smoking

Previous research has depicted that smoking occurs at higher rates among survivors of childhood victimization (DeWit, MacDonald & Offord, 1999; Felitti et al., 2001; Kendall-Tackett et al., 2000). When examining the relationship between childhood victimization and the smoking behavior increased odds of 52 to 490 percent were found, with significant increases in smoking if one was a victim of multiple forms of abuse (Anda et al., 1999; Chartier, Walker, & Naimark, 2009; Diaz, Simantov, & Rickert, 2002; Felitti, 2002). In a study by Springs and Friedrich (1992), sexual abuse was found to predict smoking, with those who experienced abuse at an earlier age beginning smoking sooner in life. Specifically, those who experienced sexual abuse started smoking 1.6 years earlier than their non-abused counterparts.

How smoking affects health is well-known to the general populations and is the largest modifiable health risk among adults. Smoking is attributed as the primary cause of a high portion of deaths (i.e. stroke, pulmonary disease, cancer of the lungs, and cardiovascular disease), as well as increasing the vulnerability of other diseases (i.e. cancer of cervix, kidneys, and pancreas) (Anda, Brown, Dube, Bremner, Felitti, & Giles, 2008; Edwards, Anda, Gu, Dube, & Felitti, 2007; Kendall-Tackett, 2013; Walker, Gelfand, Katon, Koss, Von Korff, Bernstein, & Russo, 1999). Smoking alone accounts for many health problems adult survivors of childhood victimization face, but also is

commonly seen as co-occurring with additional health risk behaviors.

Conclusion

When we understand that health is complex and influenced by one's thoughts, emotions, behaviors and social connections, it becomes evident that the individual either gathers protective or risk factors, or some of both, throughout their life, which go on to influence their wellness. Victimization is one of the factors that typically increases risk, specifically negative health outcomes and higher rates of engaging in health risk behaviors throughout the life course. To improve the health of childhood victimization survivors, and arguably the health of our nation, it is necessary to consider and address the ways that victimization influences health.

Taking a portion of Kendall-Tackett's theoretical model, the behavioral pathway will be examined to understand a portion of the unique relationship between childhood victimization and poor physical health in adulthood in a sample of women on probation and parole. Specifically, the study aims to examine if health risk behaviors mediate the relationship between childhood victimization and physical health outcomes in adulthood in a sample of women involved with the criminal justice system. Gaining this knowledge will allow for more targeted interventions to improve the health of a highly marginalized population, target a system that could be critical in the response to women's complex health needs and address health disparities at their core.

CHAPTER III

METHODOLOGY

The methods for the present research study are described below. This chapter includes a description of the research aim and design, sample, recruitment and data collection procedures, measures and proposed data analysis strategy.

Overview

The proposed study will be a secondary analysis of data from the Women's Health Research Study (WHRS) (R01DA027981, Golder PI). The WHRS was approved by the University of Louisville Institutional Review Board. The aims of WHRS include examining victimization, physical and psychological health and social outcomes for women on probation and parole. Data is being collected at three time points: baseline (July 2010-January 2013), 12 months post baseline and 24 months post baseline (both ongoing). For the current analysis only baseline data will be utilized.

Research Aim

The aim of this research is to begin to identify and describe the pathways through which childhood victimization negatively affects adult physical health. In particular, the proposed research will examine the relationship among childhood victimization, health risk behaviors, and adult physical health. It is hypothesized that the effect of childhood

victimization on adult physical health is mediated by distinct and predictable health risk behaviors. The proposed model is shown in Figure 4.

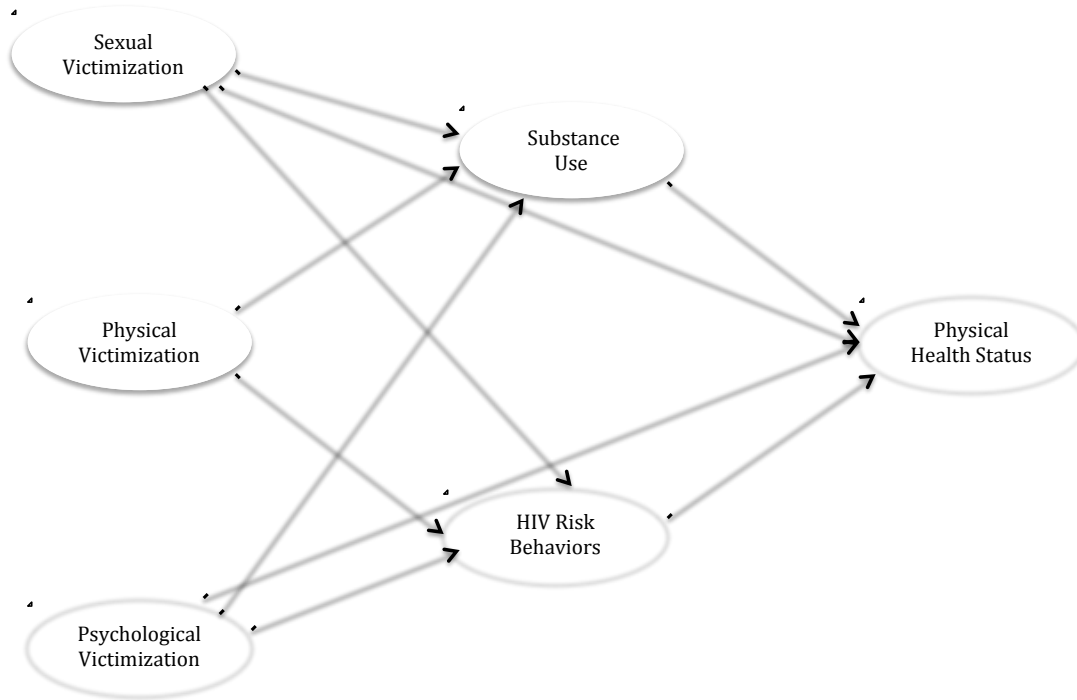


Figure 4. Hypothesized model of the relationship between childhood victimization, health risk behaviors (i.e. substance use; HIV risk behaviors), and physical health status.

Sampling and Recruitment

In the WHRS, the sample consisted of 406 women on probation and parole in Jefferson, County Kentucky. To be eligible for participation women met the following inclusion criteria: (1) female; (2) 18 or older; (3) ability to speak in English at a conversational level; (4) reported any experience of physical or sexual victimization as a child or as an adult which was perpetrated by a caregiver, intimate partner, or non-intimate partner (i.e. stranger, acquaintance); and (5) reports of having sex with men or men and women. Exclusion criteria included: (1) evaluation of severe cognitive or

psychiatric impairment that would prevent them from completion of the survey, or (2) self-selection out of the process.

The WHRS recruited women face to face at probation or parole offices and through direct mailings to those on probation and parole in the county. Additionally, advertisements in the local newspaper, on public access TV, and on the website *Craigslist* were posted. Lastly, recruitment flyers were placed in the community. Screening for eligibility was conducted by telephone (89%) and face to face (11%). Procedures included a short screening process, which did not collect any identifying information until the screener determined that the potential participant was qualified to join the study, and the participant expressed interest in participating. Prior to screening questions, potential participants were provided with a verbal informed consent process including: information on the nature of the study, expected duration of participation, procedures to be followed, reasonably foreseeable risks or discomforts, descriptions of potential benefits, a disclosure of appropriate alternative procedures or courses of treatment, a statement describing the extent to which confidentiality of records will be maintained, and an explanation of whom to contact regarding questions about the research and research subjects' rights.

A total of 517 women were screened for participation, 82% ($n = 424$) of the women screened were eligible for participation. The most common reasons for ineligibility included no history of victimization, not on probation or parole, and reporting only female sex partners. The majority of women were recruited through direct mail ($n = 170$, 32.9%) and “other” (i.e. referral from a mother, friend, probation officer, cousin, and co-worker; $n = 154$, 32.8%). Other recruitment sources included: flyers (n

=75, 14.5%), community-based organizations ($n=58$, 10.6%), direct contact ($n=48$, 9.3%), and news/radio/internet ($n=12$, 2.3%).

WHRS Data Collection

Eligible participants were individually consented using the University of Louisville IRB approved consent form and were informed about the study's certificate of confidentiality. Interviews took place in office spaces, libraries, participants' homes and other public spaces and lasted for approximately three hours. Interviews were conducted by trained female interviewers. The women were paid \$35.00 and provided transportation tickets (e.g., TARC tickets) for participating.

The Audio Computer-assisted Self-interviewing (ACASI) software system was utilized to conduct the interview via laptop computers (Nova Research Company, 2003; ACASI). This software program has shown to limit inhibition in reporting sensitive data (e.g. drug use and criminal involvement) and increase privacy to improve the accuracy of the information given by research participants (Newman, Jarlais, Turner, Gribble, Cooley, & Paone, 2002; Williams, Freeman, Bowen, Zhao, Rusek, & Signes, 2000). Further, the software supports the encryption of response data and password protected questionnaires; limiting unauthorized users to view data. Access to the computer and data was restricted by passwords.

Present Study

The present study is a secondary data analysis. A subsample of women from the WHRS were selected into this sample based on whether they indicated they had experienced any type of psychological, physical, and/or sexual victimization during

childhood. The following questions were used to assess whether the women experienced childhood victimization.

Childhood Psychological Abuse

Eight questions assessed potentially psychologically abusive experiences: (1) treat [them] like [they] were stupid or inferior and/or call [them] names in private; (2) insult, shame or humiliate [them] in front of others; (3) withhold food from [them] as punishment; (4) ban or lock [them] in your room, a closet, a cellar, or car for a day or longer as punishment; (5) deliberately keep [them] from participating in extracurricular activities that [they] wanted to do on a regular basis; (6) destroy/hurt something [they] cared about on purpose; (7) frightened [them] by repeatedly following [them], phoning [them], and/or showing up wherever [they] were; (8) threaten to hurt [them] if [they] did not give them [their] money, jewelry, jacket or shoes or do something they wanted [them] to do.

Childhood Physical Abuse

Four items assessed physical abuse (Straus, Hambly, Boney-McCoy, & Sugarman, 1996): (1) physically hurt [them] on purpose (including grabbing, slapping, burning, scalding, punching, choking, throwing you around or harshly spanking you); (2) beat [them] up; (3) use a knife or gun or some other thing (like a club or a bat) to get something from [them]; and (4) attack [them] with a weapon in their hands and [they] were afraid they wanted to injure, rape or kill [them].

Childhood Sexual Abuse

Three questions assessed sexual abuse (Straus et al., 1996): (1) do sexual things other than sexual intercourse (i.e. forced petting or forced oral sex; (2) have sexual

intercourse but it did not actually occur; and (3) have sexual intercourse and it actually happened.

Measures

Measures assessing sociodemographic variables, childhood victimization, health risk behaviors, and physical health status are described below. The variables assessing sociodemographic characteristics are utilized for descriptive purposes only. Figure 5 shows the proposed structural equation model with latent constructs and variables identified.

Demographics

Demographic Characteristics

Five demographic variables (education, race, income, employment status and homelessness) will be evaluated. Education was a categorical variable. The categories included: lower than high school; high school or trade school graduate and GED recipient; and higher than high school. Income was provided in a dollar amount based on a typical amount of money earned in the previous thirty days. Employment and homelessness were both dichotomous variables, with 1=yes and 0=no. Employment was based on a single question that assessed current work status; working part or full time placed someone into the being employed category. Homelessness was assessed through the survey question, “Do you consider yourself to be homeless?”

Three categories were used to describe race/ethnicity: African American; White, non-Hispanic; and Other¹⁰. A review of previous research in this and similar fields has demonstrated that most authors reported the percentage of the sample that was white, using only two categories (white and other) to depict race (Dong et al., 2004; Salisbury & Voorhis, 2009). This no longer seems sufficient as our society increases in diversity, so the assignment of three categories was selected.

Independent variable: Childhood Victimization

Childhood Victimization

Childhood victimization was operationalized through the adaptation of the Revised Conflict Tactics Scale, the Lifetime Victimization Measure (tailored from the National Crime Victimization Survey) and Tolman's Psychological Maltreatment of Women Inventory (Straus, Hamblly, Boney-McCoy, & Sugarman, 1996; Tjaden & Thoennes, 1998, 2000; Tolman, 1989, 1999). Childhood victimization was operationalized as violence/abuse respondents experienced from their parent(s) and/or caregiver prior to the age 18. Three subtypes of childhood victimization were assessed: psychological; physical; and sexual (Refer to Table 2).

For each subtype of childhood victimization the following indicators were assessed: (1) age of first victimization experience, (2) the number of different forms of victimization experienced and (3) an aggregate score of the frequency of victimization. Thus a total of nine variables were used to operationalize childhood victimization.

¹⁰ The "Other" category is inclusive and contains Asian or Pacific Islander, Native American, Hispanic or Latina, and Multi-Racial. In the study's sample only 7% identified themselves in one of these ethnic/racial categories.

Age at time of victimization. Age of victimization was provided in years; as questions pertained to childhood victimization, 18 years old was the upper age limit. The earliest age the participant reported first experiencing the subtype of victimization was recorded. Response options for age of first victimization experience will range from 0-18.

Count of victimization experiences (count of experiences). A variable was created to reflect the number of different victimizations a woman had experienced for each of the different subtypes (psychological, physical and sexual). The numbers of affirmative responses to questions for each subtype were summed. The range for psychological victimization was zero to eight, zero to four for physical victimization, and zero to three for sexual victimization, with the highest number representing experiencing all forms of that victimization and zero equaling not experiencing any form of that victimization.

Frequency of victimization. Respondents were asked to indicate how often each type of victimization happened. Response options for all items ranged from 0-6 (0= “Never”, 1= “A few times a year”, 2= “1-2 times per month”, 3= “1-2 times per week”, 4= “3-5 times per week”, 5= “Almost every day”, and 6= “More than 1 time per day”). All items from each of the subtypes (psychological, physical and sexual) will compose an aggregate score. Possible ranges will be based on the number of questions used to assess each subtype.

Mediating Variables: Health Risk Behaviors

Health-risk behaviors can be defined as any behavioral activity undertaken by individuals with a frequency or intensity that increases risk of disease or injury (Stephoe

& Wardle, 2005). The health-risk behaviors assessed in the current research are: substance use and high-risk sexual behavior.

Substance use. The substance use construct will be operationalized through three variables: illegal drug use, alcohol use and tobacco use. For all substances, questions regarding age of first use, regular use and frequency of use were collected.

Illegal drug use. Women were asked about their use of the following 10 substances: marijuana; cocaine; crack; heroin; other opiates (e.g., “Percocet, OxyContin, Tylenol 2”); hallucinogens, sedatives/tranquilizers/barbiturates (e.g., “Benzos, Xanax, Seconal, Valium”); club drugs (e.g., “GHB [Xyrem], Rohypnol, Ketamine [Special K]; or MDMA [ecstasy]”), and prescription drugs. The total number of drugs a woman reported ever using in her life (possible range 0-10) was used as an indicator of the extent of a woman’s lifetime involvement in substance using behavior.

Tobacco use. Women were asked to indicate the number of years they had engaged in tobacco use, “How many years have you used cigarettes regularly in your lifetime?” For this variable regular use was defined as an average of 3 times per week. Response options were given in years and months and ranged from 0-60 years, for women who used tobacco less than a year the correct corresponding amount in decimal form will be used (i.e. six months will be .5).

Alcohol use. Alcohol use was operationalized by the amount of years of regular alcohol use to intoxication, “How many years have you used alcohol to intoxication regularly in your lifetime?”. Similar to the other substance use variables, regular use was defined as an average of 3 times per a week. Answer solutions were given in years and months and ranged 0-61.

High-risk sexual behavior. The high-risk sexual behavior construct will be operationalized through one variable, the Partner HIV Risk Index. In addition, other questions regarding sexual behavior was gathered, such as number of sexual partners (ever, past twelve months and past six months) and use of substances before sexual relations.

Partner HIV risk index. The Sexual Risk Behavior Questionnaire (SRQB) was used to assess high-risk sexual behavior (El-Bassel, Ivanoff, Schilling, Gilbert, & Safyer, 1995). A composite variable of four questions was calculated to formulate the Partner HIV Risk Index. The questions included were: (1) “Has your main partner ever been incarcerated?”; (2) “How many of your sex partners in the past 6 months did you meet the same day you first had sex with them?”; (3) “How many of your sex partners in the past 6 months were likely to have had other male partners sometimes during their lives?”; and (4) “How many of you sex partners in the past 6 months were likely to have been drug injectors or shooters?”. The four questions were recoded into dichotomous variables with 0 representing the absence of the event and 1 representing any experience of it. Scores ranged from 0-4, with 0 representing that no engagement in any of the behaviors took place and 4 signifying the highest risk in the index with all behaviors occurring.

Dependent Variable: Physical Health Status

Physical health is operationalized in two ways: perception of physical health and functional disability. These measures were selected based on their use in previous literature. Physical health has commonly been understood as limitations on the ability to complete tasks, such as adult daily living activities (e.g. bathing, bending to lift an object and walking up a flight of stairs) and a general physical health rating, which states how

someone feels about their physical health status (Felitti et al., 1998; McHorney, Ware, Lu, & Sherbourne, 1994; Springer, Sheridan, Kuo, & Carnes, 2007; Springer, Sheridan, Kuo, & Carnes, 2003; Ware & Sherbourne, 1992).

Perception of general physical health. Perception of general physical health was measured by a single question, “In general would you say your health is excellent, very good, good, fair or poor?” (Thompson, Arias, Basile, & Desai, 2002). Response options ranged from 0-4, with a score of 0=“excellent health”, 1=“very good”, 2=“good”, 3=“fair” and 4=“poor health”¹¹. The selection of this question is based on the breadth of its use in multiple research studies examining the feelings of an individual towards their health (Springer, Sheridan, Kuo, & Carnes, 2007; Springer, Sheridan, Kuo, & Carnes, 2003). The use of this question to measure the self-rated health has been utilized in a variety of research and has shown to be reliable (Olofsson, Lindqvist, Shaw, & Danieisson, 2012; Thompson, Arias, Basile, & Desai, 2002).

Functional disability. Functional disability was measured using a portion of the Medical Outcomes Study Short Form (MOS SF-36). Seven questions assessing limitations on physical functioning were asked. Questions included: “Please tell us how long (if at all) your health has been limiting you in:” (1) the kinds or amounts of vigorous activities you can do, like lifting heavy objects, running or participating in strenuous sports; (2) the kinds or amounts of moderate activities you can do, like moving a table, carrying groceries or bowling; (3) walking uphill or climbing a few flight of stairs; (4) bending, lifting or stooping; (5) walking one block; (6) eating, dressing, bathing or using

¹¹ This response option range is counter intuitive, with the higher number being more negative, but this is coded as is to match the coding of other measures.

the toilet; and (7) working at a job, doing work around the house or going to school. A 3-point Likert scale was used for answer selection (0= Not limited at all; 1= Limited for 3 months or less; and 2= Limited for more than 3 months). The cumulative score of 0 representing no limitation in *any* physical activity and 14 being the highest possible score, representing limitation more than three months on *all* physical activity. The MOS SF-36 results can be compared with those in the general population and in medical clinic patients (Stewart, Hays, & Ware, 1981). Reliability ranges from .65-.94 (McHorney, Ware, Lu, & Sherbourne, 1994; Ware & Sherbourne, 1992).

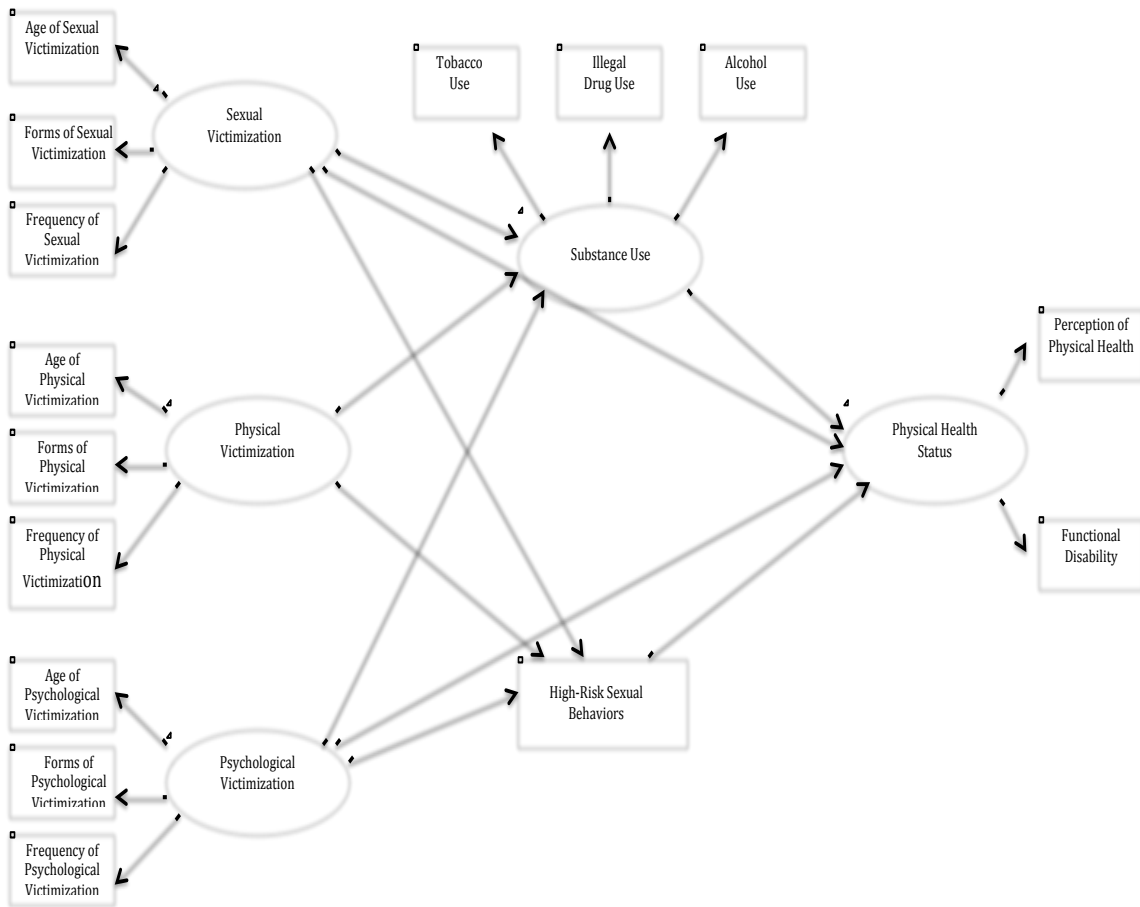


Figure 5. Hypothesized structural model of latent constructs and variables.

Analysis Strategy

Three steps will be completed in the analysis of the data: (1) descriptive statistics will be examined; (2) a between group comparison of those who have experienced childhood victimization and those who have not will be conducted; and (3) structural equation modeling will be utilized to examine the relationship between childhood victimization, health risk behaviors and physical health outcomes in adulthood.

Descriptive Statistics

Descriptive statistics for sociodemographic and model variables, including measures of central tendency, outliers, normality, linearity, and homoskedascity (Table 2). SPSS will be used to examine the descriptive statistics and correlations.

Table 2

Descriptive Statistics of Model Variables

	<u>Mean</u>	<u>SD</u>	<u>Skewness</u>	<u>Kurtosis</u>
Childhood Victimization				
Psychological				
Age at time of Victimization	7.09	3.49	0.441	-0.272
Count of Experiences	2.84	2.47	0.46	-0.945
Frequency of Victimization	1.38	1.47	0.97	0.04
Physical				
Age at time of Victimization	7.64	3.49	0.441	-0.272
Count of Experiences	1.39	1.35	0.57	-0.91
Frequency of Victimization	1.17	1.43	1.32	1.01
Sexual				
Age at time of Victimization	8.38	3.7	0.19	-0.509
Count of Experiences	0.76	1.06	0.98	-0.55
Frequency of Victimization	0.79	1.35	1.81	2.55
Substance Use				
Tobacco Use	16.97	12.67	0.459	-0.5
Alcohol Use to Intoxication	7.5	10.24	2.65	1.303
Illegal Drug Use	4.26	2.72	0.344	-0.769
High Risk Sexual Behavior				
Partner HIV Risk Index	0.71	0.84	1.192	1.364
Number of Years of Sex Trading	2.6	5.65	3.307	13
Physical Health				
Perception of general physical health	2.09	0.996	-0.159	-0.303
Functional disability	4.77	4.46	0.564	-0.904

Structural Equation Modeling

Getting at the primary aim of the study, structural equation modeling (SEM) will be utilized to examine the hypothesized relationship between childhood victimization, health risk behaviors and adult health outcomes. This approach provides a complete and flexible approach to modeling the relationships between latent constructs (Kline 1998). Benefits of SEM include: 1) allowing the measurement and examination of underlying theoretical concepts, which would be difficult to measure by examining a mean score of observed variables; 2) with multiple indicators being used to measure latent constructs, SEM allows for measurement error in models; and 3) SEM allows the estimation of direct effects in structural models (Kline, 2011). SEM has been utilized in violence research and is known for its rigor and comprehensive investigation of constructs (Campbell, Greeson, Bybee, & Raja, 2008; Coker, Watkins, Smith, & Brandt, 2003; Wang et al., 2012). Additionally, SEM enables mediation to be modeled and measured in a precise way (Kenny, Kashy, & Bolger, 1998). Mediation allows one to hypothesize by what means an independent variable affects a dependent variable (Preacher & Hayes, 2008). Mplus will be used to complete the SEM analysis (Muthen & Muthen, 1998-2012).

Model Identification and Sample Size

Model identification is completed to examine if a mathematically unique estimation of the model can be made (Kline, 2011, p. 93). The equation to decide if the model is over-identified¹² is $DF = \text{Number of Knowns} - \text{Number of Unknowns}$. To compute the number of knowns the following formula is used: $V(V+1)/2$, with

¹² The goal is to have an over-identified model verse an under-identified ($DF < 0$) model or just-identified ($DF = 0$). An over-identified model is found when $DF > 0$.

V=observed variables. The number of unknowns is computed through summing the error variances, factor variance, paths and correlations of the model. Table 3 shows the calculations for the model identification for the proposed model (Seen in Figure 5).

Table 3

Model identification calculations

	<u>Number of Knowns</u>	<u>Number of Unknowns</u>	<u>Degrees of Freedom</u>
Formula	$V(V+1)/2$	Error Variances+ Factor Variances+ Paths+ Correlations	Number of Knowns- Number of Unknowns
Total	$15(15+1)/2= 120$	$15+1+11+9=36$	$120-36=84$ Over-identified

Recommendations by Shah & Goldstein (2006) and Kline (2011) state that a sample size greater than 200 cases is required to conduct SEM. In addition, the authors state that acquiring a sample greater than 200 is optimal when analyzing a complex model. For this, the recommendation of an ideal 20:1 ratio is given, with 1 representing the item and 20 your sample size. For this proposed study there is a 19:1 ratio, which demonstrates we have a sufficient sample size to run the proposed model on.

Structural Equation Modeling

SEM will be used to investigate the mediated relationship between the constructs. The maximum likelihood procedure will be used for all estimates as it provides a robust response to violations to normality and handles model estimation with missing data by

estimating means and intercepts (Peters & Enders, 2002). The following steps will be taken to complete the analysis:

1. *Testing of measurement model.* During this stage an iterative process is followed to estimate and specify a sufficient model. The first step is to evaluate model fit, which will allow one to determine how well the model explains the data. If the model does not fit well, respecification will need to occur until satisfactory model fit is found. The goodness of fit between the hypothesized model and sample data is assessed by four fit indices. These are: χ^2 , CFI, TLI and RMSEA. Table 4 summarizes the fit indices for assessing and comparing model fit. Once a satisfactory model fit is found, then estimated parameters are interpreted and compared with the sample covariance matrix.
2. *Testing of structural mediated model.* Once a measurement model has sufficiently been estimated, the next step is to examine the structural model. This step is a three stage process: (1) Testing direct effects; (2) Testing of indirect effects; and (3) testing of the final mediation model (Preacher & Hayes, 2008). The same fit indices will be utilized for testing the structural model as were used in testing the measurement model (Table 4).
 - a. *Testing of direct effects.* In this step the relationship between the independent and dependent variables are evaluated (Figure 6). This step establishes that there is an effect that may be mediated.

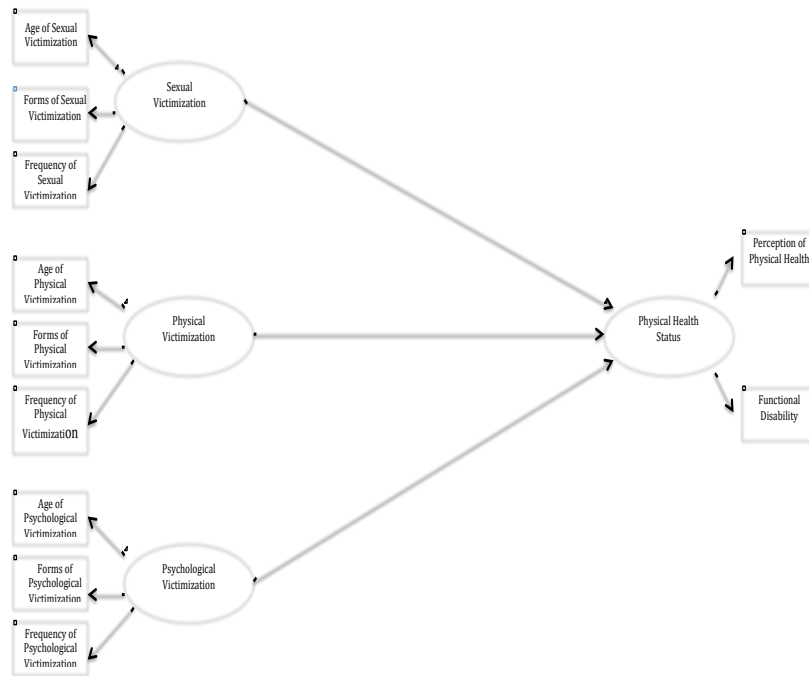


Figure 6. Testing of the independent and dependent variables.

b. *Testing of indirect effects.* During this step, the relationship between the mediators and the independent and dependent variables are examined separately (Figures 7 & 8). When examining indirect effects in mediation models, previous research supports bootstrapping techniques over previous methods (i.e. Baron and Kenny, 1986; Shrout & Bolger, 2002). Bootstrapping more precisely assesses indirect effects in mediation models while not assuming normal distribution of indirect effects (MacKinnon, Lockwood, & Williams, 2004; MacKinnon, Lockwood, Hoffman, West, & Sheet, 2002; Preacher & Hayes, 2008).

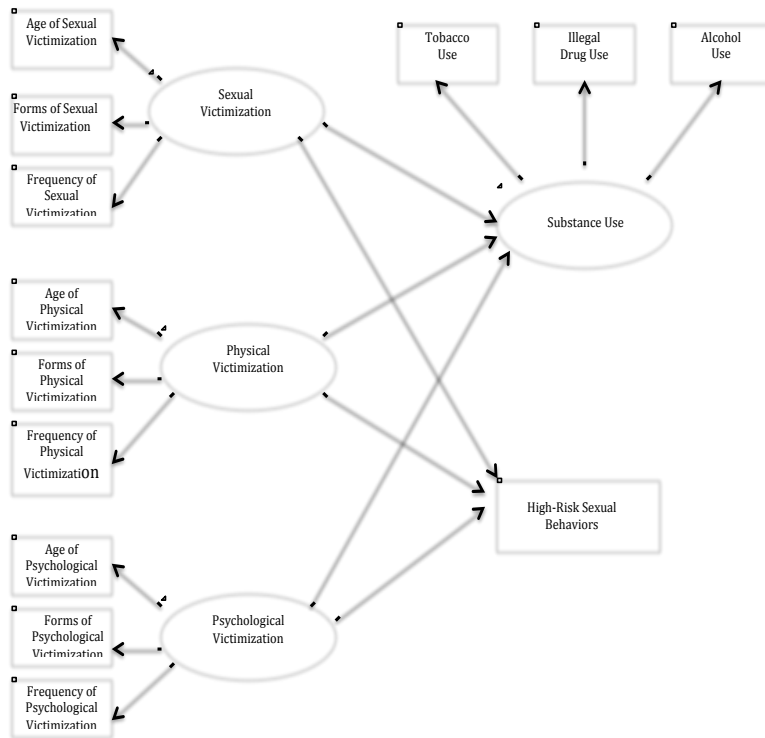


Figure 7. Testing of the independent variables and mediators.

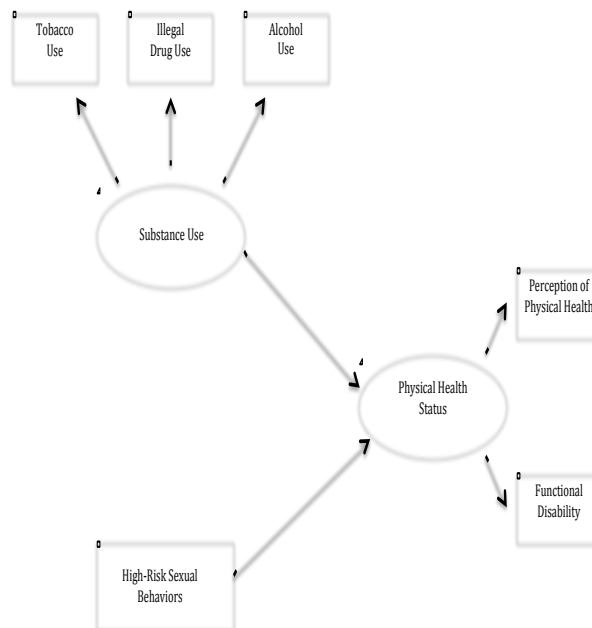


Figure 8. Testing of the mediators and dependent variables.

c. *Testing of final mediation model.* Direct, indirect and total effects will be calculated. Indirect effects will be considered significant if the bias corrected and accelerated bootstrapping confidence intervals do not include zero (CIs set at 95% from 5000 bootstrap samples; Preacher & Hayes, 2008).

Table 4

Fit Indices for Assessing Model Fit

<u>Measures of Model Fit</u>	<u>Meaning</u>	<u>Acceptable Fit</u>
Chi-squared (X_M^2)	$X_M^2 = (N - 1)F_{ML}$ <p>F_{ML} = statistical criterion (fit function) minimized in ML estimation, which is compared with the model degrees of freedom (df_M)</p>	Not sig.
Comparative Fit Index (CFI)	$CFI = 1 - \frac{X_M^2 - df_M}{X_B^2 - df_b}$	$\geq .95$, good fit $\geq .90$, adequate fit
Root Mean Square Error of Approximation ($RMSEA$)	$RMSEA = \sqrt{\frac{X_M^2 - df_M}{df_M (N - 1)}}$	$\leq .05$, good fit $.05-.08$, adequate fit
Standardized Root Mean Square Residual ($SMSR$)	$SMSR$ = a measure of the overall difference between the observed and predicted correlations	$< .08$, good fit

CHAPTER IV

RESULTS

This chapter presents the procedures and results for the data analyses. First, the descriptive statistics for the sociodemographic variables are presented. These are followed by the descriptive statistics of the measures for the study. Additionally, missing data and steps taken to address missingness, skewness, and homoskedacity are discussed throughout. The next section details the relationship between the mediating and dependent variables. Lastly, the results of the SEM analysis are presented.

Descriptive Statistics

Sociodemographics (Table 5)

The average age of participants was 37.3 years (SD=10.18, Range 19-69). Their races/ethnicities mirrored the population of women on probation and parole in the area, with most reporting they were White (50.5%) or African American/Black (41.6%). Lastly, 88% (n=333) reported some form of childhood victimization and 96.3% reported intimate partner violence (Table 6). Concerning relationship status, the majority of the women reported that they were single (43.8%) or divorced, separated, or widowed (38.2%). Approximately 29% of the women worked part- or full-time; the remaining 71% reported not working for a variety of reasons (i.e. disability). In terms of education, 36% of the women had a high school diploma or GED. Over one-third of the women

considered themselves homeless (34.0%) and over half had been in a controlled environment during the past year (57%). The majority of women were on probation (75.6%), while 22.7% were on parole, and a small percentage (1.7%) reported being on both probation and parole.

Table 5

Sociodemographic characteristics: Mean/percentage, standard deviation, and observed range (n=406)

<u>Indicator</u>	<u>Mean (SD)/ Percentage</u>
Age	
Range 19-69	37.2 (10.24)
Race	
African American	41.60%
White	50.50%
Other	7.60%
Partner Status	
Single	43.80%
Married/Living with partner of opposite sex	16.50%
Divorced/separated/widowed	38.20%
Educational Attainment	
Less than a high school diploma/GED	27.10%
GED/HS diploma	36.00%
Trade School	3.40%
Some college/college degree	30.00%
Some graduate school/graduate degree	3.20%

Work Status	
Unemployed	39.70%
Working	28.80%
Disabled	20.20%
Student	3.70%
Other	6.40%
Homeless	34.00%

Table 6
Victimization Experiences (n=406)

<u>Experience</u>	<u>Percentage</u>
Childhood Victimization	
Psychological	75.90%
Physical	63.60%
Sexual	38.20%
Intimate Partner Violence	
Psychological	94.90%
Physical	90.40%
Sexual	52.70%

Childhood Victimization

Descriptives were examined for eight childhood psychological victimization items, four childhood physical victimization items and three childhood sexual victimization items (Table 7). Seventy-five percent of the women reported that as a child some form of psychological abuse had been perpetrated against them. A majority of the women (62%) reported a caretaker insulting, shaming or humiliating them in front of others, and 55% stated a caretaker had treated them like they were stupid or inferior and/or called them names in private. Further, 43% of the women reported as a child a caretaker deliberately keeping them from participating in extra-curricular activities, 36% reported having a caregiver destroying something they cared about on purpose, and 25% of women reported being threatened with physical harm if they did not give a caretaker money, other belongings, or not doing something the caretaker wanted them to do. The remaining categories represented a smaller proportion of the women in the sample.

In regards to childhood physical victimization, 63.8% of the women reported that as a child, a caregiver physically hurt them. The most experienced form of physical victimization (62%) was a parent or caretaker physically hurting the individual on purpose (including grabbing, slapping, burning, scalding, punching, choking, throwing one around, or harshly spanking). The second most frequent form of physical victimization was a caregiver beating them up (37%), followed by being attacked with a weapon and they were afraid the caregiver would injure rape or kill them (26%), and 14% stated that a caregiver has used a gun or knife to get something from them.

In terms of childhood sexual abuse, 38% of the women reported this in their victimization history, with an average frequency of .79 (a little less than a few times per

year). Specifically, 33% of the women reported that a caregiver had forced or threatened them to do sexual things other than sexual intercourse, 23% reported a caregiver had forced or threatened them to have sexual intercourse and it actually happened and 20% stated that a caregiver had forced or threatened them to have sexual intercourse but it did not actually happen.

Overall, of the three childhood victimization categories (psychological, physical, and sexual), 43% of women reported only having psychological child victimization, 32% reported only experiencing physical violence as a child, and 3.4% reported only experiencing child sexual victimization. Three variables were created for each of the three categories of victimization (psychological, physical and sexual): 1) Number of forms of experiences; 2) Age of first experience; and 3) Frequency of experiences (Refer to Table 2 in Chapter III).

Table 7

Childhood Psychological Victimization (n=406)

Victimization occurring to the participant during childhood by parent/caretaker	
	<u>Percentage</u>
1. Treated you like you were stupid or inferior and/or called you names in private	54.70%
2. Insulted, shamed or humiliated you in front of others	61.60%
3. Withheld food as punishment	18.70%
4. Banned or locked you in a room, a cellar, or car for a day or longer as a punishment	20.70%

5. Deliberately kept you from participating in extracurricular activities that you wanted to do on a regular basis	43.10%
6. Destroyed/hurt something you cared about on purpose	35.50%
7. Frightened repeatedly by being followed, phoned or showing up where you were located	24.60%
8. Threatened to hurt you if you did not give money, jewelry, jacket, or shoes, or do something they wanted you to do	62.10%

Childhood Physical Victimization (n=406)

	<u>Percentage</u>
1. Physically hurt on purpose	62.10%
2. Beat you up	36.70%
3. Used a knife or gun or other form of weapon to take something from you	14.00%
4. Attacked with a weapon in hand	26.10%

Childhood Sexual Victimization (n=406)

	<u>Percentage</u>
1. Forced or threatened sexual actions other than sexual intercourse	33.00%
2. Forced or threatened to have sexual intercourse but it did not occur	20.00%
3. Forced or threaten to have sexual intercourse and it actually happened	22.40%

In regards to the count variables that identified the totality of experiences amongst each victimization category, the range for psychological victimization was 0-8, 0-4 for physical victimization and 0-3 for sexual victimization¹³. For those who reported

¹³ In this section, reporting zero forms of the type of victimization is not reported, as it is reported above in the general victimization descriptive and is the opposite number of those who did report any type of the victimization.

experiencing psychological victimization, 16% reported experiencing one form, 13% experienced four forms and 12% stated they had experienced three forms. All other counts, independently accounted for less than 10% of those who experienced childhood psychological victimization, with 4% experiencing all eight forms. Count variables for childhood physical victimization revealed 22% stated they experienced one form, 19% two forms, 13% three forms and 10% all four forms. Lastly, in terms of childhood sexual victimization, the most common was experiencing two forms (18%), followed by 11% experiencing one form and 10% reporting all three forms of the category.

Next, the age of first victimization experience for each of the categories was examined. The range for all categories of victimization was 1-16 years of age. In regards to first psychological victimization event, the mean age was 6.4 years old. Physical victimization had a mean age of 7.6 years old and sexual victimization was 8.2 years old.

Lastly, frequency of victimization experiences was examined through computation of an aggregate score to look at how recurrent the category of victimization occurred during the participant's childhood. For all victimization categories, the scores ranged zero to six, with 0= never occurring, 1=once or twice in their life, 2=a few times a year, 3=once or twice a month, 4=once or twice a week, 5=once a day and 6=more than once a day. Psychological victimization occurred on average 1.4 times during childhood, physical victimization was experienced at a frequency of 1.2 times and women reported sexual victimization occurring .79 times across childhood.

Health Risk Behaviors¹⁴ (Refer to Table 2 in Chapter III).

In regards to substance use, regular tobacco and alcohol use were examined, as well as a cumulative count of illegal substance use. The mean amount of years women regularly used tobacco was 17 years (SD=12 years) with a range of 0-60. Forty-nine (12%) of the women in the sample did not regularly use tobacco for any time period. A majority of the women (70%) in the sample had regularly used tobacco at least ten years.

Women in the sample regularly used alcohol to intoxication on average 7.5 years (SD=10.24 years) with a range of 0-47.1 years. Fifty-nine percent of the women reported using alcohol regularly to intoxication for some period of time, with 20% of the sample using alcohol to intoxication for greater than 14 years.

On average, women in the sample used on average four illegal substances with a range of 0-10 substances (Table 8). Most commonly, 17% of the women used three substances, followed respectively by one and four both at 11%. Only 7% of the sample had never used any of the ten illegal substances, and 4% of the women had used all ten. Respondents reported an average age of first use around 20 years old, with the regular use of substances lasting approximately 8 years.

¹⁴ The sample descriptives are reported for the complete sample of 406 women.

Table 8

*Number of Illegal Substances Used
(n=406)*

<u>Number of Substances</u>	<u>Percent (n)</u>
0	6.9% (28)
1	11.3% (46)
2	10.6% (43)
3	16.7% (68)
4	11.3% (46)
5	10.6% (43)
6	9.4% (38)
7	8.9% (36)
8	6.2% (25)
9	3.9% (16)
10	4.2% (17)

The second health risk behavior that was examined was high-risk sexual behaviors. The HIV partner risk index was an aggregate score ranging from 0-4. The mean score was .71, with 48% (N=195) reporting no partner risk. Further, the number of sexual partners was examined. On average women reported having 30 sexual partners, with a range of 0-300. 70% of the women reported having 10 or more sexual partners. The number of years of sex trading was examined, and 35.5% reported ever trading sex. The average number of years for sex trading was 2.6.

Physical Health Status

The general health rating index ranged from 0-4, with 0 being “excellent” and 4 being “poor” (Table 10). Women in the study reported a mean general health rating of two, which is “good”. Specifically, 7% reported “excellent”, 19% reported “very good”, and 41% reported “good”. The remainder of the women reported “fair” (27%) or poor (7%) health.

In terms of functional disability, a cumulative score was utilized combining seven different variables that assessed physical limitations (i.e. walking, bending and vigorous activity). The mean for the final scale was 4.77, with a range of 0-14. This reveals that none of the women in the sample had every physical limitation for greater than a 3 month timespan. An independent review of the variables demonstrated that across all seven of the variables approximately 50% of the women reported no limitation in the specific physical activity (Table 9).

Table 9

Functional Disability Rating by Type of Activity (n=406)

	<u>Percent (n)</u>
Vigorous Activity (i.e. lifting heavy objects, running or participating in strenuous sports)	
Not at all	47.6% (193)
Limited for 3 months or less	18.7% (76)
Limited for more than 3 months	33.7% (137)
Moderate Activity (i.e. moving a table, carrying groceries or bowling)	
Not at all	53.4% (217)
Limited for 3 months or less	20.2% (82)

Limited for more than 3 months	26.4% (107)
Walking uphill or climbing a few flight of stairs	
Not at all	51.7% (210)
Limited for 3 months or less	21.7% (88)
Limited for more than 3 months	26.6% (108)
Bending lifting or stooping	
Not at all	51.4% (205)
Limited for 3 months or less	22.9% (93)
Limited for more than 3 months	25.6% (104)
Walking one block	
Not at all	64.3% (261)
Limited for 3 months or less	14% (57)
Limited for more than 3 months	21.7% (88)
Eating, dressing, bathing, or using the toilet	
Not at all	73.4% (298)
Limited for 3 months or less	10.6% (43)
Limited for more than 3 months	16% (65)
Working at a job, doing work around the house or going to school	
Not at all	60.6% (246)
Limited for 3 months or less	12.3% (50)
Limited for more than 3 months	27.1% (110)

Skewness, Kurtosis and Missing Data

Overall, the variables were normally distributed. No problematic skewness (>3) or kurtosis (>10) values were identified. Missing data values were never greater than 5%. Full maximum likelihood estimation was utilized to handle missing data. This process is

iterative, allowing it to capture the uncertainty in the estimates, and determines the likelihood for parameter values (Kline, 2011; Muthen & Muthen, 2012; Peters & Enders, 2002). Given the data, maximum likelihood determines the possibility for different parameter values to identify the values with the maximum likelihood. This method provides unbiased parameters and standard errors (Muthen & Muthen, 2012; Peters & Enders, 2002).

Bivariate Analysis

Bivariate analysis was conducted to examine correlations among all model variables. This analysis allows for determination of whether there is enough variation among model variables in the current study, as well as examines levels of multicollinearity and multivariate outliers (Table 10) (Tabachnick and Fidell, 2007). Overall, findings indicate that some of the data were sufficiently correlated, while other data was not (correlations loading less than .30 and/or non-significant at the .05 level) (Tabachnick and Fidell, 2007). Extreme high correlations ($>.700$) did exist between some of the victimization variables (i.e. count of physical victimization experiences and frequency of physical victimization). As stated, there were variables not significantly correlated and have limited relationships with other variables in the model. Based on these bivariate findings, specifically related to the mediator variables, additional substance use and high-risk sexual behaviors were evaluated, as potential alternative indicators for inclusion in the SEM model. The most promising alternatives were number of years of regular use of marijuana and number of years of sex trading (As seen in Table 10). At this time the decision was made to retain all proposed variables, due to the study being exploratory in purpose and the robust nature of SEM.

Table 10

Correlations Among Model Variables ($n=333$)

	<u>Sex: Age</u>	<u>Sex: Frequency</u>	<u>Sex: Forms</u>	<u>Physical: Form</u>	<u>Physical: Age</u>	<u>Physical: Frequency</u>	<u>Psychological: Form</u>	<u>Psychological: Age</u>	<u>Psychological: Frequency</u>	<u>Partner HIV Risk</u>	<u>Years of Sex Trading</u>	<u>Number of Illegal Substances</u>	<u>Years of Marijuana Use</u>	<u>Years of Alcohol to Intoxication</u>	<u>Years of Tobacco Use</u>	<u>General Health Rating</u>	<u>Functional Disability</u>
Sex: Age	1																
Sex: Frequency	-.230**	1															
Sex: Forms	-.223*	.988**	1														
Physical: Form	-.089	.497**	.506**	1													
Physical: Age	.453**	-.209**	-.210**	-.384**	1												
Physical: Frequency	-.089	.495**	.502**	.999**	-.386**	1											
Psychological: Forms	-.076	.541**	.544**	.798**	-.333**	.798**	1										
Psychological: Age	.395**	-.150*	-.147*	-.267**	.750**	-.265**	-.245**	1									
Psychological: Frequency	-.075	.541**	.545**	.796**	-.335**	.796**	.992**	-.260**	1								
Partner HIV Risk	-.029	-.080	-.075	.022	.081	.021	-.037	.011	-.041	1							
Years of Sex Trading	.013	.052	.050	-.049	.076	-.049	-.005	-.020	-.008	.016	1						
Number of Illegal Substances	-.050	-.046	-.050	-.084	-.062	-.084	-.067	-.042	-.073	.211**	.197**	1					
Years of Marijuana Use	.017	-.010	-.026	.006	-.083	.008	-.017	-.041	-.012	-.096	.237**	.212**	1				
Years of Alcohol to Intoxication	-.016	.070	.064	.096	-.156*	.094	.157*	-.067	.163**	-.106	.369**	.182**	.510**	1			
Years of Tobacco Use	-.145	.097	.086	.078	-.176**	.080	.107*	-.082	.110*	-.126*	.219**	.232**	.409**	.441**	1		
General Health Rating	-.154	.071	.083	.139**	-.134*	.141**	.209**	-.179**	.210**	-.050	.086	.095	.082	.174**	.187**	1	
Functional Disability	-.100	.059	.050	.126*	-.110	.126*	.174**	-.085	.178**	-.027	.070	-.020	.126*	.089	.116*	.318**	1

** $p \leq .01$; * $p \leq .05$

Structural Equation Modeling

Structural equation modeling (SEM) was utilized for the multivariate data analysis, as it is the methodology that is best suited for studying the mediated relationship between constructs (Barron and Kenny, 1986; Kline, 2011). SEM has an underlying goal of identifying “a unique set of parameters consistent with the data” (Byrne, 2009, p.35). As described in Chapter 3, model identification, model estimation and respecification, final model fit and testing of mediation will be discussed below.

Model Identification

The focus of model identification is to determine whether or not a unique set of parameters exist that is consistent with the data (Kline, 2011). SEM uses the variance-covariance matrix, which is based on the observed variables, to identify and fit the model. Models may be underidentified, just-identified or overidentified¹⁵. The counting rule is used to identify a model through calculating if the number of free parameters is less than or equal to the number of observations. An overidentified model occurs when the total number of known data points exceeds the parameters (or unknowns) to be estimated. In the case where the number of known data points is equal to the parameters to be estimated, the model is just identified. Lastly, an underidentified model is when the parameters to be estimated are less than the known data points. As stated in Chapter III, the proposed model is overidentified (Table 4) allowing it to calculate a number of unique estimates for each of the free parameters, which means we can precede forward conducting SEM (Kline, 2011).

¹⁵ There is also the chance of having an unidentified model, meaning that unique solutions for the values of the parameters of the model are not found. In other words, there is not a sole unique solution and the model cannot be tested.

It is a goal in SEM analysis for each latent construct to have at least three observed variables to identify it. In some cases, an exception to this rule is made when there are only two observed variables on a latent construct, but this can only occur when the complete model still remains over-identified. For the present SEM analysis, a factor loading of one was set for each group of observed variables onto a latent construct. This observed variable that is set to one for each latent construct is known as the marker variable (Kline, 2011). This procedure allows a scale to be set that helps in model identification. The marker variables for each latent construct were selected based on high inter-item correlations, as well as a theoretical understanding of the relationships, with other variables (Kline, 2011). For the present study, marker variables included: childhood physical victimization frequency and regular alcohol use to intoxication. Additionally, error terms were set to one for all models. There were no issues identified with model identification.

Testing of Measurement Model

The maximum likelihood (ML) procedure was used for all estimates as it provides a robust response to violations to normality and handles model estimation with missing data by estimating means and intercepts (Peters & Enders, 2002). ML is the most common form of estimation and is an iterative process whereby the values with the maximum likelihood that fit the data are found (Tabachnick & Fidell, 2007; Barron & Kenny, 1986).

Model estimation and respecification. In fitting the measurement model, five models were respecified in order to identify the best quantitative and substantively meaningful model. In the following section this process is detailed.

Results of the proposed initial model (Figure 9) identified Heywood cases, thus the results of the model cannot be interpreted. A Heywood case occurs when a standardized loading is larger than one and the error variance is negative. Possible causes of Heywood cases include: (1) bad prior communality estimates; (2) too many common factors; (3) too few common factors; (4) not enough data to provide stable estimates; or (5) the common factor model is not an appropriate model for the data. Based on this finding, and the bivariate analysis, it seems that there are too few common factors in the model. Although all variables were retained at the conclusion of the bivariate analysis based on theoretical underpinnings, the multivariate analysis demonstrates a need for model respecification. Probable solutions for Heywood cases include: (1) treat as specification error and modify the model; (2) create a non-linear constraint on the loading to prevent it from being too large; or (3) fix the standardized loading to one (Barron & Kenny, 1986). Again, considering the bivariate and multivariate findings, it seemed that in this case there are possible specification errors and model modifications should be considered. Respecification occurs through an iterative process, with making a sole change to the model at a time, based on the empirical and theoretical underpinnings of the model (Barron & Kenny, 1986).

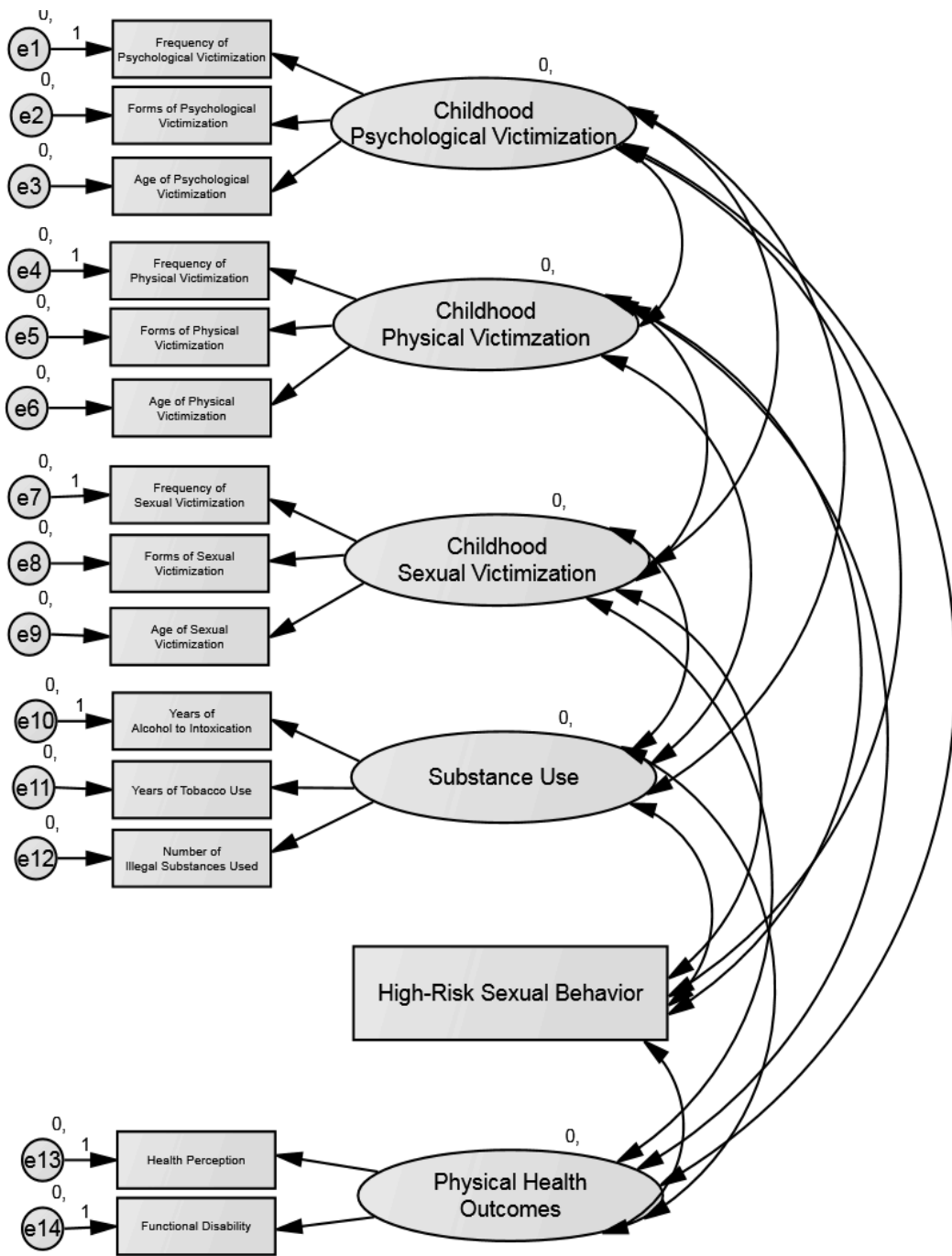


Figure 9. Initial Measurement Model. No statistics presented as there were Heywood Cases and results cannot be interpreted.

It was a hope of the research to capture the uniqueness that is provided by measuring victimization three different ways (i.e. frequency, count of forms, and earliest age). While this was the case, based on the bivariate findings stated earlier in the chapter and the Heywood cases finding, it was important to investigate this section of the model for respecification. The model began with three independent latent constructs (sexual, physical and psychological victimization), each having three variables loaded onto them (frequency, age, and count of forms). Based on the variability in the data there did not seem to be reason enough to retain all three variables in the model. Although, measuring victimization experiences through different forms has been encouraged in the literature and is conceptually important for the variability it conveys (Finkelhor, Ormrod & Turner, 2009; Finkelhor, Ormrod & Turner, 2007), it was evident that the model would not be able to retain all variables. After the analysis of multiple models, it was decided to retain frequency of victimization for each type of victimization, as it provided the best relationship with other factors in the model. This resulted in three independent items being placed on a sole latent construct.

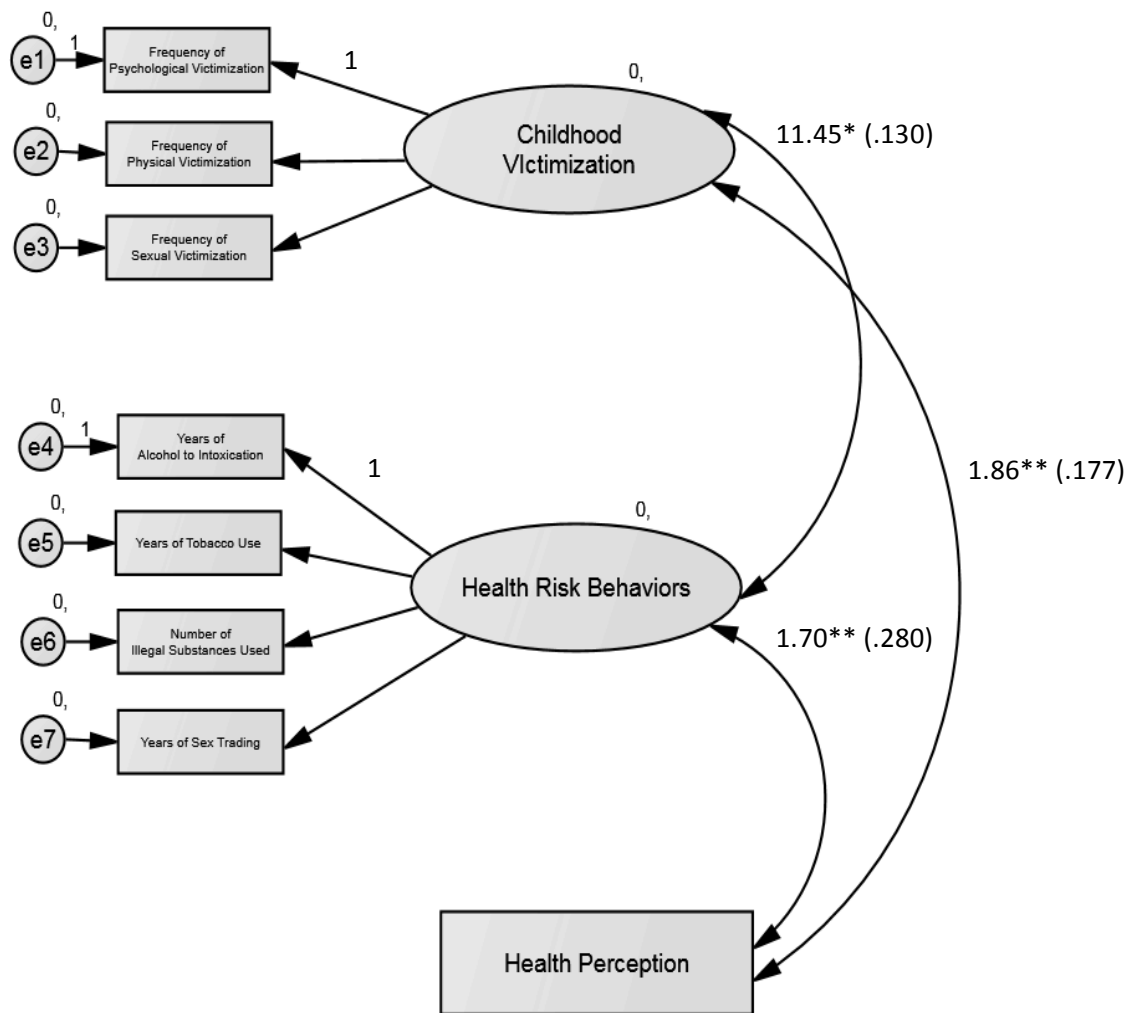
Results of the model revealed poor model fit: $\chi^2 = 307.446$, $p = .000$; TLI = .009; CFI = .532; RMSEA = .227; SRMR = .0496. All variable factor loadings were .400 or higher, except for functional disability loading onto physical health (.247). The decision was made to remove this indicator from the model, and make the general health rating an observed variable for the outcome.

Following this modification to the model, there was an improvement in fit, but overall the model was still a poor fit: $\chi^2 = 42.87$, $p = .000$; TLI = .827; CFI = .938; RMSEA = .100; SRMR = .0611. After considering the empirical data (i.e. not strong

correlations between the different types of childhood victimization and the two mediating pathways), as well as a theoretical understanding of the constructs, the decision was made to place the victimization indicators onto one latent childhood victimization construct.

This change resulted in minimal improvements to model fit, resulting in a still poor fitting model: $\chi^2 = 53.97$, $p = .000$; TLI = .878; CFI = .930; RMSEA = .084; SRMR = .064. Based on the empirical data, the HIV partner risk index was not correlating well with the other constructs and indicators in the model, as well as it had an estimate of .712. Theoretically, it was important to capture high-risk sexual behavior in the model, as it is an integral part in understanding the role of health risk behaviors in mediating the relationship between childhood victimization and physical health outcomes. Based on both the empirical data and the desire to model build, a single behavioral pathway (health risk behaviors) was constructed that combined the substance use and high-risk sexual behavior.

Again, the change to the model resulted in minimal improvements to model fit: $\chi^2 = 55.042$, $p = .000$; TLI = .892; CFI = .930; RMSEA = .079; SRMR = .0657. At this time consideration of alternative variables to measure the constructs was considered. The HIV partner risk index loaded onto the behavioral pathway very poorly (.003). As stated above, based on previous understanding it is important to capture the high risk sexual behavior in the model. The decision was made to remove the HIV partner risk index and add the variable “number of years of sex trading” on the behavioral pathway (Figure 10).



** $p \leq .01$
 * $p \leq .05$
 $X^2(18) = 26.46, p = .090$
 CFI = .985
 TLI = .976
 RMSEA = .038, p-close = .730

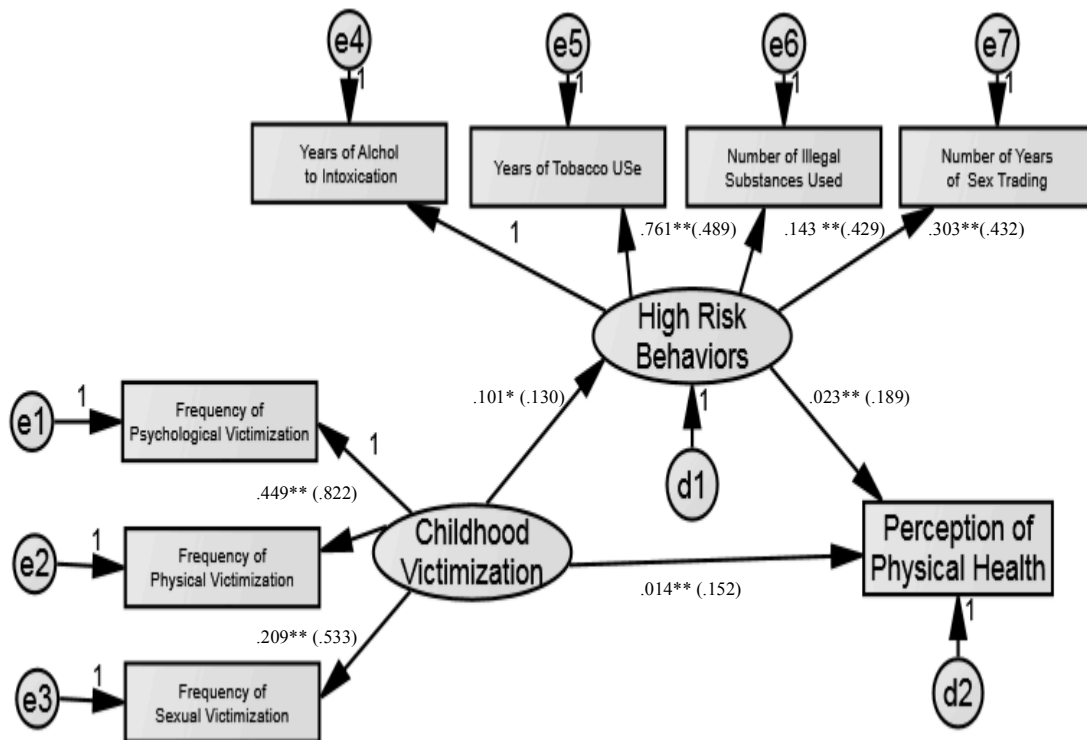
Figure 10. Final Mediation Model Following Respecifications.

This resulted in a significant improvement to model fit. The respecified model now had adequate fit: $\chi^2 = 26.459$, $p = .090$; TLI = .976; CFI = .985; RMSEA = .038; SRMR = .0505. Lastly, correlations amongst the constructs were all significant at the .05 level.

Testing of Structural Model

The structural model tested the relationship between childhood victimization and physical health status when mediated by the behavioral pathway, which contained substance use and high risk sexual behavior variables (Figure 11). The model fit was adequate: $\chi^2 = 26.459$, $p = .090$; TLI = .976; CFI = .985; RMSEA = .038; SRMR = .0505. All paths were significant at the .05 level. The findings of the model indicate that there is a direct effect of childhood victimization on perception of physical health, with every one unit of increase in childhood victimization resulting in .014 increase in worse health perception, when controlling for health risk behaviors¹⁶. Additionally, childhood victimization had an effect on health risk behaviors, there was a .10 increase in health risk behaviors for every one unit of increase in childhood victimization. In terms of the relationship between the health risk behavioral pathway and perception of physical health, for every unit of increase for health risk behaviors there was a .02 increase in negative health perception when controlling for childhood victimization.

¹⁶ Reported estimates are unstandardized.



** $p \leq .01$
 * $p \leq .05$
 $\chi^2(18) = 26.46, p = .090$
 CFI = .985
 TLI = .976
 RMSEA = .038, p-close = .730

Figure 11. Structural Model presenting unstandardized regression coefficients (standardized estimates provided in parenthesis).

Examination of direct and indirect effects of childhood victimization on health risk behaviors and physical health were examined (Table 11). Specifically, the indirect effect was examined to see if health risk behaviors mediate the effect of childhood

victimization on physical health perception. The findings indicate partial mediation, with health risk behaviors accounting for 12.5%¹⁷ of the variance in the relationship between childhood victimization and health perception.

Table 11

Direct and Indirect Effect of Childhood Victimization on Health Risk Behaviors and Physical Health

	Childhood Victimization		Health Risk Behaviors	
	<u>Direct</u>	<u>Indirect</u>	<u>Direct</u>	<u>Indirect</u>
Health Risk Behaviors	.101*	---	---	---
Physical Health	.014**	.002**	.023***	---

*** $p \leq .01$; ** $p \leq .05$; * $p \leq .10$

Lastly, to test the study's replicability, bootstrapping procedures were performed. Bootstrap resampling is a non-parametric method of resampling with replacement that is supported in mediation research (Barron & Kenny, 1986; Shrout & Bulger, 2002). It is suggested that between 1000 to 5000 iterations be completed in order to assure replicability of the mediation model, where for each iteration the indirect effect is calculated and a sampling distribution is empirically generated (Mallinckrodt, Abraham, Wei, & Russell, 2006). Bootstrapped confidence intervals were set at 95%. For the current study, 5000 iterations were able to run, which assures the stableness and replicability of the mediation model.

¹⁷ The statistical equation for mediation is the indirect effect (C) divided by the total effect of X on Y, when not accounting for the mediators (AB). The equation is: AB/C , $.002/.016 = .125$ or 12.5%.

CHAPTER V DISCUSSION

The aim of the present research was to examine health risk behaviors (substance use and high risk sexual behavior) as potential mediators in the relationship between childhood victimization and health outcomes in adulthood for women involved in the criminal justice system. The current findings are suggestive of a relationship between childhood victimization and health outcomes in adulthood, which is partially mediated through the engagement in health risk behaviors. These findings build on prior research, while also highlighting important ways the relationships may differ in this particularly marginalized population. This chapter will discuss the research findings, as well as implications for practice and policy, and conclude with a discussion of limitations and directions for future research.

Study Findings

The current analysis demonstrates that a relationship exists between childhood victimization, health risk behaviors, and adult physical health in women involved in the criminal justice system. Specifically, health risk behaviors explained 12.5% of the variance in the relationship between childhood victimization and physical health outcomes in this sample of women. Arguably, these life experiences make women involved with the criminal justice system one of the most neglected and marginalized populations in the United States. Exploring these findings, as well as previous research

with women involved in the criminal justice system, will elucidate the unique needs of these women in regards to their childhood experiences, health risk behaviors, and health in adulthood.

Relationship between Childhood Victimization, Health Risk Behaviors and Adult Health

From the results of the current model we know three relationships exist in a sample of women involved in the criminal justice system. The relationships are the following: (1) the frequency of childhood victimization is linked to the rate of engagement in health risk behaviors; (2) the frequency of childhood victimization is connected to poor health in adulthood; and (3) the rate of engagement in health risk behaviors is associated with poor health in adulthood. Thus, childhood victimization does have a relationship with the engagement in health risk behaviors and physical health in adulthood among women involved in the CJ system. Specifically, as the frequency of childhood victimization increased so did the rate of engagement in health risk behaviors (high risk sexual behavior and substance use) and poorer health ratings were recorded. This demonstrates that even amidst other adversities and life circumstances, childhood victimization often plays a role in substance abuse and HIV risk behaviors, as well as impacts one's health into adulthood. Additionally, there is an important connection between the engagement in health risk behaviors and physical health in the sample, with increased engagement in the behaviors resulting in worse health perception. If the period of time women are involved in the criminal justice system is better utilized to provide greater access to public health and health care services there is the potential to improve the well-being of a population who record some of the worst health outcomes in the U.S.

(Messina& Grella, 2006). When considering women in the criminal justice system, to not consider the impact of previous trauma from childhood victimization experiences through trauma-informed care misses a piece of the complex puzzle of meeting this vulnerable population's needs.

While the above relationships are informative, the primary aim of the current research was to investigate if health risk behaviors help explain a portion of the variance in the relationship of childhood victimization and adult physical health. The current analysis revealed partial mediation, with a 12.5% mediation effect by health risk behaviors on the relationship between childhood victimization and physical health in adulthood, which is the first time this relationship has been fully explored in women involved in the criminal justice system. Portions of the relationship between childhood victimization, health risk behaviors, and physical health outcomes has been previously explored. In a sample of criminal justice involved women, Messina and Grella (2006) found that self-rated health status was lower when women had experienced one or more adverse childhood experiences, with 29% to 42% rating their health as fair/poor. They also found that this sample was more likely be diagnosed with a sexually transmitted disease and use substances (i.e. tobacco and alcohol) (Messina & Grella, 2006). The research by Messina and Grealla (2006) support the findings of the current study in establishing a relationship between childhood victimization, health risk behaviors, and physical health outcomes in criminal justice involved women and emphasize the unique relationship that exist amongst the constructs. In the case of women involved in the criminal justice system, it may be difficult to identify the order of these experiences, as there are higher rates of all life experiences throughout the life course. While Kendall-

Tackett's (2013) behavioral pathway provides a minimal amount of variance explained by health risk behaviors, there are strong relationships between the constructs that exist and may provide insight into the experiences of women involved in the criminal justice system. This illustrates that there are unaccounted factors (i.e. social and cognitive factors) that may contribute to the relationship between childhood victimization and associated health outcomes. The intersectionality of these life experiences perpetuates health disparities in this population and continues to further marginalize criminal justice involved women. Lastly, the exposure to experiences, such as childhood victimization, should be explored as it elucidates how experiencing early trauma may affect one throughout the life course.

Childhood Victimization in Women Involved in the Criminal Justice System

Exposure to childhood victimization has been found to be higher in criminal justice involved women than in the general population (Bloom, Owen, & Covington, 2004). Although, women in the sample were selected based on victimization experiences, the study findings indicate troubling rates of childhood victimization, supporting the need to consider the effects of trauma on the individual, as well as probable sequelae, when treating women in the criminal justice system. In the current study, 88% of the sample experienced some form of childhood victimization. Specifically, the women in the current study had high rates of physical (63.6%) and sexual (38.2%) victimization when compared to a national sample. This built on prior research by Messina and Grella (2006) that found that 77% to 90% of women in criminal justice system report histories of emotional, physical, and sexual abuse (Messina, Burdon, & Prendergast, 2003; Pollock, 2002). Overall, the rates of victimization experienced by women in the criminal justice

system are considerably higher than a national sample (Finkelhor, Turner, Shattuck, & Hambry, 2014). Childhood victimization may result in many inequities throughout the life course. Knowing the potential negative effects victimization has on the individual's life, it is evident that this high rates of sexual and physical victimization must be considered when working with criminal justice involved women.

Considering the gender pathways perspective, for many women the initial exposure to victimization places them on a pathway that includes psychological distress, future victimization experiences, high rates of engagement in substance use, poor physical health, and criminal justice involvement (Covington, 2007; Widom & Ames, 1994). Thus, the experience of victimization in and of itself is harmful, but furthermore it is carried around with the individual throughout their life course, which Kendall-Tackett captures in her proposed pathways, and impacts one's physical and mental health. Previous research illustrates that childhood victimization and severity of addiction are strong predictors of involvement in criminal activity and physical health problems, and the relationship between these constructs is stronger for women than men (Bloom et al., 2004; Messina, Grella, Burdon, & Prendergast, 2007). This means that a majority of the women who are involved in the criminal justice system are coming with a history of trauma that needs to be assessed and considered when developing interventions for this population. Addressing these high rates of victimization experiences in criminal justice involved women is potentially targeting some of the most rudimentary causes of social and health problems.

Health and Health Risk Behaviors of Women Involved in the Criminal Justice System

Generally, women involved in the criminal justice system constitute a medically complex population that is under-studied and under-served. In addition to having a higher rate of comorbid diseases and poorer health, women involved in the criminal justice system typically lack service to medical care, have less social support (be it formal or informal), and worse mental health outcomes resulting in the complex medical status of this population. Similar to previous research, the current study found worse health and higher engagement in health risk behaviors in this population. The current analysis found that in the sample of women there were a third that rated their health fair/poor, almost half who engaged in sex trading behavior, and a majority who engaged with some form of substance abuse across their life course.

The current analysis revealed that 33.7% of the women reported fair/poor health. Considering this and research by Marquart, Brewer, Mullings, & Crouch (1999), which found women involved in the criminal justice system are three times more likely to report poor health than women in the general population, it is evident that this population is disproportionately affected by negative health. The poorer health rating by the women in the current sample may be attributed to other health factors, such as functional disability, specific health conditions and engagement in health risk behaviors across the life course.

Functional disability ratings were captured for seven activities, such as independently getting dressed and walking up a flight of stairs. The portion of the sample that was limited in their activity level for more than three months ranged 16% (eating, dressing, bathing or using the toilet) to 33.7% (vigorous activity, such lifting heavy

objects or running). These disabilities are often linked to specific health problems (i.e. diagnosis of chronic illnesses or past injury) and impact the individual for the remainder of their life. Many women are entering the criminal justice system needing assistance and continuous medical care, but due to the structure and monetary issues they remain underserved and under supported in managing their medical needs. If appropriate care and treatment are not received it is probable these women will live with poorer quality of life and for limited amount of years, fueling health disparities between populations of women. Understanding the necessity of need for health care in the women who are involved in the criminal justice system should fuel a response of action to better the health of those who are already within our reach of care.

Previous research has identified a multitude of diseases (i.e. sexually transmitted diseases) and chronic illnesses (i.e. diabetes) occurring at higher rates among women involved in the criminal justice system (Binswanger, Krueger & Steiner, 2009; Binswanger, Merrill, Krueger, White, Booth, & Elmore, 2010; Dumont et al., 2012; Wilper, et al., 2009). In the present study, 2.7% women reported being diagnosed with HIV or AIDS. Previous research has shown HIV prevalence is approximately five times higher for those involved in the criminal justice system when compared to a general population, and women show even higher rates than their male counterparts (2.4% verse 1.5%) (Bond & Semaan, 1996; Dumont, Brockmann, Dickman, Alexander, & Rich, 2012). This number is alarming as HIV/AIDS has implications on the quality and quantity of life for the individual. Furthermore, it weakens the immune system, making the individual vulnerable to other diseases. Treatment of this disease must remain consistent and can be very costly to the individual, which may be troublesome for those

involved in the criminal justice system. HIV/AIDS has looming social issues, as it can be spread through high-risk sexual behavior and needle sharing, with both behaviors occurring at higher rates in women involved in the criminal justice system than the general public (Dumont, Brockmann, Dickman, Alexander, & Rich, 2012). While HIV was not a variable in the model, the rate of diagnosis may have contributed to higher rates of functional disability and lower ratings of general health, and provides a contextual understanding of the general health status of this population of women. HIV/AIDS and other health complications are only further compounded by the lack of health care access prior to involvement with the criminal justice system. Previous research has shown that female offenders had limited health service utilization in the community and while incarcerated, women sought out medical services at a greater rate than men due to their increased medical needs (Pollock, 2002; Staton, Leukefeld, Logan, 2001; Staton, Leukefeld & Webster, 2003). As the U.S. attempts to eradicate health disparities and improve the health of all Americans, there would be benefit in examining its healthcare services provided to criminal justice involved women across the spectrum, those in a controlled and community environments.

In regards to high risk sexual behaviors, in the current sample of women 41.4% of the women recorded sex trading during their lifetime and on average they engaged in this behavior for approximately six years. Women who experienced victimization during their childhoods often find themselves trading sex for money, food, shelter, and drugs. Not surprisingly, sex trading is linked to a multitude of sexually transmitted diseases, including HIV, as well as a higher rate of exposure to violence (Epperson, Khan, Miller, Perron, El-Bassel, & Gilbert, 2010). Women in the study also reported other high risk

sexual behaviors, such as having sex with injection drug users (7.9%), using drugs or alcohol before intercourse (22.6%), and having intercourse with someone they met the same day (13.1%) during the previous six months. Furthermore, instead of involvement in the criminal justice system protecting women, research has demonstrated they are exposed to new health risks (i.e. high-risk sexual behavior and needle sharing for tattooing) (Beckwith, Zaller, Fu, Montague & Rich, 2010; Pinkerton, Galletly & Seal, 2007; Pouget, Kershaw, Niccolai, Ickovics & Blankships, 2010; Rosen, Schoenback, Wohl, White, Stewart, & Golin, 2009). In light of the study findings and previous research, it should be a focus of the system to eradicate exposure to health-harming experiences. Specifically, providing social support and employment opportunities for these women would provide alternate routes to sex trading and improve the health and wellbeing of the population.

Another health risk behavior that is common among women involved in the criminal justice system is substance use, and maybe especially tobacco use. In the present sample, 77.8% reported tobacco use in the last six months, which is substantially higher than the 15.3% of women in the general population who reported using tobacco in 2013 (“CDC Tobacco Fact Sheet”, 2014). In previous research with criminal justice involved women, Messina and Grella (2006) found that 77%-86% of women involved in the criminal justice system who experienced at least one childhood experience was a current smoker. Smoking, although harmful to the body, is an early coping behavior selected by many to manage stress and anxiety with many individuals becoming nicotine dependent over time (Brady & Sinha, 2005; Morissette, Tull, Gulliver, Kamholz, & Zimering, 2007). Thus, considering the life course of many women who become involved in the

criminal justice system, it is of no surprise that our sample has a much higher rate of tobacco use. Research by Anda et al. (1999) found an increased risk of smoking behavior in individuals exposed to adverse childhood experiences. Tobacco use is of great concern due to it decreasing years of life lived by 14 years, as well it being the leading cause of preventable illness in the U.S. (“CDC Tobacco Fact Sheet”, 2014). Thus, based on the rate of tobacco use and the known outcomes, it is not surprising that this group of women often experiences worse physical health outcomes than the general population.

Use of other substances told a similar story as tobacco use in the current sample of women involved in the criminal justice system. In regards to alcohol use, 94.6% reported ever consuming alcohol, with 71.2% stating they had used alcohol to intoxication in the past. More alarming, the women in sample stated they used alcohol to intoxication on average for 11 years. Previous literature showed a common finding, with 78% of women reporting using alcohol prior to criminal justice involvement (Staton, Leukefeld, & Webster, 2003). Furthermore, illicit drug use was high in this sample of women, with 93.1% of the sample reporting ever using one or more illicit drugs. Twenty percent of sample had injected drugs, with 12% having shared injection drug equipment. Injection drug use is often linked to negative health outcomes, such as HIV, so this high rate is of great importance when caring for the women involved in the criminal justice system. Overall, the numbers in regards to illicit drug use in the sample are seven or more times higher than a national average (Degenhardt et al., 2008). This high engagement in substance use is a unique part of the story for women involved in the criminal justice system.

Previous research helps capture the scope of substance use and/or abuse among women in the criminal justice system. Although varied, the estimates for those involved in the criminal justice system and meet the criteria for drug dependence are well above 50%, and this number is substantially higher for females (Binswanger, Krueger & Steiner, 2009; Freudenberg, 2001; James & Glaze, 2006). Previous research found that 90% of criminal justice involved women reported drug problems (Staton, Leukefeld, & Webster, 2003). Much like with tobacco use, alcohol and illicit substance use are often sought as coping mechanisms to manage stress and anxiety. Based on the gendered pathways perspective, women involved in the criminal justice system are often exposed to higher rates of childhood victimization and mental health illness, which both bring about stress and anxiety, as well higher engagement in substance use and worse health outcomes (Salisbury & Van Voorhis, 2009). More succinctly, the gendered pathways perspective suggests that women involved in the criminal justice system often experience psychological distress and mental illness (concepts captured in Kendall-Tackett's pathways), due to impoverished backgrounds and victimization experiences, and engage in self-medication as a means of coping (Browne, Miller, & Maguin, 1999; Covington, 2007; Daly, 1992; Salisbury & Van Voorhis, 2009; Widom & Ames, 1994). Specifically, drug-dependent criminal justice involved women are more likely to be diagnosed with chronic physical health problems (i.e. tuberculosis, anemia, diabetes and obesity) when compared to their male counterparts (Messina & Grella, 2006).

Understanding the interconnectedness of the relationships between life experiences and exposures to substance use is a pivotal piece in addressing substance use among this population. To this point, while it is evident that substance abuse is a large

and looming problem that women involved in the criminal justice system face, a lack of an appropriate response that matches the magnitude of the problem still awaits to be applied. Previous research has shown that as few as 15% of individuals, both men and women, involved in the criminal justice system receive drug treatment during incarceration (Belenko & Peugh, 2005; Chandler, Fletcher & Volkow, 2009; Fiscella, Pless, Meldrum & Fiscell, 2004), with even less women having access to drug treatment (less than 10%) (Freudenberg, 2002). Based on the current and previous research, there needs to be a policy and program shift to how the system responds to substance use in this population, as well as a commitment to meet the needs of all criminal justice system who struggle with substance abuse.

Policy and Practice Implications

The argument has been made that women involved in the criminal justice system compose one of the most misunderstood and vulnerable segments of our population, but health care, public health, and criminal justice systems have not adapted to meet the needs of these women. At this point the health care needs of justice-involved women have been virtually ignored (Covington, 2007; Freudenberg, 2002). Prior to their involvement with the criminal justice system, these girls and women often live a life disconnected from health care and public health services, which results in them entering into the criminal justice system with a multitude of medical problems (i.e. chronic conditions and sexually transmitted diseases) (Covington, 2007; Messina & Grella, 2006; Smith, Simonian, & Yarussi, 2006; Wattanaporn & Holtfreter, 2014). In order to prepare a response, it is important to acknowledge that low-income women with a history of victimization experiences, high rates of involvement in health risk behaviors and health

problems are enmeshed within the criminal justice system (Covington, 2007; Wattanaporn & Holtfreter, 2014). This results in a system that is designed to handle criminal behaviors, being involuntarily forced to undertake the responsibility of providing health treatment to women previously missed by the health and public health communities. Currently, in the conceptualization of interventions for criminal justice involved women, the disproportionate prevalence of physical health problems among this population is forgotten and assessment of potential predictors of physical health problems amongst these women could inform criminal justice policy. Practice and policy responses should be multi-fold, with primary, secondary, tertiary levels of intervention.

Primary and Secondary Level of Intervention

Current development in research has begun to recognize the vital role trauma plays in the evolution of physical, as well as mental, health problems (Covington, 2003; Covington, 2007; Felitti, et al., 1998). With this knowledge it is imperative to support an earlier, holistic response and target survivors of childhood victimization prior to them experiencing future risk factors (i.e. involvement in the CJ system). While this is not the primary focus of the research, as the current sample of women are involved in the criminal justice system, staying true to public health intervention it is important to note primary and secondary levels of intervention. Under the assumption childhood victimization will occur in our society, the primary area for intervention would be screening for childhood victimization in the health care setting, before the individual is engaging in health risk behaviors or involved in the criminal justice system. The secondary level of intervention would occur when the individual begins to engage in

health risk behaviors, such as high levels of substance use, but are yet to be involved in the criminal justice system.

Primary intervention. Screening for childhood victimization, along with other adverse childhood experiences, in the health care setting allows individuals to understand their health more deeply and enables practitioners know how to better treat patients. From routine screenings of victimization, education of parents about the effects of abuse can occur, more aggressive treatments of illnesses can be implemented, and multi-disciplinary teams can work with the child to help process the trauma, build resiliency and develop health coping behaviors. As adverse childhood experiences have proven to be the best predictor of health care utilization, health care costs, tobacco use, substance use, and illicit drug use, most of which were discussed earlier due to their higher rates in criminal justice involved women, it is critical to find a way to respond earlier to one of the biggest public health crisis facing us today (Felitti et al., 1998).

Secondary intervention. Based on the current findings of the research, two areas for secondary intervention are highlighted. The first targets the high rate of substance abusing women involved in the criminal justice system. Expansion of treatment programs for the addicted and mentally ill would help aid in reducing the continuous use of these substances, while supporting the individual's rehabilitation process. The hope would be to build positive coping skills, help women regain their lives, improve health, and keep women from involvement in the criminal justice system. This is an early, and important move, in allowing public policy and programming to take a step in separating substance use from criminal behavior.

The second intervention, aims to expand linkages between systems of care in the community. Resoundingly the point has been made in the current study and previous research that women involved in the criminal justice system have a lack of access to public health, healthcare, and many other social systems prior to their criminal justice involvement. Creating linkages between systems of care that reach some of the most vulnerable and underserved women in the population provides a way to eradicate health inequalities among populations, as well as protect some women from involvement in the criminal justice system. A cohesive system of care that supports an individual, through providing health insurance, food, healthcare, economic security, and employment would lift women out of a vulnerable state by bringing value to their life in new ways through protection of their health and well-being.

Tertiary Level of Intervention

Response to health and health risk behaviors. As the sample in the present study was composed of women involved in the criminal justice system, the tertiary level of intervention is discussed in great detail, as it discusses policy and practice implications for the criminal justice system. In *Estell v. Gamble* (1976), the U.S. Supreme Court ruled that a deliberate failure to provide adequate medical treatment to prisoners constituted cruel and unusual treatment (Applebaum, 2011). What is not captured in this ruling and still a struggle for the CJ system is how to evenly screen and treat this population of women. More recently, in 2011, *Brown v. Plata* framed health care as a fundamental task of the CJ system, due to the many marginalized and underserved individuals who become involved in the system (Dumont, 2012). While these rulings show federal support for the caring of the physical health needs of women involved in the criminal justice system, at

this time adequate health care while involved in the CJ system is limited due to cost, as well as the lack of knowledge on the unique health needs of the population.

Furthermore, not only is the involvement in the CJ system not helping to aid an underserved population in regards to their medical needs, research has revealed that involvement in the criminal justice system may be harmful to the individual. Involvement in the CJ system, specifically incarceration, contributes highly to unfavorable outcomes related to addiction, such as when individuals are released from the controlled environment they are more vulnerable to overdose (Dumont, et al., 2012). Additionally, former prisoners are 12 times more likely than the general population to die of any cause two weeks following release from a controlled environment and 129 more times likely to die from a drug overdose (Binswanger, Stern, Deyo, Heagerty, & Cheadle, 2007; Seaman, Brettle & Gore, 1998; Spaulding, Seals, McCallum, Perez, Brzozowski, & Steenland, 2011). This shows that these women are not receiving the needed services in regards to substance use, as well as mental health, while imprisoned and are often returning to high-risk behaviors that have health implications (Binswanger, Stern, Deyo, Heagerty, & Cheadle, 2007). Further, release from a controlled environment typically means an abrupt termination of medical care, due to a lack of comprehensive discharge planning or aftercare programming (Draine, Ahuja, Altice, Arriola & Avery, 2011; Freudenberg, 2001, Prendergast, Wellish, Falkin, 1995; Springer, Azar, & Altice, 2011, Wang, Hong, Samuels, Shavit, Sanders, & Kushel, 2010). This abrupt end of services can upset medicine regiments, treatments for chronic conditions, access to physicians, counseling for substance, as well as strip away services for other basic needs of the population. Many of these women are still involved in the criminal justice system through

community corrections (i.e. probation and parole), thus these women are still engaged in a system that can meet their physical health needs, as well as other services. Thus, no matter what level of involvement the women have with the criminal justice system, either in a controlled or community setting, this time should be seen as an opportunity to access a wide array of individuals, and communities (i.e. poor and ethnically diverse), that frequently do not have access to health and public health initiatives. By taking on this mindset through policy and program change, the criminal justice system could help to mitigate health disparities for the women it serves by linking the previously medically underserved to healthcare services.

In response to the growing body of research that has identified the needs of criminal justice involved women, programs have been developed to target specific health behaviors and health outcomes. Four examples of policy and program change are presented here, and should be considered by other states.

1. In the state of Massachusetts a partnership between the health department and county jails provides coordinated jail and community health and social services, assistance in receiving medical benefits, and ongoing post-release case management and primary health care services (Conklin, Lincoln & Flanagan, 1998; Hammett, Roberts, Kennedy, 2001).
2. Rhode Island mandated routine HIV testing for all prisoners, which then resulted in a diagnosis of one-third of all people known to have HIV in the state. These individuals were able to be educated on the

disease, as well as receive the needed medical treatment because of this screening policy (Desai, Latta, Spaulding, Rich, & Flanigan, 2002).

3. A prison in New York State offers education on HIV prevention, health education, and post-release counseling services (Bouldin, 1993; Hammett, Roberts, Kennedy, 2001).
4. Health Link, a program specific for women leaving New York City jails, delivers health education, and case management during incarceration and a year post-release focused on reducing drug use, HIV risk behavior and risk of rearrest (Richie, Freudenberg, & Page, 2001).

In summary, programs should consider including the following: (1) integration of drug treatment, health care, social services, mental health care; (2) prerelease and post-release services; (3) partnership amongst criminal justice system, public health agencies, health care system and community organization.

Response to high rates of childhood victimization in criminal justice involved women. While increasing health and public health programming is important for the criminal justice system, it is also vital that the criminal justice system considers the victimization history and relevant sequela of the women they are serving. To not consider the experience of childhood victimization would result in not fully treating the health disparities, as well as other outcomes, seen in this population of women. The criminal justice system must consider that women offenders more commonly report higher rates of childhood victimization, addiction, chronic physical health conditions, as well as trauma in adulthood, higher rates of posttraumatic stress disorder, homelessness and mental health problems (Bloom, Owen, & Covington, 2004; Grella, Stein, & Greenwell, 2005;

Messina, Burdon, & Predergast, 2003; Messina & Grella, 2006; Zlotnick et al., 2008).

Trauma-informed gender responsive treatment (GRT), such as Helping Women Recover and Beyond Trauma, identifies the importance of trauma experiences in women's psychological development and attempts to avoid triggering trauma reactions in women, support women's coping capacity, and gives room for women to manage their trauma to access, engage and benefit from services (Covington, 2008; Grella, 2008; Harris & Falot, 2001). The curriculum includes elements of addiction and trauma theory, with a desire to promote psychological growth and prosocial behaviors (Covington, 2008). Both Helping Women Recover and Beyond Trauma are excellent programs that consider the victimization history of women in the criminal justice system, but unfortunately these programs forget the disproportionate prevalence of physical health problems in this population and do not provide curriculum to help combat the negative health outcomes (Messina, 2006). Thus, combining policy and programming changes as suggested above around health and health risk behaviors with programs such as Beyond Trauma could significantly better the health, physical and mental, of women involved in the criminal justice system, as well as limiting further trauma to this population of women.

Limitations

A number of limitations in the current research should be acknowledged. A discussion of these limitations follows.

Sampling Limitations

Participants for the Women's Health Research study were sampled based upon their victimization experiences (both childhood and adult). Additionally, the current research study utilized a more specific subsample of those who experienced childhood victimization. Due to this limitation the findings of the study cannot be generalized to a non-victimized population, or even a population who only experienced victimization in adulthood. Similarly, the sample only included women who were involved in the criminal justice system through probation and/or parole. The findings of the current research should only be applied to women involved in the criminal justice system. Future research should look to include those who have not experienced childhood victimization and those not involved in the criminal justice system, as this would provide comparison samples and allow for the identification for unique relationships between constructs among populations. This would allow the research to assess if similar relationships exist between the study constructs (childhood victimization experiences, health risk behaviors and physical health outcomes in adulthood) in a random sample of women.

Cross-sectional Design and Assumptions of Causality

Due to the nature of cross-sectional designs, the study is not able to make causal inferences amongst the study constructs. Cross-sectional designs gather their data at a single moment in time, thus limiting the amount of information one can infer about the cause-and-effect relationship, which is better captured in longitudinal studies. In the case of the current research study, it is impossible to conclude that childhood victimization experiences cause the rates of engagement in health risk behaviors and physical health outcomes in adulthood, or that the rates of engagement in health risk behaviors cause the

health outcomes in adulthood. Thus, it is recommended that future research should look to conduct longitudinal studies examining the causal relationships between the constructs.

Use of Retrospective Measures of Childhood Victimization

Retrospective designs look backward and examine exposure to probable risk, or protective, factors in an individual's life. In the present study, childhood victimization was measured retrospectively. In childhood victimization research, retrospective designs are commonly used, with the measures relying on the study participants' ability to recollect on past experiences. Research has identified good discriminant validity and predictive efficiency on self-reported victimization measures by adult survivors of childhood victimization (Widom & Shepard, 1996). In addition, retrospective studies are less costly and time consuming to conduct when compared to prospective studies (Hardt & Rutter, 2004). Lastly, adult reports of childhood victimization would not require mandated legal reporting, thus potentially allowing participants to report more honestly on their previous victimization experiences. Disadvantages of using such designs include recall bias, memory distortions, recollection of childhood events being shaped by succeeding experiences, and vagaries of memory due to mood and/or emotion (Hardt & Rutter, 2004; Widom & Morris, 1997; Widom & Shepard, 1996). Specifically, it is feared that childhood victimization details (i.e. age of first experience and frequency) can be distorted. Thus, these retrospective design limitations should be considered when interpreting the findings of the present analysis. Future research should consider the use of prospective longitudinal research design, which is critical to establishing causal relationships (Widom & Morris, 1997; Widom & Shepard, 1996).

Directions for Future Research

As the number of women involved in the criminal justice system continues to grow and remains underserved by health and public health initiatives, future research around their unique life experiences, prior to and during criminal justice involvement, is warranted. As there were significant relationships between childhood victimization, health risk behaviors and physical health in the present study, future research should continue to examine the relationship between these constructs, while considering other factors. Considering Kendall-Tackett's additional pathways, cognitive, emotional, physiological and social paths, would be an intuitive next step for this research. Specifically, as much of the literature hints at, these pathways may be potential mediators in the engagement of health risk behaviors and health outcomes in this population who are survivors of childhood victimization. Specifically, consideration of the emotional pathway should be given. Other research should consider examining similar outcomes among a non-victimized population of women involved in the criminal justice system. Lastly, future research should look at victimization experiences across the life course and cumulative victimization and the effect on health outcomes in women involved in the criminal justice system.

Summary and Conclusion

The present study identified that relationships exist between childhood victimization, health risk behaviors and health in the sample of women involved with the criminal justice system. Unfortunately for women who experienced higher levels of childhood victimization they had increased rates of engagement in health risk behaviors and rated their physical health poorer. Further, the study found that the relationship

between childhood victimization and perception of physical health was minimally mediated by the engagement of health risk behaviors. This is somewhat of a surprising finding, but this could be due to the severity of childhood victimization experiences by the women in the sample, and for much of those involved in the criminal justice system. It was found that this sample of women experienced many of the negative life experiences (i.e. substance abuse and negative physical health outcomes) that had previously been established in the literature. Public policy and program development must address the trauma experiences and physical health needs of criminal justice involved women. Future research should further explore the relationship between these contextual factors and others, especially the emotional pathway and cumulative victimization.

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CURRICULUM VITA

Tanya Rae Renn

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EDUCATION:

University of Louisville, Louisville, KY

Graduation: May 2015

Kent School of Social Work

Doctorate of Philosophy in Social Work

University of Louisville, Louisville, KY

Graduation: May 2011

Kent School of Social Work

Master of Science in Social Work

University of Louisville, Louisville, KY

Graduation: May 2011

School of Public Health and Information Sciences

Master of Public Health

Wofford College, Spartanburg, SC

Graduation: May 2007

Bachelor of Science, Psychology; Minor, Sociology

RESEARCH EXPERIENCE:

University of Louisville, Kent School of Social Work

May 2011- Current

Graduate Research Assistant

Worked on all aspects of the Women's Health Research Grant, awarded by the National Institute on Drug Abuse (R01DA027981), under the supervision of Dr. Seana Golder (PI). The longitudinal research study examines the relationship among victimization, mental and physical health, substance use, and the health seeking process. Roles included recruitment, interviewing research participants, data cleaning and multivariate data analysis.

University of Louisville, School of Public Health and Information Sciences-

Summer 2011

Research Assistant

Worked with Dr. Muriel Harris to complete a needs assessment for the population of individuals served by the Tamale Teaching Hospital (Tamale, Ghana). Based on one of the WHO Millennium Health Goals, the focus of this research was maternal and child health in the area. Met with the Ghanaian Regional Director of Health, Chief of Tamale Teaching Hospital, employees at the Navrongo Research Center, multiple non-profit organizers, and chiefs and members of the local communities.

Center for Health Equity

August 2009- August 2010

Men's Health Network Intern

Collected and analyzed data for the Men's Health Initiative and African American Men's Empowerment Network in preparation for creating an effective and efficient program to empower African American men towards seeking healthcare.

SPARK Researched-Based PE, San Diego, CA

Fall 2008- May 2010

Data Collector and Data Analyst

Worked in Jefferson County elementary schools (Louisville, KY) collecting data on the physical education system for the SPARK PE program. Completed data analysis and managed data systems.

TEACHING EXPERIENCE:

University of Louisville, Kent School of Social Work

Fall 2012- Current

Adjunct Lecturer

- Taught *Human Behavior in the Social Environment I and II* to master level students in consecutive Fall and Spring semesters.
- Created syllabi and weekly sessions that emphasized NASW core competencies.
- Taught using a mixture of formats (e.g. web-based discussions, critical thinking exercises)
- Advised students on potential specialty areas and populations of interest.
- Attended sequence meetings to collaborate over assignments, CSWE core competencies and further development of the sequence.

University of Louisville, Kent School of Social Work

Fall 2013- Current

Adjunct Lecturer

- Taught *Biology for the Social Sciences* to bachelor level students at the Kent School of Social Work during both Fall and Spring semesters.
- Designed syllabus and course content to highlight NASW core competencies.
- Recruited guest lecturers to speak on relevant course material.
- Attended seminars at the University of Louisville Delphi Center for Teaching and Learning to develop new teaching skills (i.e. ways to bring technology into the classroom)

FIELD EXPERIENCE:

Baptist Hospital East, Neurological Rehabilitation Unit

Kent School of Social Work Practicum Student

August 2010- May 2011

Worked as a student intern on the neurological rehabilitation unit. Functioned as part of an interdisciplinary team collaborating with physicians, nurses, and physical, speech and occupational therapists to care plan for patients. Completed psycho-social assessments, facilitated team and family conferences to develop and evaluate plan of care, and advocated for patients with health insurance agencies, occupational and disability claims.

University of Louisville, Kidney Disease Program

Kent School of Social Work Practicum Student

August 2009- May 2010

Performed psychosocial assessments, including Kidney Disease Quality of Life Surveys and Beck Depression Inventories. Participated as an active member in patient care plan meetings.

RELEVANT EXPERIENCE:

Scottie's Place: Wilderness Therapy for Underprivileged Youth

Summer Program Director

Summer 2008

Assisted the CEO with the development and implementation of programming for summer camps that combined academics and wilderness therapy for inner city, homeless youth.

Scottie's Place: Wilderness Therapy for Underprivileged Youth

Counselor

Summer 2004, Summer 2006

Taught team building, anger management and trust activities. Set up a network system for programming.

PUBLICATIONS:

Peer Reviewed Publications

Golder, S., Hall, M. T., Logan, T., Higgins, G. E., Dishon, A. J., **Renn, T.**, & Winham, K. (2013). Substance use among victimized women on probation and parole. *Substance Use and Misuse, 49(4)*, 435-447.

Washington, K., Bowland, S., Mueggenburg, K., Pederson, M., Otten, S., & **Renn, T.** (*In press*). Learning to facilitate advance care planning: The novice social worker's experience. *Journal of Teaching in Social Work*.

Winham, K. M., Engstrom, M., Golder, S., **Renn, T.**, Higgins, G.E., & Logan, T. (*In press*). Childhood victimization, attachment, psychological distress, substance use among women on probation and parole. *American Journal of Orthopsychiatry*.

Under Review

Winham, K. M., Golder, S., Brown, A., **Renn, T.**, Higgins, G. E., & Logan, T. (2014). Psychological and social predictors of HIV risk behaviors among victimized women on probation and parole.

Manuscripts in Preparation

Renn, T., Golder, S., Winham, K., Brown, A., Logan, T. (2014). Examining psychosocial factors' effect on physical health and service utilization among a sample of victimized women on probation and parole. Manuscript in preparation.

Winham, K. M., **Renn, T.**, Hall, M. T., Golder, S., Higgins, G. E., & Logan, T. (2014). A latent class analysis of childhood victimization and intimate partner violence among women on probation and parole: Examining mental health and health risk behaviors. Manuscript in preparation.

Winham, K. M., Golder, S., **Renn, T.**, Higgins, G. E., & Logan, T. (2014). Correlates of sex trading in victimized women on probation and parole. Manuscript in preparation.

Brown, A., Golder, S., **Renn, T.**, Winham, K., Higgins, G. E., Logan, T. (2014). Attachment, coping, childhood victimization, and substance use among victimized women on probation and parole. Manuscript in preparation.

PRESENTATIONS:

Renn, T., Golder, S., Dishon, A., Winham, K.M., Higgins, G.E., & Logan, T. (November 2014). *Health behaviors and health outcomes in female childhood victimization survivors on probation and parole*. Accepted for presentation at the American Society of Criminology, San Francisco, CA.

Winham, K.M., Golder, S., **Renn, T.**, Higgins, G.E., & Logan, T. (November 2014). *Correlates of sex trading in victimized women on probation and parole*. Paper accepted for presentation at the American Society of Criminology, San Francisco, CA.

Renn, T., Golder, S., Winham, K.M., Dishon, A., Higgins, G.E., & Logan, T. (November 2014). *Health risk behaviors and health outcomes in women on probation and parole: Finding group differences among those who and who had not experienced child victimization*. Accepted for presentation at the American Public Health Association, New Orleans, LA.

Renn, T., Golder, S., Winham, K.M., Dishon, A., Higgins, G.E., & Logan, T. (October, 2014). *Childhood victimization, health behaviors and health outcomes in adulthood: A mediated relationship*. Accepted for presentation at the Council on Social Work Education, Tampa, FL.

Winham, K.M., Golder, S., Sar, B.K., Higgins, G.E., **Renn, T.**, Hall, M.T., & Logan, T. (October 2014). *The structure of posttraumatic symptoms in victimized women on probation and parole*. Accepted for presentation at the Council on Social Work Education, Tampa, FL.

- Winham, K., Golder, S., **Renn, T.**, Higgins, G., & Logan, T. (February, 2014). *Victimized Women on Probation and Parole: Understanding Substance Use, Attachment and Distress*. Paper presented at the Academy of Criminal Justice Sciences, Philadelphia, PA.
- Renn, T.**, Golder, S., Dishon, A., Winham, K., Logan, T., & Higgins, G. (November, 2013). *Examining psychosocial factors' effect on physical health and service utilization among victimized women on probation and parole*. Poster presented at the American Society of Criminology, Atlanta, GA.
- Winham, K., **Renn, T.**, Dishon, A., Golder, S., Higgins, G., & Logan, T. (November, 2013). *Examining HIV Risk Behavior in Women on Probation and Parole: Social and Psychological Predictors*. Paper accepted for presentation at the American Society of Criminology, Atlanta, GA.
- Dishon, A., **Renn, T.**, Winham, K., Golder, S., & Logan, TK. (November 2013). *Psychological Distress, Self-Esteem, and ChildVictimization: A SEM Mediation Model*. Paper presentation at American Society of Criminology, Atlanta, GA.
- Renn, T.**, Golder, S., Dishon, A., Winham, K., Logan, T., & Higgins, G. (October, 2013). *Examining psychosocial factors' effect on physical health and service utilization among victimized women on probation and parole*. Paper accepted for poster presentation at the American Public Health Association, Boston, MA.
- Renn, T.**, Golder, S., Winham, K., Dishon, A., Logan, T., & Higgins, G. (October, 2013). *A preliminary investigation of health decision-making among a sample of women on probation and parole through structural equation modeling*. Paper accepted for poster presentation at the American Public Health Association, Boston, MA.
- Winham, K., Dishon, A., **Renn, T.**, Golder, S., Higgins, G., & Logan, T. (September, 2013). *Victimized women on probation and parole: Understanding attachment and distress*. Paper presented at the Institute on Violence, Trauma, and Abuse Conference, San Diego, CA.
- Renn, T.**, Golder, S., Winham, K., Dishon, A., Logan, T., & Higgins, G. (June, 2013). *A preliminary investigation of health decision-making among a sample of women on probation and parole through structural equation modeling*. Paper accepted for presentation at the International Conference on Social Work in Health and Mental Health, Los Angeles, CA.
- Dishon, A., Winham, K., **Renn, T.**, Golder, S. (November 2012). *Involvement in substance use among women on probation and parole: An attachment and coping perspective*. Paper presentation at American Society of Criminology, Chicago, IL.

Dishon, A., **Renn, T.**, Winham, K., Golder, S. (July 2012). *Attachment, coping, and substance use among women on probation and parole*. Paper presentation at the International Family Violence and Child Victimization Research Conference: University of New Hampshire School of Law.

Dishon, A., **Renn, T.**, Golder, S., Logan, T., & Higgins, G. (November 2011). *A descriptive analysis of lifespan victimization among women on probation and parole: Preliminary data and findings from the Women's Health Research Study*. Paper accepted for presentation at *Ending Domestic & Sexual Violence: Innovations in Practice and Research Conference*, University of New Hampshire.

COMMUNITY ENGAGEMENT:

Scottie's Place, Peterstown, WV

Board Member; Chairman of the Board

2011-Current

- Facilitated collaboration between Americana Community Center (Louisville, KY) and Scottie's Place to have the first annual summer camp experience for refugee children who have relocated to the US.
- Co-wrote grants to create sustainable programming for domestic and international program.
- Aided in ongoing program design focusing on the infusion of resiliency programming for youth in the domestic and international (Dukwi Refugee Camp, Botswana) programs.

VaxTrac, Louisville, KY

Board Member

March 2014-Current

- Collaborate with other board members to identify potential global partners to increase the utilization of the fingerprint technology to track vaccination records in third world countries.
- Attend bi-annual meetings to review budget, allocate funds received by the Bill and Melinda Gates Foundation and identify potential funding opportunities.
- Strategize ways to create sustainable programming within the medical clinics in the countries VaxTrac is currently working in (i.e. Benin and Nepal).

SERVICE:

University of Louisville

2008 Master of Public Health Student Government Association
First Year Service Chair

2008 School of Public Health and Information Sciences
Alternative Spring Break Director

Wofford College

2003-2007 Bonner Scholar
Scholar (4 years)
Senior Intern (1 year)

HONORS:

University of Louisville

2011 Diabetes Interdisciplinary Program Participant
Selected to represent the M.S.S.W program in an interdisciplinary 4-week program that discussed techniques and provided field experience around working towards irradiating chronic illnesses through using an interdisciplinary approach in the healthcare setting.

University of Louisville, Kent School of Social Work

2011 Graduate Dean Citation

2015 Graduate Dean Citation

Wofford College

2003-2007 Zeta Tau Alpha Fraternity

2003-2005 Women's Soccer

2003-2005 Women's Track