ADVERSE CHILDHOOD EXPERIENCES:

PREDICTING CYCLICAL PATTERNS BETWEEN CHILDHOOD EXPERIENCES AND ADVERSE BEHAVIORS IN ADULTHOOD

By

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Abstract

Adverse Childhood Experiences (ACEs) are ten specific incidences occurring in childhood known to have deleterious impacts on an individual's life (Felitti et al., 1998). The more ACEs (i.e. abuse, neglect, household dysfunction) the worse the outcomes in several domains across the lifespan—chronic health conditions, mental health disorders, social problems, and high-risk behaviors. The aim of this study was to predict a cycling pattern of specific behaviors from childhood experiences to adult behaviors by collecting self-report survey data. Participants (N =212) reported ACEs before age 18 and five specific adverse behaviors endorsed after age 18 congruent with the ACE measure evaluating household dysfunction. Participants endorsing divorce, alcoholism or drug use, mental illness, or history of incarceration or domestic violence reflected a cyclic pattern of adverse behaviors. Cycling behaviors were summed to total a Cycling Score for participants quantifying the number of behaviors endorsed in adulthood. A linear regression showed a significant positive effect in the prediction of adverse adult behaviors endorsed by an individual who has ACEs, $F(1, 210) = 33.01$, $p < .001$. Predicting a cycle of ACE in an individual is a pivotal piece of research for early intervention, appropriating treatment, and disrupting the cycle of ACE to the next generation.

Keywords: adverse childhood experiences, cycle of ACE, generational transmission

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Chapter One: Introduction

Statement of the Problem: Impact of Adverse Childhood Experiences

The subject of adverse childhood experiences (ACE) is a continuing catalyst for vast avenues of research among medical and social science professionals. Two decades ago, Felitti et al. (1998) published "Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Death in Adults" and ignited a fury of investigation into the effects of ACEs, ultimately manifesting in disease and death. Ongoing research on the effects of ACEs on multiple domains of an individual is aimed at understanding the long-term impact imprinted from growing up in adverse conditions. As young children experience adversity and grow up in an environment of chronic or acute stress, they are susceptible to cognitive disruption, psychological challenges, neurobiological changes, psychosocial behaviors, and poor health which exacerbate negative effects on development, quality of life, and life course (Anda et al., 2006; Felitti et al., 1998; Jääskeläinen, Holmila, Notkola, & Raitasalo, 2016). Public health concerns, mental health impairment, increased psychotropic pharmaceutical utilization, rapidly inflating health care costs, and effects on the global population are impacted by ACEs (1998). Furthering the growing body of research is key in discovering and sustaining prevention and treatment measures, medically and psychologically.

Key Literature Review

Felitti et al. (1998) conducted the ACE study between 1995 and 1997 using data from over 17,500 adults within a Health Maintenance Organization (HMO) in Southern California. Through a medical lens, these researchers studied the relationship between adverse childhood experiences and subsequent health related problems. Felitti et al.

(1998) noted that patients presenting with chronic conditions such as emphysema, liver disease, and diabetes often endorsed health-risk behaviors such as smoking, drug and alcohol use, and overeating. These patients also often reported exposure to adverse experiences during childhood, prior to age 18, including abuse, neglect, or household dysfunction. An instrument known as the ACE measure was created by Felitti et al. (1998) and used to quantify the impact of negative experiences reported by these patients.

Developed by Felitti et al. (1998), the ACE measure is a 10-question survey used to gather self-report data on a patient's childhood experiences. Questions ask each respondent if he or she experienced physical, sexual, or emotional abuse, physical or emotional neglect, or household dysfunction such as witnessing parental domestic violence, parental separation or divorce, parental problematic drinking or substance abuse, parental mental illness or suicide, or parental incarceration prior to the age of 18. For every question the respondent answers yes, a score of one point is assigned. Points are added to create an ACE score ranging from 0 to 10. By quantifying the number of ACEs reported by the individual, researchers have tied many negative life outcomes involving maladaptive behaviors and chronic conditions correlated with ACE scores.

Using the ACE measure to quantify the number of adverse experiences, Felitti et al. (1998) published results concluding the more ACEs in a person's life, the more subsequent health risk behaviors they would endorse such as smoking, drinking, drug use, over eating, and multiple sex partners. These behaviors were known antecedents of health problems, and would potentially lead to a greater risk of developing chronic diseases resulting in poor quality of life and early mortality.

Felitti et al. (1998) report a graded correlation or graded-dose response between the number of adverse experiences during childhood and greater health risk behaviors. For many participants these behaviors manifest in myriad chronic health problems and diseases. Individuals reporting four or more adverse experiences reported increased rates of alcoholism, drug abuse, sexual partners, significantly low levels of physical activity, depression, and increased attempted suicides. The health implications of these behaviors include obesity, sexually transmitted diseases, ischemic heart disease, bone fractures, liver and lung diseases, and multiple types of cancers.

Felitti et al. (1998) report adults who experience more exposure to adverse conditions in childhood had significant health problems later in life. Adverse health conditions affect the individual, the family, the local population-base, and the global community. Documented risk factors of ACEs lead to poorer quality of life, higher pharmacy utilization, increased health care demands, and higher mortality rates (1998).

Research with a medical focus. Research on ACEs highlights health risks resulting in chronic conditions, lower quality of life, and premature mortality such as autoimmune disease (Dube et al., 2009), liver, lung, and heart disease (Anda, Brown, & Dube, 2008; Dong, Dube, & Felitti, 2003; Dong, Giles, Felitti, & Dube, 2004; Edwards, Anda, Gu, & Dube, 2007; Su, Jimenez, Roberts, & Loucks, 2015), diabetes (Felitti et al., 1998), sleep disturbances (Chapman et al., 2011), frequent headaches (Anda, Tietjen, Schulman, Felitti, & Croft, 2010), and multiple cancers (Brown et al., 2010; Kelly-Irving, Mabile, Grosclaude, Lang, & Delpierre 2013).

Research with mental health focus. Higher ACE scores are correlated with myriad mental health issues that often co-occur such as risk of depressive disorders and

suicide attempts (De Lissnyder, Koster, & De Raedt, 2012; Edwards, Holden, Felitti, & Anda, 2003; Fuller-Thompson, E., Baird, S. L., Dhrodia, R., & Brennedstuhl, S., 2016; Mersky, Topitzes, & Reynolds, 2013; Rossow & Lauritzen, 2001), anxiety and obsessive compulsive disorder (Dar & Iqbal, 2015; Mersky, Topitzes, & Reynolds, 2013; Munoz et al., 2018), eating disorders (Fairburn et al., 1998; Kinzel, Mangweth, Traweger, & Biebel, 1997), psychotic symptoms (Benarous et al., 2017; Brietzke et al., 2012; Jääskeläinen et al., 2016; Ullrich & Marneros, 2007) and prescribing psychotropic medications (Anda et al., 2007).

Research with social impact focus. Extensive research on social and vocational challenges due to ACEs provides insight into problems faced by individuals throughout the lifespan in multiple domains. Academic and vocational problems including decreased school success (Blodgett & Lanigan, 2018; Iachini, Petiwala, & DeHart, 2016), high school drop-out rates (Bethell, Newacheck, Hawes, Halfon, 2014), job loss and unemployment (Tam, Zlotnick, & Robertson, 2003), and homelessness (Herman, Susser, Struening, & Link, 1997; Tam, Zlotnick, & Robertson, 2003) appear in greater numbers among individuals reporting higher ACE scores. Interpersonal conflict is an outcome of higher ACE scores involving adolescent violence (Duke, Pettingell, McMorris, & Borowsky, 2010), juvenile recidivism (Wolff & Baglivio, 2017), intimate partner violence (Mair, Cunradi, & Todd, 2012), marital conflict (DiLillo, et al., 2009; Nguyen, Karney, & Bradbury, 2017; Whisman, 2006), parenting challenges (Hughes & Cossar, 2016), and attachment disruption (Frederick & Goddard, 2008).

Research with diverse cultural populations. Adverse childhood experiences affect global populations with culturally diverse settings such as China (Qin, Ma-Xia, Jie,

Wen-Xian, & Dong-Qing, 2008), Chile (Seiler, Kohler, Ruf-Leuschner, Landolt, 2016), Native American tribes (Koss et al., 2003), Iran (Mirlashari, Demirkol, Salsali, Rafiey, & Jahanbani, 2012), and Sweden (Giordano, Ohlsson, Kendler, Sundquist, & Sundquist, 2014). Research in sub-cultures within populations reflect even greater challenges with higher ACEs including deployed troops and military veterans (Cabrera, Hoge, Bliese, Castro, & Messer, 2007), LGBTQ individuals (Rauch, 2016), urban minorities (Mersky, Topitzes, & Reynolds, 2013), low income mothers (Marcenko, Kemp, & Larson, 2000), and prison inmates (Bowles, DeHart, & Webb, 2012; Will, Whalen, & Loper, 2014; Wolff & Baglivio, 2017).

Research of resulting high-risk behaviors. Developing research highlights relationships with ACEs and high-risk health behaviors. Higher ACE scores correlate with early and frequent endorsement of health risk behaviors such as use of illicit drugs, marijuana, and controlled substances (Forster, Grigsby, Rogers & Benjamin, 2018; Giordano et al. 2014; Mersky, et al., 2013; Rossow & Lauritzen, 2001), early tobacco use and lifetime smoking (Alcalá, von Ehrenstein, & Tomiyama, 2016; Elliott et al., 2014; Mersky, Topitzes, & Reynolds, 2013), alcoholism and early alcohol use in teens (Dube, Anda, Felitti, Edwards, & Croft, 2002; Elliott et al., 2014; Fuller-Thomson, Roane, & Brennenstuhl, 2016; Mersky, et al., 2013; Rothman, Bernstein, & Strunin, 2010), sexual behaviors that include multiple partners and early age of first intercourse (Belsky, Ruttle, Boyce, Armstrong, & Essex, 2015; Hillis, Anda, Felitti, Marchbanks, 2001; Hillis et al., 2004), over eating (Fairburn, 1998; Kinzel, 1997; McDonnell & Garbers, 2017), the propensity to engage in aggression and crime (Duke, Pettingell, McMorris, & Borowsky,

2010; Wolff & Baglivio, 2017), and antisocial, delinquent behaviors, and harshness aimed at own children (Conger, Schofield, Neppl, & Merrick, 2013).

Research covering lifespan. Adverse childhood experiences are implicated in negative outcomes across the lifespan from childhood, during adolescence, throughout the aging process to early mortality. Problematic behavior among young children (Clarkson Freeman, 2014; Conners et al., 2004) and excessive absenteeism during elementary school (Stempel, Cox-Martin, Bronsert, Dickinson, & Allison, 2017) are areas ACE research has covered child participants. Adolescents are of specific interest with mental illness and suicide risk (Ivarsson, Saavedra, Granqvist, & Broberg, 2016), alcohol initiation (Dube et al., 2006), juvenile delinquency (Wolff & Baglivio, 2017), endorsement of high-risk sexual behaviors and teen pregnancy (Belsky, Ruttle, Boyce, Armstrong, & Essex, 2015; Layne et al., 2014), in addition to higher high school drop-out rates (Bethell, Newacheck, Hawes, Halfon, 2014).

Research on generational transmission. At the forefront of current research is the topic of generational transmission of problematic behaviors among children reflective of parents who endorse high risk behaviors. Dube, Anda, Felitti, Edwards, and Croft (2002) highlight results of parental alcoholism felt by the children. Parental alcoholism predicts a greater risk of offspring becoming an alcoholic or marrying an alcoholic. According to Anda et al. (2002), children raised by alcoholic parents often become alcoholics themselves and are more likely to report depressive symptoms. Qin, et al., (2008) elucidate the risk of parental alcoholism and the likelihood of personal use among male Chinese medical students from a global perspective.

According to Conger, Schofield, Neppl, and Merrick (2013), aggressive parenting styles that include physical and emotional abuse, can result in a cycling of aggression and mental disorders in the next generation. Levey et al. (2017) note that victims of childhood abuse are at greater risk of intimate partner violence and vulnerability of offspring exposure to abuse.

Generational cycles researched by Wiig et al. (2017) explain the struggle of three generations of women involving substance abuse. Women who became substance abusers in adulthood were raised by substance addicts, and faced unique challenges fighting against family patterns of addiction. Will, Whalen, and Loper (2014) highlight another generational pattern of incarceration describing children of incarcerated adults who subsequently went to prison "second generation offenders".

According to Beidel and Turner (1997), children of anxious and depressed parents have significantly greater risks of developing mental health disorders. Bailey, Hill, Oesterle, and Hawkins (2009) state oppositional, delinquent, and low impulse control behaviors in adults are often passed to the next generation. Social learning, modeling, and exposure to chronic stress due to ACEs present complex, interrelated mechanisms reflective of a cycling pattern of similar behaviors.

ACE Scores and a Nonlinear Approach

Due to the complex nature of the ACE data and multifaceted applications to individuals and populations, a nonlinear approach to analysis is critical. Awareness of linear assumption biases is imperative when observing a stressor and response (Langhe, Puntoni, & Larrick 2017) especially relating to the impact of ACEs. A single stressor may produce multiple outcomes in nonlinear ways resulting in disproportionately larger

damage to the individual. For example, a one-time experience of sexual abuse may result in the child developing anxiety and depression, have difficulty concentrating in school, be untrusting of others, and have poor interpersonal communication. He or she may endorse drug and alcohol use due to the chronic stress, present more frequent somatic complaints to doctors, and endorse suicide ideation (Bryant & Range, 1995).

Many linear relationships are deduced by correlational data showing a strong relationship between ACE score and negative outcome. Data also present combined effects of ACEs as many individuals with one ACE often report more than one due to overlapping childhood experiences such as an alcoholic parent who is emotionally abusive, witnessing domestic violence *and* parental divorce, or parental incarceration *and* physical neglect, for example (Anda et al., 2002).

Felitti et al. (1998) found an exponential effect on the individual who reported four or more ACEs and termed the effect a graded-dose response relationship. This means if an individual reports multiple criterion on the ACE measure, the likelihood of a negative outcome is magnified. The higher the ACE score the more intense and severe the manifestation of problematic behaviors and health issues in the individual.

Problem Statement

Regardless of age, gender, ethnicity, geographical location, sub-culture identification, or socio economic status, research consistently validates more adverse experiences implicated in having the greatest impact on the individual (Clarkson Freeman, 2014; Marcenko et al., 2000; Mersky et al., 2013; Qin, et al., 2008). Researchers Dong, Dube, Felitti, Giles, and Anda (2003) present data on a causal

pathway from childhood experience to later adult life, manifested in external behaviors and symptoms.

A person with a high ACE score may later engage in drug and alcohol use, experience marital discord, struggle with mental illness, engage in domestic violence, and perhaps be involved in crime (DiLillo, et al., 2009; Forster et al., 2018; Giordano et al. 2014; Mair, Cunradi, & Todd, 2012; Mersky et al., 2013; Rossow & Lauritzen, 2001). These are the same criteria assessing for ACEs in the individual during childhood implicating a cyclic pattern. Further investigating a cycling pattern of behavior relating to ACEs will help fill a critical piece currently missing in the research.

Data continually show a correlation with ACE scores and co-occurring high-risk behaviors, mental illness, distress, and diseases, (Beidel & Turner, 1997; Levey et al., 2017; Will, Whalen, & Loper, 2014), yet little attention is given to the cyclic nature of adverse experiences and why individuals who report ACEs emulate similar behaviors in adulthood. A cycle of ACEs has not been analyzed to date showing a pattern of destructive behaviors repeated from an individuals' reported ACEs before the age of 18 and the adult behaviors endorsed after age 18, reflective of similar clustered criteria on the original ACE measure.

Although researchers continue analyzing the multifaceted impact of ACEs on an individual, few studies investigate the possible risks of perpetuating the cycle of ACE in an individual repeating behavior patterns consistent with childhood experiences. Behaviors repeated in adulthood mimicking experiences from childhood would indicate a recurring set of problematic responses similar to those felt in childhood. If an individual reports adverse *childhood* experiences on the ACE measure and endorses the same

behaviors during *adulthood* assessed on the ACE measure, a cycling pattern of experiences and behaviors would be evident. This is a critical missing piece in the current body of research.

Furthermore, individuals with many adverse experiences in childhood are at greater risk of engaging in high-risk sexual behaviors at the age of reproduction potentially repeating a similar pattern of adverse experiences to the next generation (Belsky et al., 2015; Hillis et al., 2001; Layne et al., 2014). Hughes and Cossar (2016) caution that individuals with higher ACE scores engage in earlier use of drugs, alcohol, tobacco, and sex, have lower test scores, poorer academic performance, lower graduation rates, and less vocational opportunities. They will also experience greater health problems yet carry the responsibility for raising children within these challenging conditions (Hillis et al., 2001). Little research exists on exposure risks to second generation offspring by parents who themselves experienced adverse conditions during childhood.

The under researched area of generational transmission of ACE is of grave concern. To date, multigenerational research of adverse experiences suggests a linear, one to one relationship between alcoholic children of alcoholic parents (Anda et al. 2002; Dube et al., 2002; Qin, et al., 2008), aggressive parenting and a cycle of abuse (Conger et al., 2013; Levey et al., 2017), patterns of substance abuse from parent to child (Wiig et al., 2017), incarcerated parents and incarcerated offspring (Will et al., 2014), and parental contagion of mental illness from one generation to the next (Bailey et al., 2009; Beidel & Turner, 1997).

Researchers have yet to explore if adverse experiences felt in the parent generation unintentionally become determinants of adversity across multiple domains to the subsequent offspring. Anda et al. (2002) found that children growing up with alcoholic parents carried additional risk of ACEs in childhood including abuse, neglect, and domestic violence, and were more likely to witness parent-related criminal activity, drug use, and mental illness. A cycling pattern is embedded within ACE research yet the risk of an individual repeating the ACE pattern from childhood into adulthood remains an under researched concern. Not only might an individual report a painful childhood of adversity, he or she may repeat similarly dysfunctional behaviors in adulthood. Worse, without intervention, these individuals may repeat a cycle of ACEs by exposing their children to adversity because of their own behaviors. Adverse adult behaviors are ACEs to offspring who grow up absorbing the residual outcomes secondhand, propagating a cycle of ACE.

Rationale

Multiple ACEs correlate with more negative outcomes. It is therefore reasonable to deduce that *experience* can predict, or at least influence, behavioral *expression*. In other words, a person who "lives through" adverse childhood experiences, is likely to "live out" behaviors consistent with research. The theoretical rationale of this study is to identify a cyclical pattern from ACEs to adverse adulthood behaviors by matching ACE-like criteria behaviors endorsed by an individual. In addition, based on the literature, it is reasonable to assume adult behaviors reflective of ACEs would be an ACE exposure risk to offspring growing up in the home. Although research elucidates this phenomenon with specific pathologies, a retrospective history of individual ACE and current endorsement

of similar adverse behaviors in adulthood has not been addressed. Neither has the impact of cycling adverse behaviors within the family system and the impact on the next generation. Generational impact studies have either remained compartmentalized within pathologies or remain under researched. This research study provides novel insight into generational transmission of ACEs.

Purpose of the Study

This research study is designed with the purpose of quantitatively analyzing the propensity of adults with ACEs to later endorse ACE-like behaviors in adulthood, suggesting a cyclical pattern. Behaviors analyzed in this study are a subset of five behaviors used to assess for ACEs and indicate a cycle of repeated behavior if endorsed by the individual later in adulthood. The five behaviors analyzed in the current study are the same criteria evaluating household dysfunction on the ACE measure: Problematic drinking or substance use, mental illness, divorce or separation, involvement in domestic violence, or history of incarceration. In order to detect a cycling pattern, ACE-like behaviors currently endorsed in adulthood will be identified and enumerated as cycling behaviors. Cycling behaviors will be quantified for statistical analysis by a numerical value called a Cycling Score and tested for significance of prediction between ACE and cycling behaviors.

The current study will also illuminate exposure risk of ACE to the next generation by assessing if children are present where ACE cycling behaviors are endorsed. Using collected demographic data and validated measures, the aim of this research is to predict scientifically the likelihood of a cycling pattern of experiences from childhood to adulthood. If a cycling pattern exists and ACEs can predict maladaptive cycling

behaviors in adulthood, then children born in these families will potentially be exposed to adverse experiences in their childhood and repeat a cycle of ACEs in their generation.

The aim of this study is to expand the established body of research by exploring, examining, and predicting cyclical patterns of ACEs between childhood experiences and adverse behaviors in adulthood. This research offers a new approach to ACEs that heightens the need to educate individuals who, themselves, experienced adversities in childhood. Education can effectively mitigate future cyclic patterns (Wiig et al., 2017), reduce risks of health-related behaviors, and lower risk of chronic disease (Felitti et al., 1998). This study will also serve as a catalyst for establishing preventative measures that break the cycle of ACE and ameliorate risk of exposure of ACEs to the next generation (Anda et al., 2002; Bailey et al., 2009; Conger et al., 2013; Hills et al., 2001).

This study provides novel research to a vast body of existing literature on ACE because it focuses on repeating problematic behaviors patterns specific to ACE criteria. Although correlations between ACE and negative outcomes are prevalent in the current body of research, predicting a cycle of ACE in an individual has not been explored. New research showing a prediction between early experience to later maladaptive behaviors has the power to interrupt a destructive cycle of ACE. Educating younger people on the risks of endorsing unhealthy cyclic behaviors and validating their chronic stress can have an important impact on their future decisions.

Another novel piece of research from the current study is addressing the impact of multigenerational ACEs from parent to child. As ACEs are based on reports from one's childhood, adults may be unaware of the adverse impact they inflict on their offspring

due to behaviors they endorse currently. New insight may impact choice behaviors and potentially break the cycle of ACE.

Hypothesis

The null hypothesis for this study is that ACEs have no effect on the endorsement of adverse behaviors in adulthood. The alternate hypothesis is that ACEs can predict the endorsement of similar adverse behaviors in adulthood in the areas of alcohol or substance abuse, mental illness, divorce/separation, domestic violence, or incarceration, thus creating a cyclical pattern of experiences.

Chapter Two: Literature Review

Theoretical Perspective

Expanding on the current body of research cataloging relationships between ACEs and adverse adult behaviors later in life, this study will examine the likelihood of an individual living out negative outcomes by endorsing adverse behaviors. It will also offer new insight on the potential exposure risks of ACEs to children living within the family system of adverse experiences carried out by parental behaviors. Using a systems theoretical perspective, this study will integrate the complexity of familial interactions influencing an individual's childhood experiences and the resulting adverse behaviors endorsed by the individual in adulthood.

In "Generation to Generation" family therapist E. Friedman (1985) suggests that instead of attributing "conflict and anxieties to one's personality, rather our individual problems have more to do with our relational networks…where we stand within the relational systems, and how we function within that position" (p.13).

A systems theoretical perspective will bolster the scientific efficacy of the research by addressing the human component of the mind-body connection. The phenomenon of generational transmission of negative experiences, the impact of parental health behaviors on the emotional family system, and the pejorative effects on the weakest members of society cannot be understood without it. A scientific approach to better understanding childhood stress and maladaptive coping requires integrating contextual factors in the analysis of individual behaviors. Systems thinking inspired the lens through which a team of medical doctors (Felitti et al., 1998) launched an

investigation into why chronic medical problems seem to appear more frequently among patients with similar childhood experiences of adversity, birthing the ACE study.

History of the Adverse Childhood Experiences Study

The original ACE study. Twenty years ago, the ACE study (Felitti et al., 1998) was launched through collecting survey data of over 17,500 participants between 1995 and 1997. Conducted by medical doctors, it was originally intended to explore the relationship between negative experiences in childhood in four dimensions (emotional, physical, sexual abuse, and household dysfunction) and health risks and diseases in later adulthood. In 1998, Felitti et al. published the first of many articles addressing the association between mortality in the United States due to health and lifestyle behaviors, and the development of high-risk behaviors throughout adolescence and young adulthood. Their aim was to illuminate the strong correlation of negative childhood experiences with the risk factors already established to be linked with higher prevalence of disease and earlier mortality.

The impetus of this study was that early 1990's medical journals published new research on the long-term medical consequences of childhood abuse (McCauley, Kern, Kolodner, & Schroeder, 1997). Doctors saw trends in health-related problems, observable antecedent health risks, and consistent positive screens for child abuse victimization in patients. According to Felitti et al. (1998), psychologists had previously researched the long-term consequences of childhood abuse, developing the breadth of understanding in numerous articles within the scope of prevalence and risk factors relating to victims of abuse, especially sexual abuse. Medical research had provided relevant information in the primary care setting with useful applications to adolescent and adult health, and mental

health (Hibbard, Ingersoll, & Orr, 1990). However, little information provided insight into the effects of childhood exposure to other adverse conditions: drug and alcohol use in the family of origin, domestic violence, disruption of home stability by divorce or separation, mental illness, criminal activity or incarceration of a parent, in addition to abuse exposure during childhood. A concern for Felitti et al. (1998) was a possible attribution error that limited high-risk outcome study results to sexual or physical abuse only, without consideration of other negative experiences.

The ACE Study (Felitti et al., 1998) involved collecting data from members in Kaiser Permanente's San Diego Health Appraisal Clinic where patients were willingly evaluated in multiple health related categories. The use of medical questionnaires collecting demographic and biopsychosocial data, previous medical conditions, family medical history, a physical exam, laboratory tests, and overview of organ function are all compiled and shared with patients as a standardized evaluation. Upon completion of the evaluation, patients were mailed the ACE questionnaire (Appendix A) asking for a self-report of childhood abuse and exposure to household dysfunction as best as participants could recall from childhood until age 18. Two waves of questionnaires were mailed during discrete intervals to increase respondent participation. After 17,500 surveys were analyzed, results were published comparing scores on the ACE questionnaire and risk factors, exposing strong correlations between ACEs and chronic problems relating to leading causes of death in the United States.

Original ACE survey design. The original ACE questionnaire (Appendix A) is a 10 question, self-report measure designed by Felitti et al. (1998) to capture data on dimensions of an individual's childhood including emotional and psychological abuse,

physical abuse, sexual abuse, childhood physical or emotional neglect, and household dysfunction such as a parent in the home with problematic drinking or substance use, displaying symptoms of mental illness, if during childhood the individual witnessed domestic violence, or if a parent was incarcerated for criminal activity. Respondents self-reported personal experiences from childhood in these specific domains of abuse, neglect, or exposure to household dysfunction by answering yes or no to each question. For every Yes response, the individual received a score of one point. No responses were given a score of zero. The total score for the 10 questions became the individual's ACE score between 0 to 10 indicating the number of ACEs. The higher the score, the more adverse experiences reported during the individual's childhood.

Original ACE study findings. Felitti et al. (1998) reported several key findings. First, the graded dose response between exposure to abuse, neglect, or household dysfunction and multiple risk factors leading to death is strong. The higher the score, the greater the health risk and worse health outcome for the individual. Second, living in a home where an adult caregiver is an alcoholic was the highest reported category of ACE. Third, more than half the respondents reported at least one experience, and there was a 65% to 93% probability that a respondent who reported one category of exposure also reported a second. Fourth, data show increased prevalence of smoking, obesity, less physical activity, depression and suicide attempts, alcoholism, drug use, 50+ sexual partners, and a history of sexually transmitted diseases among individuals with more ACEs (1998).

A major conclusion made by Felitti et al. (1998) emerged from a pivotal question posed by the researchers about the link between childhood experiences and health risk

behaviors leading to adult disease. Medically, they could trace specific behaviors to the genesis and development of pathology manifested in disease. The childhood experiences precipitating health risk behaviors remained a mystery, however. Felitti et al. (1998) found a link between ACEs and resulting behaviors. "Smoking, alcohol or drugs abuse, overeating, and sexual behaviors may be consciously or unconsciously used for immediate pharmacological or psychological benefit as coping devices in the face of stress and abuse." (Felitti et al, 1998, p. 253). They delineate that abuse and family dysfunction, either acute or chronic, would produce elevated levels of anxiety and depression in children. Behaviors found to provide temporary relief or distraction, such as substance use, problematic drinking, tobacco use, overeating, or sex, may develop into chronic habits to cope with chronic stress. Chronic habits that are stress-reducing are understood in the medical community as precursors to diseases like liver and lung cancers, diabetes, coronary artery disease, or chronic obstructive pulmonary disease (COPD). This is the driving force behind much of the subsequent research on the effects of ACEs and negative outcomes in later life.

A platform for future studies. Felitti et al. (1998) posited the detrimental trajectory of an individual's life to morbidity and early mortality could be traced back to the exposure and cumulative effect of ACEs. Providing a pivotal link between ACEs, psychological attributions for high-risk behaviors, physical health pathology and chronic disease, many subsequent studies have extrapolated this data to vast areas of research (De Lissnyder et al., 2012; DiLillo et al., 2009; Duke et al., 2010; Edwards et al., 2003; Fuller-Thompson et al., 2016; Hughes & Cossar, 2016; Mersky et al., 2013; Nguyen et al., 2017; Rossow & Lauritzen, 2001). Since the publication of the ACE study,

awareness, concern, training, research, and dissemination of related outcome study results have furthered the understanding of systemic interrelationships of social, emotional, and physical health. The culmination of new, refined, current data contributes to prevention and treatment of adverse adult behaviors, improving overall personal health and positively impacting communities, globally (Anda et al., 2008; Dube et al., 2009).

Brief History of Subsequent ACE Studies

Biological domains: Medical problems, chronic conditions, and diseases.

Physiologically and biologically related health risks resulting in chronic conditions, lower quality of life, and premature mortality include autoimmune disease (Danese & McEwen, 2012; Dube et al., 2009), liver, lung, and heart disease (Anda et al., 2008; Dong et al., 2003; Dong et al., 2004; Edwards et al., 2007; Su et al., 2015), diabetes (Felitti et al., 1998), sleep disturbances (Chapman et al., 2011), frequent headaches (Anda et al., 2010), and multiple cancers (Brown et al., 2010; Kelly-Irving et al., Delpierre, 2013).

One of the most important pieces of literature tying adverse experiences to a host of biological responses is from Danese and McEwen's (2012) study showing adverse childhood experiences change an individual's physiology. According to Danese and McEwen (2012) allostasis—the body's response to environmental stressors to restore homeostasis, is responsible for changes in prefrontal cortex and hippocampus size and function, and elevates inflammation response. Allostasis helps the body adapt to short term stress but becomes abnormally active with chronic or acute stress. Long lasting changes are seen in the nervous system, immune system, and endocrine system. Over time and under chronic stress conditions, allosteric load, or wear and tear on the body, accumulates into early aging and poor health.

According to Felitti et al. (1998), an overactive immune system can induce autoimmune disease in a person with several ACEs by perpetually activating the inflammatory response. This is the body's natural response to disease, injury, toxins and trauma. Decades after traumatic childhood stress, autoimmune disease can be experienced in adulthood (Dube et al., 2009). Autoimmune diseases include diabetes, rheumatoid arthritis, psoriasis, inflammatory bowel disease, lupus, and multiple sclerosis. Autoimmune chronic conditions are reported to have higher prevalence in patients with multiple adverse experiences (1998).

Dong, Dube, and Felitti, (2003) examined the relationship of high-risk behaviors like sexual activity and substance use as mediators of adverse childhood experiences and liver disease. They state a graded dose relationship of ACE is found in the increased risk of liver disease due to viral infections associated with sexually transmitted infections (STIs) and alcohol-related problems from substance use, concluding a causal pathway from ACE to behavior to onset of diseases impairing liver function.

Edwards, Anda, Gu, and Dube (2007) state that individuals reporting higher ACEs are at greater risk of smoking during adolescence often manifesting in cardiopulmonary diseases and emphysema. Anda, Brown, and Dube (2008) conclude a relationship with higher ACE scores and problematic, persistent smoking leading to smoking related illnesses. Dong, Giles, Felitti, and Dube, (2004) describe a causal pathway from ACE to ischemic heart disease. Su, Jimenez, Roberts, and Loucks (2015) restate that cardiovascular disease is the leading cause of death among men and women worldwide, and show children growing up in adverse circumstances are at greater risk of developing cardiovascular disease in adulthood.

According to Chapman et al. (2011), patients often report sleep disturbances that interfere with functioning due to difficulty falling and staying asleep. Patients report greater symptoms of sleep disturbance as exposure to adverse experiences increases. Anda, Tietjen, Schulman, Felitti, and Croft (2010) note an increased frequency and severity of migraines among patients with higher ACE scores.

Brown et al. (2010) show a relationship between ACE and risk of lung cancer and conclude not all occurrences of lung cancer are attributed to smoking related risk factors, suggesting stress related experiences may be responsible for development of certain cancers. Kelly-Irving, Mabile, Grosclaude, Lang, and Delpierre (2013) illuminate the importance of chronic and acute stress altering biological functions. They warn experiences involving chronic or acute stress in early development is implicated in activating physiological responses which are known to influence biological etiology of cancers.

Psychological domain: Mental health disorders. Higher ACE scores are correlated with myriad mental health issues that often co-occur such as risk of depressive disorders and suicide attempts (De Lissnyder et al., 2012; Edwards et al., 2003; Fuller-Thompson et al., 2016; Mersky et al., 2013; Rossow & Lauritzen, 2001;), anxiety and obsessive compulsive disorder (Dar & Iqbal, 2015; Mersky et al., 2013; Munoz et al., 2018), eating disorders (Fairburn, 1998; Kinzel, 1997), psychotic symptoms (Benarous et al., 2017; Brietzke et al., 2012; Jääskeläinen et al., 2016; Ullrich & Marneros, 2007), and prescribing psychotropic medications (Anda et al. 2007).

A key piece of research shedding light into the graded dose response and co-occurring nature of adverse experiences from Edwards, Holden, Felitti, and Anda (2003)

shows the occurrence of multiple categories of ACE in the individual. They note a trend in the literature to compartmentalize physical, emotional, and sexual abuse and their aim was to report on the prevalence of overlapping abuse types. Prevalence of only one type of adverse experience was less than 10% of child abuse cases, and they found instead most children victimized by abuse experienced multiple types of ACEs concurrently. Another limitation they found in previous research was that exposure to abuse was not differentiated between single incidents and repeated victimization. Research participants were members of a Health Maintenance Organization (HMO) who completed a family health questionnaire. Questions included childhood abuse and exposure to family dysfunction, current health behaviors and conditions, and current mental health status. Key findings were that respondents had worse mental health with an increase in occurrence categories, confirming the graded dose response relationship with mental health presentations.

De Lissnyder, Koster, and De Raedt (2012) investigated the components of cognitive vulnerability rather than the affective symptoms of depression. They found that depression is not the experience of negative thoughts as it is the inability to control negative memories. Higher levels of rumination of information stored in memory contributed to cognitive vulnerability for depression. The recurring negative memories stored in the working memory interfered with shifting between emotional and non-emotional information in the cognitive process. Rumination is also the focus of research relating obsessive negative thinking due to a history of ACEs and presentations of generalized anxiety (Dar & Iqbal, 2015).

Further research on anxiety resulting from ACEs by Munoz et al. (2018) shows how traumatic memories compete for attentional focus and take cognitive focus away from goal setting and hope for the future. This results in less hope felt by the individual and more anxiety due to cognitive attention on worrisome thoughts. From an information processing perspective, internal psychological processes are induced by sensory input visually or audibly, including negative experiences. These negative, adverse experiences become stored as long-term memories when assigned meaning and organized into schemas. Cross sectional data on 180 participants found ACEs as an antecedent to lower hope due to repetitive memories and triggers of past trauma. Anxiety was found to be a result of competing cognitive attention where rumination was an obstacle to pathways of goals and hope.

Rossow and Lauritzen (2001) address suicide behavior among drug addicts noting a consistent precursor of drug addicts with the prevalence of depression was a theme of childhood stressors, including parental alcoholism, abuse, and a broken home. Their findings show suicide attempts were more closely associated with exposure to childhood adversity. All respondents who had attempted suicide also reported at least one adverse childhood experience.

According to Fuller-Thompson, Baird, Dhrodia, and Brennedstuhl (2016), the prevalence of suicide ideation is significantly higher among individuals with a history of adverse childhood experiences. Early exposure to violence desensitized an individual to self-injurious behavior. Data from 22,559 Canadian Community Mental Health surveys found that less severe forms of childhood abuse are related equally to observing domestic violence between parents, when assessing suicide risk.

Eating disorders have high prevalence among both male and female college students reporting ACEs, specifically binge eating among women (Fairburn, 1998; Kinzel, 1997). In a recent systematic review of obesity, McDonnell and Garbers (2017) explain the researched evidence that ACEs are related to adult obesity. The focus of their report is to educate mental health providers on trauma-informed interventions to address the underlying precipitating risk factors prior to developing obesity. They also concur that eating behaviors associated with emotions, stress, and attempts to regulate mood are maladaptive contributors to long term problems such as heart disease, diabetes, stroke, and cancer.

Ullrich and Marneros, (2007) assess the co-occurring nature of personality disorders along different dimensions: psychopathic, neurotic, and attached traits. Four hundred sixteen incarcerated offenders both male and female were analyzed and indicated risk factor etiologies of negative experiences early in the family of origin. Functional problems appeared in a child before age 15 and positively predicted psychopathic personality disorder factors.

Brietzke et al. (2012) show through a meta-analysis of research up to 2012 that epidemiological studies validate a direct pathway between ACEs and numerous psychiatric disorders throughout development. They report earlier ages of a child's exposure is associated with worse outcomes. For example, more severe symptoms of depression are found in children abused before 12 years old. Disorders typically appearing in later life after experiencing adversity in childhood include anxiety, personality disorders, higher rates of suicide, psychotic symptoms in adult life, bipolar disorder, major depression and post-traumatic stress.

Benarous et al. (2017) show psychiatric disorders among inpatient youths including schizophrenia, catatonia, and bipolar disorder have a high association with ACEs. Seventy-five hospitalized patients were administered the ACE measure. Findings showed similar adverse experiences between schizophrenic, catatonic, and bipolar patients, however youth with bipolar disorder appeared to be exposed to family violence more than those with other disorders. They also confirmed the high prevalence of adverse experiences in many child psychiatric patients including bipolar disorder, anxiety, and depression. They state, "Maltreated individuals with psychiatric disorder tended to have an earlier age of onset, greater symptoms of severity, co-morbidity, increased risk of suicide, and a poor response to treatment than non ACE individuals with the same diagnosis" (p. 253). A relationship with ACE risk factors and early onset of psychiatric disorders in children is strongly suggested.

Not surprisingly, Anda et al. (2007), report a strong relationship of higher ACE scores with increased prescribing and greater utilization of psychotropic medications, and the economic impact on healthcare. When a child is exposed to multiple adverse experiences throughout development, especially early development, severe mental health impairments follow. Analysis of the literature confirms higher rates of later life pathology among individuals with a history of early ACE exposure and a pharmacological approach to treating symptoms.

Social domains: Interpersonal, academic, vocational challenges. In addition to increased biological and psychological difficulties, research highlighting extensive social challenges also provide insight into the impact of ACEs. Academic and vocational problems such as decreased school success (Blodgett & Lanigan, 2018; Iachini et al.,

2016), high school dropout rates (Bethell et al., 2014), job loss and unemployment (Tam et al., 2003), and homelessness (Herman et al., 1997) are all related to higher ACEs.

Interpersonal conflict is documented in the literature as an outcome of higher ACE scores including adolescent violence perpetration (Duke, et al., 2010), marital conflict (DiLillo et al., 2009; Nguyen et al., 2017; Whisman, 2006), parenting challenges (Hughes & Cossar, 2016), intimate partner violence (Mair et al., 2012), attachment disruption (Frederick & Goddard, 2008), and familial stress (Jääskeläinen et al., 2016).

Iachini, Petiwala, and DeHart (2016) identified patterns of school disengagement by 13 students in a qualitative study. The most commonly reported ACE was parental divorce and incarceration creating obstacles in attentional focus with students. Bethell, Newacheck, Hawes, and Halfon (2014) confirm attention difficulties and decreased school engagement in a longitudinal study from the National Survey of Children's health. They found associations between adverse experiences and chronic conditions among children, along with health risks, an increase in days of school missed, and more grade repetition.

According to Tam, Zlotnick, and Robertson (2003), inadequate skills acquisition from lower school success among individuals with ACEs result in limited employment opportunities. They report that homeless adults endorse high ACE scores and report less knowledge of appropriate work behaviors, a prevalence of mental illness, and history of substance use. Adverse experiences were the preceding factor to alcohol and drug use among the homeless. Consistent drug use was the strongest indicator of poor work force participation which often preceded the homeless lifestyle.

Mersky, Topitzes, and Reynolds (2013) reported on the trajectory of individuals reporting more ACEs and associated drug, alcohol, and tobacco use along with difficulties maintaining employment stability. Substance use disrupted job performance attendance, and work relationships.

According to Duke, Pettingell, McMorris, and Borowsky (2010), violence is perpetrated in younger individuals who have experienced alcohol abuse by a parent. Young adults studied showed functionally impairing levels of interpersonal violence, delinquency, fighting, aggression with weapons, self-mutilation, suicide planning, and victimization of others associated with higher reported ACEs.

Relationship stress and dissolution studied by DiLillo et al. (2009) covered over 200 newly married couples reporting on levels of childhood maltreatment. Over a two year period, couples were assessed three times for marital satisfaction. Decreases in marital satisfaction were analyzed and reported in association with higher reported ACEs in individuals. Physical and psychological abuse experienced by husbands during childhood and physical and emotional neglect reported by wives during childhood had the greatest impact on marital function. Marital discord ending in separation or divorce was higher among individuals who had ACEs citing physical abuse. Marital satisfaction was lower among respondents who had been exposed to childhood sexual abuse (Whisman, 2006).

According to Nguyen, Karney, and Bradbury (2017), individuals with a history of abuse seem to marry a partner with similar abuse histories. Couples who shared similar abuse histories experienced less negative impact than one partner with abuse and one without. For example, non-abused husbands married to abused wives reported greater

marital dissatisfaction. Physical and sexual abuse reported by husbands only, related to poor marital outcomes.

Hughes and Cossar (2016) researched parenting challenges among women who reported higher occurrences of emotional abuse. Mothers who reported greater emotional neglect as children were found to be more psychologically controlling. Associations were observed between negative experiences in a mother's childhood and subsequent parent-child dysfunction.

Frederick and Goddard (2008) give attention to the relationship between ACE and personal relationships later in life noting that parent-child relationship problems, length of day care or time away from parents, experiences with violence, and family breakdown were risk factors in attachment disturbances. Results from a qualitative study show people who experience abuse and adversity in childhood had relationship difficulties seen in few friends, social isolation, and family estrangement.

Jääskeläinen et al. (2016) differentiate between genders regarding parental roles when related to substance abuse and the consequences for their children. Parental substance abuse increases the probability of later substance use among adolescents. Parental mental disorders, living in broken homes, and environmental factors such as poverty were associated with parental substance abuse. Alcoholic parents had a direct effect on mental disorders and substance use in teenagers. Parental mental disorders, substance use, broken families, and economic stress on the family led to earlier experiences of mental health problems in younger children.

Future research of the impact of ACEs on social applications may include sibling relationships, vulnerability to bullying in elementary school, risk factors in involvement

in negative social settings such as gangs, the effects of social media, cyberbullying, gaming addiction, and attention spans in technologically saturated cultures.

Multicultural focus. ACEs relate to cultures in global communities in many researched areas of the world such as China (Qin et al., 2008), Chile (Seiler et al., 2016), Native American tribes (Koss et al., 2003), Iran (Mirlashari et al., 2012), and Sweden (Giordano et al., 2014).

Qin et al. (2008) report 2,073 Chinese medical students were administered the ACE measure and assessed for personal alcohol use. They showed a graded dose relationship of four or more adverse experiences and significant personal problematic alcohol use. Bi-parental alcoholism correlated with the highest ACE scores and problematic drinking.

A study by Seiler, Kohler, Ruf-Leuschner, and Landolt (2016) of Chilean girls in foster care compared to non-foster care females evaluated associations between ACE, mental health, post-traumatic stress disorder (PTSD), and health quality of life. Their results show Chilean foster girls who experienced significantly higher ACEs also report greater symptom severity of mental health problems and PTSD, and worse health quality of life than their age counterparts in non-foster care families.

Native American tribes studied by Koss et al. (2003) experience alcoholism as a major cause of death in their communities. The researchers analyzed numerous factors of ACE and how they perpetuate alcoholism within the culture. Their findings show significant relationships with lifetime alcohol dependence and ACEs, specifically of physical and sexual abuse among men, and sexual abuse and neglect in women.

Mirlashari, Demirkol, Salsali, Rafiey, and Jahanbani, (2012) qualitatively explored early childhood adversity in Iranian young adults struggling with substance addiction by interviewing 15 men and women in a treatment setting. Respondents reported individually experiencing adverse family dysfunction in their childhoods as the main factor in reasons for using substances.

The literature also addresses sub-cultures within populations reporting greater challenges correlated with higher ACEs such as deployed troops and military veterans (Cabrera et al., 2007), LGBTQ individuals (Aaron & Hughes, 2007; Rauch, 2016), urban minorities (Mersky et al., 2013), low income mothers (Marcenko et al., 2000), and prison inmates (Bowles et al., 2012; Will et al., 2014; Wolff & Baglivio, 2017).

According to Cabrera, Hoge, Bliese, Castro, and Messer (2007), deployed military troops with multiple ACEs experience greater depression and PTSD than their non-deployed counterparts when comparing ACE scores with both groups. ACEs are a strong predictor of more severe mental health symptoms in troops who were deployed, than the expected stress of combat.

Aaron and Hughes (2007) researched associated risk factors of obesity and noted higher prevalence of obesity among lesbian women. They report a sample of 447 self-described lesbian women participated in qualitative interviewing about their early childhood experiences. More than 31% of respondents reported childhood sexual abuse. They noted study participants who reported a history of sexual abuse were related to higher rates of severe obesity than their lesbian counterparts denying childhood sexual abuse.

Rauch's (2016) research among lesbian women involved in intimate partner violence (IPV) supports the co-relationship of multiple types of abuse when child abuse is reported. Physical and emotional abuse is associated with higher levels of IPV in monogamous same sex relationships.

A study on urban minorities by Mersky, Topitzes, and Reynolds (2013) shows a greater effect of mental health problems, smoking, alcohol, and marijuana use than environmental risk factors alone. Considering other demographic and environmental risks felt by low income, urban minority populations, the longitudinal study illuminates how ACEs among this population are greater than other risk factors such as poverty and crime.

High risk health behaviors: Endorsing risk. In support of the literature produced by Felitti et al. (1998), the National Center for Disease Control (CDC) promotes initiatives for healthier behaviors and ACE awareness based on data supporting a hierarchical progression from adverse experience to social and neurological disruption, to health risk behaviors, to disease and chronic health problems, then to early mortality. High risk health behaviors are a key focus in this current study as they lead to addiction, disease, and overall poor health.

Many studies show prevalence and co-occurrence of drugs and alcohol use (Forster et al., 2018; Giordano, et al. 2014; Mersky et al., 2013; Rossow & Lauritzen, 2001), early tobacco use and lifetime smoking (Alcalá, von Ehrenstein, & Tomiyama, 2016; Elliott et al., 2014; Mersky et al., 2013), early alcohol use in teens (Eliott et al., 2014; Fuller-Thomson, Roane, & Brennenstuhl, 2016; Mersky et al., 2013; Rothberg et al., 2010), sexual behaviors that include multiple partners and early age of first

intercourse (Belsky et al., 2015; Hillis et al., 2001; Hillis et al., 2004), and binge eating behaviors (Fairburn, 1998; Kinzel, 1997; McDonnell & Garbers, 2017).

Dube et al. (2002) state children of alcoholics endorse alcohol abuse in adulthood. Early child abuse led to alcohol use in adulthood. The interrelationship of childhood abuse and other adverse experiences may be clustered to include alcoholism, substance use, domestic violence, separation or divorce of parents, a parent with mental illness, and crime. Survey data of 17,337 men and women were analyzed for relationships between eight ACEs, risk of heavy drinking, and risk of marrying an alcoholic. Early childhood neurological impact of stress, emotional vulnerability of living in chaotic home environments, and anxiety and depression resulting from a chaotic home life are all risk factors to coping with alcohol.

According to Elliott et al. (2014) ACEs, especially physical neglect and all types of abuse, can predict persistent use of nicotine and alcohol products. They report a graded dose response relationship between four or more types of ACEs and stronger predictions of chemical use and dependence.

Rothberg, Bernstein, and Strunin (2010) interviewed adolescents brought to an emergency room for alcohol related problems in a qualitative pilot study. They queried teenage participants on personal reasons for early alcohol use and found high ACEs were why the teens started drinking alcohol at a young age. Most often reported was parental neglect, being parentified, lack of parental supervision, being left alone often, feeling lonely, and having parents not really care what they did were reasons attributed to early alcohol use. Alcohol was used most often to cope with loneliness according to respondents.

Mersky, Topitzes, and Reynolds (2013) show early adversity with low income urban minorities had a greater effect than environmental risk factors alone. In a longitudinal study of racial and ethnic minority underprivileged children, increased exposure of adverse events is associated with more negative outcomes including more mental health problems, and frequent tobacco, alcohol, and marijuana use. Considering other demographic and environmental risks felt by low income, urban minority populations, this study illuminated how ACEs significantly stood out beyond other risk factors. Lower life satisfaction, more frequent depressive symptoms, anxiety, and greater substance use were reported more in urban minority samples who also had adverse childhood experiences.

Alcalá, von Ehrenstein, and Tomiyama (2016) studied the increase use of tobacco products due to ACEs. Their aim was to study smokeless tobacco products noting cigarette smoking is on the decline while use of smokeless products is increasing. ACEs are implicated in smoking and tobacco use behaviors as a way of lowering stress.

According to Fuller-Thomson, Roane, and Brennenstuhl (2016), ACEs are significantly correlated with both alcohol and drug dependence in later life. Both directly experiencing abuse, such as physical or sexual abuse, and indirectly experiencing adversity in the form of witnessing parental violence were associated with later substance dependence. Chronic exposure to domestic violence appears to increase the odds of addiction even when no direct abuse had been experienced physically.

Forster, Grigsby, Rogers, and Benjamin (2018) found that ACEs are correlated with polysubstance use among college students. High percentages of college students engage in risky polysubstance, including frequent use of alcohol, tobacco, marijuana,

illicit drugs and prescription medication. Substance use interferes with academic performance, impacts social connections, and affects health. Students likely use alcohol and drugs as a way of coping with ACE related stress during the transition from adolescence to adulthood in the college experience.

According to Hillis, Anda, Felitti, and Marchbanks (2001), ACEs relate to adult diseases associated with sexual risks. Women exposed to many types of adverse experiences have a 50% increase in the likelihood of an unintended first pregnancy, multiple sex partners, and an increased risk of sexually transmitted diseases. As the frequency of ACE exposure in childhood increases, the likelihood of early intercourse prior to age 15, having 30 or more sex partners, and rates of contracting sexually transmitted diseases also increases. Other factors mediating reasons for early intercourse include feeling depressed, poor parental support, low parental education, poverty, living in single parent homes, poor personal school performance, lacking future goals, alcohol, tobacco, and drug use.

According to Wolff and Baglivio (2017), juvenile recidivism is related to negative emotional processing of ACEs. Over 25,000 juvenile offenders with disruptive externalizing behaviors attributed poor emotional control to be related to ACE scores. The offenders were found to have negative emotionality that included antagonistic interpretations of others' actions toward them and over aggressive responses.

Effects on children and adolescents. Young children exhibit behaviors reflective of adverse experiences such as delinquency and antisocial behaviors (Clarkson Freeman, 2014), children of mothers with substance abuse are affected (Conners et al., 2004), and

chronic absenteeism from school (Stempel, Cox-Martin, Bronsert, Dickinson, & Allison, 2017), all impact the health and social trajectory of a vulnerable child.

According to Dube et al. (2002), growing up in an environment where one or both parents engage in problem drinking expose children to high levels of stress associated with neurological and developmental challenges. Subsequently, children who experience chronic stress in childhood have psychological, behavioral, and social adjustment problems at a higher rate than their peers.

Jääskeläinen et al. (2016) highlight the influence of parental substance abuse on adolescent substance use and mental disorders. When several conditions overlap in the family, such as divorce, mental illness in parents, and poverty, mental health problems and harmful substance abuse in teenage years will most likely follow.

According to Wolff and Baglivio (2017), a higher incidence of juvenile recidivism among children with more ACEs is due to negative emotionality. Hostile and antagonistic assumptions of others' responses and overly aggressive counter responses lead to increased offending. These adolescents were exposed to harsh parenting practices including emotional and physical abuse.

Layne et al. (2014) state vulnerability to adverse experiences in childhood manifest in adolescent endorsement of high risk behaviors such as substance use, sexual behavior, self-directed violence, and suicidal ideation and behavior. Predictors of adolescent behaviors include family stability, peer groups, and school environments. Childhood trauma impacts neurodevelopment, endocrine function, psychosocial interactions such as peer relations, school performance, and stress reducing coping such as smoking and substance use. Often the culmination of these multiple effects leads to

functional impairment and criminal activity. Additionally, victims of childhood abuse carry greater risk of re victimization in adulthood endorsed by higher rates of intimate partner violence.

Continuing to deepen the knowledge of adverse childhood experiences in early stages of development will help broaden the understanding of epidemiology and appropriation of treatment goals for patients both medically and psychologically.

Generational transmission of ACE. Dube et al. (2002) expanded the research of ACE scores and outcomes by illuminating critical results of parental alcoholism felt by the children. They note an "intergenerational cycling of alcohol abuse" (p. 714) linking ACEs of parental alcohol abuse with the subsequent increased risk of problematic drinking reported by offspring. Family factors and parental alcoholism predict the risk of becoming an alcoholic or marrying an alcoholic.

According to Anda et al. (2002), children raised by alcoholic parents often become alcoholics themselves. An unpredictable home environment, carrying the secret stigma of an alcoholic parent, and living in constant stress explained why these individuals were more likely to grow up to become alcoholics and more likely to report depressive symptoms. Adult children of alcoholics experience an increased risk of depression because their lives were negatively impacted due to parental alcoholism often including abuse, violence, neglect, and family chaos more common in alcoholic homes.

Qin et al. (2008) elucidate the risk of parental alcoholism and the likelihood of personal use among male Chinese medical students from a global perspective. Higher rates of alcoholism were correlated with more reported ACEs. Personal alcohol use was greatest among students who report both parents being alcoholics.

Alcoholism plays a role in systemic degradation in families according to Jääskeläinen et al. (2016). The network effect of parental substance abuse on poor familial relationships predicts a child's negative psychosocial well-being can be attributed to relational tension and poor parenting in the family environment. In families where one or both parents have substance abuse, mental disorders, broken homes, and financial challenges coexist.

Levey et al. (2017) note that victims of childhood abuse are at risk of re-victimization in adulthood, increasing the risk of intimate partner violence and vulnerability of offspring exposure to abuse. They report an increased risk of child abuse among mother's dealing with mental illness. Interventions aimed at mitigating repetitive child abuse in the following generation were more influenced by maternal abuse history and involvement in domestic violence.

Generational cycles researched by Wiig et al. (2017) highlight the challenges children of substance abusers face when they become parents. Women who became substance abusers in adulthood, raised by substance addicts, reported the challenges of fighting against family patterns of addiction. Although all participants described adverse, traumatic experiences of violence, parental substance use, and neglect, not all women studied repeated the cycle of violence or neglect. Now as parents raising children, some women became vigilant to provide predictable, stable home lives for their children.

Transgenerational mental health concerns continue to heighten awareness of exposure from parent generations exhibiting chronic symptoms of anxiety and depression to children in the home. Offspring of anxious and depressed parents have significantly

greater risks of developing mental health disorders according to Beidel and Turner (1997).

Will, Whalen, and Loper (2014) state individuals whose parents were incarcerated during their childhood now followed in their parents' footsteps as adults. They link youth conduct problems with adolescent aggression and later adult violence leading to criminal charges. Risk factors influencing childhood conduct problems include history of abuse and neglect. Other psychosocial impacts of parental incarceration include disruption within the family system such as strain, attachment challenges, stigma, decreased supervision, and separation from community resources. They found second generation offenders reported more problematic behavior before age 15, and more crimes, detention, and drug related issues than their first generation counterparts.

Conger et al. (2013) focused on intergenerational transmission of harsh and abusive parenting based on the increased risk for developmental problems in youth who report harsh and rejecting parenting behaviors. Aggressive parenting styles toward children, such as physical and emotional abuse, can also result in antisocial behaviors, mental disorders, and a cycling of aggression toward offspring in the next generation. Hostile, abusive parenting behaviors produce adjustment problems in children and adolescents. Poor adjustment is linked to antisocial behaviors exhibited in children and adolescents. They predicted this to be one element of the cycling of harsh parenting for the prospective generation.

Bailey et al. (2009) expose intergenerational transmission of learned externalizing behaviors such as oppositional, aggressive, delinquent, and impulsive responses toward others. Harsh parenting is often passed intergenerationally through social learning,

modeling, and vicarious observations of behaviors. Parenting practices and behaviors are repeated in cyclic patterns from one generation to the next. Parenting behaviors involving substance abuse showed stronger associations with next generation externalizing behaviors, than the hypothesized harsh parenting behaviors predicted to be more problematic. Social learning, modeling, and exposure to ACEs present complex, interrelated mechanisms reflective of a cycling pattern of detrimental behavior.

Research on the negative outcomes of ACE across multiple generations gives insight into the damage some parent behaviors have on the growing child. Assessing specific behaviors implicated in the cycling of adverse behaviors is key in the current research study. Further research on the possible cycling of ACE in an individual and the potential risks of generational transmission of ACE will help better understand the magnitude of cycling patterns that affect people from generation to generation.

Chapter Three: Quantitative Methodology

Type of Research Design

A quantitative survey design was used for gathering data from a randomized, non-stratified sample of the population through a digital platform, advertised through social media. Demographic data were collected on each participant including gender, age range, relationship status, geographical region in the US, income range, work status, history of incarceration, involvement with domestic violence, education level, and race. Participants self-reported information on validated measures for ACE, mental health screens, and alcohol and substance use screens, then data were coded and scored for statistical analysis. The predictor variable of ACEs was scored for each participant based on the original ACE measure (Appendix A) where scores range from 0 to 10 according to the number of ACEs the participant reports from his or her childhood.

For the purpose of this study, five behaviors taken from the original ACE measure were assessed for repeating patterns from childhood to adulthood. These behaviors include the five criteria for household dysfunction collected on the ACE, specifically divorce/separation, domestic violence, alcoholism or drug use, mental illness, and incarceration. In order to detect a cycling pattern, these specific behaviors endorsed in adulthood were enumerated as cycling behaviors. Cycling behaviors were quantified for statistical analysis by a numerical value called a Cycling Score to test for significance of prediction between ACE and cycling behaviors. The Cycling Score was the sum of repeating behaviors an individual endorsed in adulthood. This score from 0 to 5 was used for statistical analysis of predictions between childhood experiences and adult behaviors.

The predicted variable is the outcome number of adverse behaviors endorsed in adulthood by participants, Cycling Score. Adverse adult behaviors are a collection of data gathered from survey respondents including three demographic questions and screens quantifying degrees of mental illness and substance use. A total of five behaviors endorsed by participants are included in the predicted variable measure of a Cycling Score including divorce or separation, substance abuse, domestic violence, mental illness, and incarceration. These behaviors are consistent with the ACE measure (Appendix A) with the goal of statistically analyzing the likelihood of a repeating cycle involving similar behavior patterns replicated from childhood experiences. The Cycling Score quantifies the number of behaviors endorsed by participants and is a sub set of the criteria taken from the original ACE measure. The Cycling Score is a mechanism to calculate the number of repeated behaviors in adulthood and analyze the statistical significance of repeating behavior patterns from childhood to adulthood.

The ACE score and Cycling Score were used in several regression analyses to test for statistical significance of the predictor variable (ACEs) predicting the outcome variable (Cycling Score) measuring the number of cycling behaviors endorsed by participants. The aim of this research study was to predict with accuracy the likelihood that individuals who report ACEs between ages 0 to 18 years old would subsequently endorse adverse adult behaviors consistent with repeating the cycle of adversity for themselves and possibly their offspring.

Procedure

Using the digital platform Survey Monkey, the Institutional Review Board (IRB) approved Survey (Appendix A) was launched and remained open for 41 days between

November 25, 2018 and January 4, 2019. A direct link to the survey was copied into emails and posted on social media sites for willing participants to easily and anonymously complete the survey. Adults over age 18 were invited to participate in this research study. Electronic data collection provided the benefit of access to a diverse sample of participants with demographics ranging in age, gender, marital status, education level, income range, geographical location within the United States, and racial identity allowing for possible mapping of demographics with findings in future studies. Demographic details were collected for a multiple regression analysis to determine significance of data among specific populations.

No compensation, favors, or monetary drawings were offered to participants for completing the survey. Participants needed to link to the survey through their internet carrier and phone or computer device to complete the five minute, closed ended questionnaire. The survey data was collected and hosted by the digital platform, Survey Monkey, until the data collection was closed (on January 4, 2019), and the full set of data was exported to Microsoft Excel and IBM SPSS Statistics 25 analytics software for organization and statistical analysis. The digital collection procedure ensured participants anonymity and did not allow for duplicated responses.

Data Collection Instruments and Scoring

The ACE measure (Felitti et al., 1998) is a 10-question self-report measure used to determine participants experiences prior to age 18 that are considered adverse according to the validated measure (Appendix A) involving abuse, neglect, and household dysfunction. Criteria include (a) emotional abuse, (b) physical abuse, (c) sexual abuse, (d) emotional neglect, (e) physical neglect, (f) parental divorce, (g)

domestic violence in the home, (h) alcoholic or drug user in the home, (i) household member with mental illness, and (j) incarcerated household member. Participants respond to each question on the ACE measure with either a Yes (affirmative) or No (negative), indicating their involvement in each event prior to turning 18 years old. For every affirmative response, there is a score of one point. Every negative response is assigned a score of zero points. Scores are added for the number of affirmative responses, creating an ACE score of 0 to 10 points. Each participant in this study has an ACE score ranging between 0 to 10 points.

The Patient Health Questionnaire-9 (PHQ-9) is a nine-question self-reporting screener assessing for depression in clinical practice (Kroenke, Spitzer, Williams, & Löwe, 2010). Each question asks participants to report his or her level of distress and frequency of depression symptoms including anhedonia, sleep disturbances, negative mood, change in appetite, and suicide ideation. The PHQ-9 has a proven clinical utility for assessing the mental health status of patients presenting with depression based on criteria listed in the Diagnostic and Statistical Manual 5th edition (DSM-5).

The nine-question instrument screens for depression (Kroenke et al., 2010) (Appendix A). Frequencies of self-report depression type symptoms are coded and summed for a total score. Not at all (0), several days (1), over half the days (2), nearly every day (3). Total scores range from 0 to 27. A score between 0 to 4 indicates the participant either does not endorse symptoms or experiences minimal symptoms of depression. A score of 5 to 9 indicates mild depression. A score of 10 to 14 equates to moderate depression. Scores between 15 to 19, endorse moderately severe depression, and 20 to 27 severe depression.

The Generalized Anxiety Disorder-7 (GAD-7) is a brief seven-question self-reporting measure assessing for generalized anxiety in clinical practice (Spitzer, Kroenke, Williams, & Löwe, 2006). Each question asks participants to report his or her level of distress and frequency of anxiety symptoms including persistent worry, difficulty relaxing, fear, restlessness, and irritability. The GAD-7 has a proven clinical utility for assessing the mental health status of patients presenting with anxiety based on criteria listed in the DSM-5.

The seven-question instrument screens for anxiety (Spitzer et al., 2006) as participants rate self-reported frequency of criteria (Appendix A). Frequencies of self-report anxiety type symptoms are coded and summed for a total score: Not at all (0), several days (1), over half the days (2), nearly every day (3). Total scores range from 0 to 21. A score between 0 to 5 indicates the participant either does not endorse symptoms or experiences mild symptoms of anxiety. A score of 6 to 10 indicates moderate anxiety. A score of 11 to 21 is indicative of severe anxiety.

The Alcohol Use Disorders Identification Test (AUDIT), is a 10-question screening tool developed by the World Health Organization (WHO) and endorsed by the US Department of Health Substance Abuse and Mental Health Services Administration (SAMHSA) for assessing hazardous drinking behaviors (Bush, Kivlahan, McDonnel, et al., 1998). The AUDIT-C is a 3-question brief, reliable alcohol screen modified from the 10-question measure used in primary care settings to help identify patients who endorse hazardous drinking (Mulvaney-Day et al., 2017). It is a self-report measure assessing the amount of alcohol consumption a respondent endorses. Participants in the current study self-reported alcohol consumption on the AUDIT-C (Appendix A) and responses were

scored and summed according to the published scoring protocol. Scores are on a scale from 0 to 12. A score of 4+ for men or 3+ for women is positive for hazardous drinking.

Two additional questions are added to the AUDIT-C to assess substance use on the survey. One question asks participants about marijuana use and one question asks if participants have used other non-prescribed substances. Assessing marijuana use was based on a participants' endorsement of any use. Scoring was based on affirming or denying use. Assessing for non-prescription drug use was a question taken from the Drug Abuse Screening Test (DAST) (Skinner, 1982). Scores were based on participants either affirming or denying this class of substance use. (Appendix A).

Coding and Tabulating Variables

Participants answered 11 demographic questions to be analyzed for frequency and distributions. Demographic details were applied in data analytics for correlational relationships with specific participant attributes and the predicted outcome of adverse adult behaviors.

The ACE measure was coded for answers: Yes (affirmative response) = 1, No (negative response) = 0 and participant individual scores were summed to calculate an ACE score. The predictor variable of the ACE score is on a scale of 0 to 10.

Cycling Score predicted variable. In order to determine the frequency of adverse behaviors in adulthood, a Cycling Score was created as a numerical value representing the number of adverse behaviors an individual reports endorsing during adulthood. The five outcome behaviors during adulthood analyzed in the current study were selected from the ten experiences on the ACE measure, specifically five household dysfunction criteria: Problematic drinking or substance use, mental illness, divorce or

separation, domestic violence, and history of incarceration, gathered from participant's self-report of current experiences. The Cycling Score quantifies the number of cycling behaviors and is the predicted variable used to forecast outcomes and deduce the incidence of cycling patterns among participants. For the five behaviors assessed, a participant may endorse, based on self-report, between 0 and 5 adverse adult behaviors. Since these five outcome behaviors are mapped from the ACE questionnaire, they indicate a cycle of ACE in adulthood. These five adverse outcome behaviors were summed to total a Cycling Score for each participant, evaluating a cyclical pattern. The numerical value of the Cycling Score helped quantify a total number of adverse adult behaviors ranging from 0 to 5, and could be used in the statistical analysis of predicted outcomes. Quantifying these five behaviors in a Cycling Score provides insight in a cycling pattern and gives insight into possible determinants of ACEs to the subsequent offspring.

Cycling Score categories include (a) Divorced/Separated, (b) Alcohol or Substance Use, (c) Mental Illness, (d) Domestic Violence, and (e) Incarceration. Participants responded to Divorce/Separated, History of Domestic Violence, and History of Incarceration on the Demographic Questionnaire with either a Yes or No, indicating their involvement in each event since becoming an adult. The Mental Illness and Alcohol or Substance Use data points were scored and tabulated from the validated measures included in the survey (PHQ-9, GAD-7, AUDIT-C). Participants endorsing moderate to severe mental health symptoms according to the scoring protocol were coded with a Yes (affirmative) for mental illness. Participants engaging in problematic drinking according

to the scoring protocol or endorsed substance use were coded Yes (affirmative) for problematic drinking or drug use.

The Cycling Score was determined by participants' responses for each of the five outcome criteria. Every Yes (affirmative) was assigned one point. Every No (negative) was assigned zero points. Scores were summed creating a numerical value for repeated behaviors in adulthood. The Cycling Score quantified the number of adverse adult behaviors a participant endorses, used for statistical analysis on a scale between 0 and 5.

Coding and Tabulating Measures

Both the PHQ-9 (Kroenke et al., 2010) and GAD-7 (Spitzer et al., 2006) were coded for answers according to scoring guidelines and summed, then categorized for severity to determine level of mental illness. Participants in the current study reported scores ranging between 0 to 24 for depression and scores ranging between 0 to 21 for anxiety. A positive screen for depression is a score of 10 or more. A score under 10 is considered minimal, sub-clinical depression. A positive screen for anxiety is a score of six or more. A score under six is mild, sub threshold anxiety.

For the purpose of obtaining a Mental Illness score, participants endorsing clinically significant levels of either depression or anxiety (n =116, 55%) were assigned a score of one. This includes any participants who endorsed suicide ideation. Participants reporting mild anxiety, minimal or mild depression, or no anxiety or depression (n =96, 45%) were assigned a score of zero for Mental Illness.

Coding the AUDIT-C followed published guidelines (Bush et al., 1998) where each response coordinates with a numerical value. Three questions were summed, stratified for gender consumption thresholds: Females = 3+, and Male = 4+. Scores were

sorted and organized with the other two substance questions. Marijuana use and non-prescription drug use were sorted between Yes and No responses.

An alcohol and substance abuse score was obtained by compiling all alcohol use and substance use data. If a participant was a female with an AUDIT-C score of 3+ or a male with an AUDIT-C score of 4+, reported using marijuana, or reported non-prescription drug use, they were assigned a score of one for positive hazardous alcohol scores, or any endorsed marijuana or substances. Participants under the AUDIT-C threshold for problematic drinking who also denied marijuana or other drug use were assigned a substance use score of zero. Combining the AUDIT-C scores for problematic drinking with marijuana and drugs not used for medical reasons created an inclusive score for problematic alcohol use and drug use.

Mitigating Ethical Concerns

The Survey used for data collection in this study was approved by the Northwest University IRB, chaired by Dr. Molly Quick. The researcher made every attempt to mitigate any anticipated ethical issue with survey data collection. Although there was risk of unintended eliciting of negative emotion associated with past abuse, neglect, or memories of parental substance use or divorce, risk was stated up front in the consent to participate. Respondents were made aware of risks, permitted leave the survey incomplete, and were offered counseling resources if necessary.

Upon importing survey data from the digital collection platform Survey Monkey, it was noted by the researcher that IP addresses were listed for each response. IP addresses were deleted from the data to ensure anonymity as promised to participants, maintaining unidentifiable information only. The survey did not collect identifiable

information on participants. The pertinent details of the IRB submission for this research study are listed in Appendix A and the full document is available upon request.

Chapter Four: Results

Descriptive Characteristics of Participants

In 40 days, 218 surveys were collected for analysis through Survey Monkey. Of the 218 responses, six (2.7%) surveys were excluded from analysis for being incomplete. Completed surveys (N =212) were analyzed for significance. Of the 212 completed surveys, 53 males (25%) and 159 females (75%) self-reported different age ranges. Fifty participants reported age 18 to 29 years old (24%), 119 participants reported being 30 to 49 years old (56%), and 43 participants reported being over 50 years old (20%). The racial diversity represented by the participants included 178 White (84%), 12 Hispanic (6%), seven Asian (3%), four Black (2%), and one American Indian, one Alaska Native, and one Pacific Islander individuals. Eight participants self-identified as "Other" race (4%). Responses came from all geographical locations in the United States: 112 from the Northwest (53%), 48 from the Central region (23%), 24 from the Southeast (11%), 20 from the Southwest (9%), and eight from the Northeast (4%). Full time work was reported by 142 participants (67%), while 41 are working part time (19%), 13 are unemployed (6%), 11 are retired (5%), and five are disabled (2%). Income ranged between 70 participants earning between $0 to $50,000 (33%), 64 earning between $50,000 to $100,000 (30%), 40 earning between $100,000 to $150,000 (19%), and 38 earning over $150,000 annually (18%).

Frequency of Reported ACEs

Forty-eight participants (23%) reported zero adverse childhood experiences, with 77% (n =164) reporting one or more ACE. The most frequently occurring ACEs among the participants (N =212), were having a parent who was mentally ill (45%, n =95),

having parents who were divorced or separated (41%, n =86), and having a parent who was a problem drinker or used drugs regularly (34%, n =72). The least reported adverse childhood experience was parental incarceration (8%, n =16).

Figure 1. ACE Score Frequencies

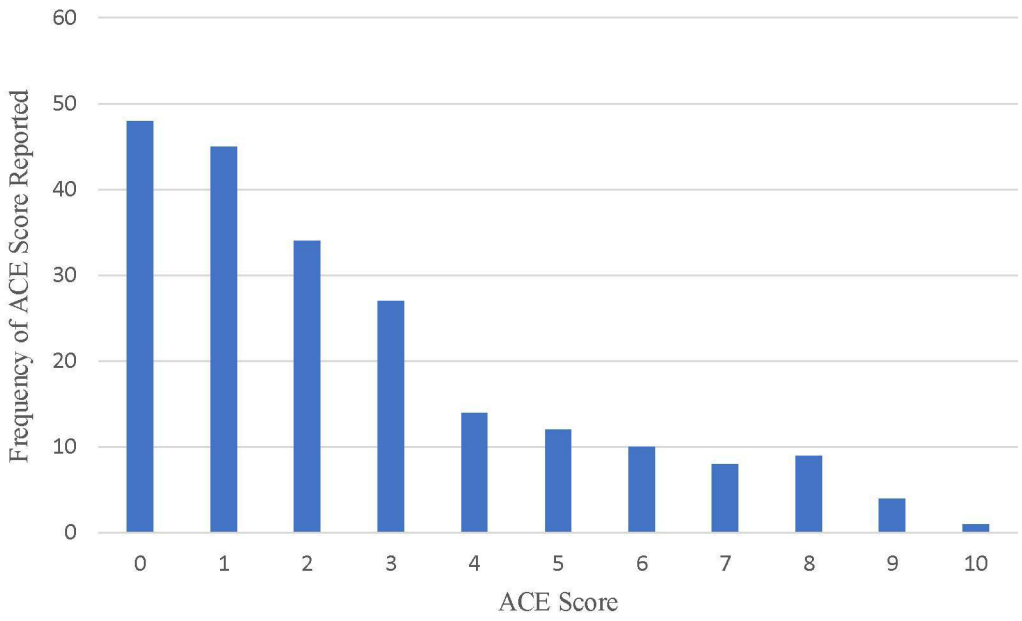

Figure 1. Reported ACE scores for N=212 participants before age 18.

Figure 2. Frequency of Specific Type of ACE Reported

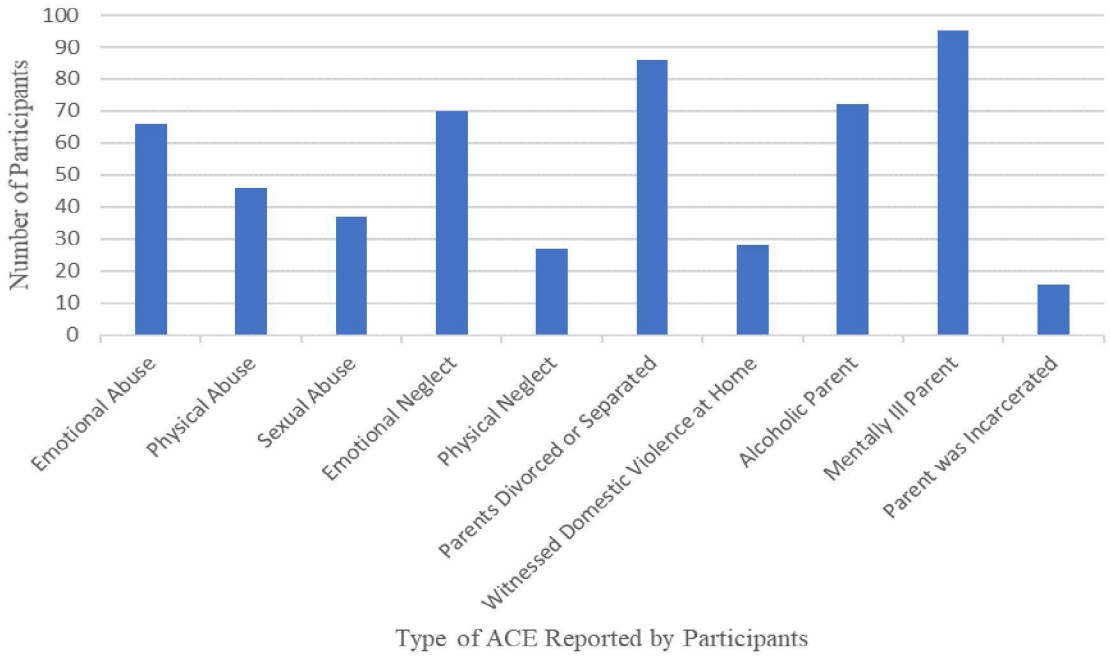

Figure 2. Frequency of specific ACEs reported by N=212 participants.

Frequencies of Specific Adverse Behaviors

Alcohol and substance use. Problematic alcohol and drug use was endorsed by 51% (n =81) participants, 104 participants (49%) denied drugs and problematic alcohol. Fifty-eight females (27%) and 19 males (9%) endorsed alcohol consumption that was problematic based on published scoring protocols (Bush, Kivlahan, McDonnel, et al., 1998). Seventy-two study participants (34%) endorsed using drugs other than those prescribed for medical reasons.

Symptom presentations of mental illness. Participants reporting minimal, mild, or no depression on the PHQ-9 with scores from 0 to 9 totaled 158 (75%). Participants endorsing clinical levels of depression reported symptoms on the PHQ-9 adding up between 10 to 27, represented by 54 participants (25%). Participants reporting mild or no anxiety on the GAD-7 obtained scores between 0 to 5 and totaled 102 (48%) responses.

Participants endorsing moderate to severe anxiety obtained score on the GAD-7 between 6 to 12, and 110 (52%) participants met criteria. Fifty-five percent (n =116) participants endorsed either clinical symptoms of depression or anxiety, and 58 participants (27%) reported suicide ideation.

Demographic criteria of endorsing adverse behaviors. Demographic details of participants endorsing behaviors reflective of adverse ACE-like criteria include relationship status of divorce or separation, personal experience with domestic violence (DV), and history of incarceration. Forty participants are single (19%), 15 endorse cohabitating (7%), 12 state they are currently divorced (6%), and 143 of the participants (67%) state they are currently married. Fifty respondents report experiencing DV (24%), while 161 deny DV (76%). Although 196 respondents (92%) deny a history of being in prison, 16 endorse being incarcerated (8%) at some point in their adult life. Eighty of the participants (38%) state they have young children while 132 deny having children under 18 years old (62%).

Figure 3. Frequency of Specific Cycling Behaviors

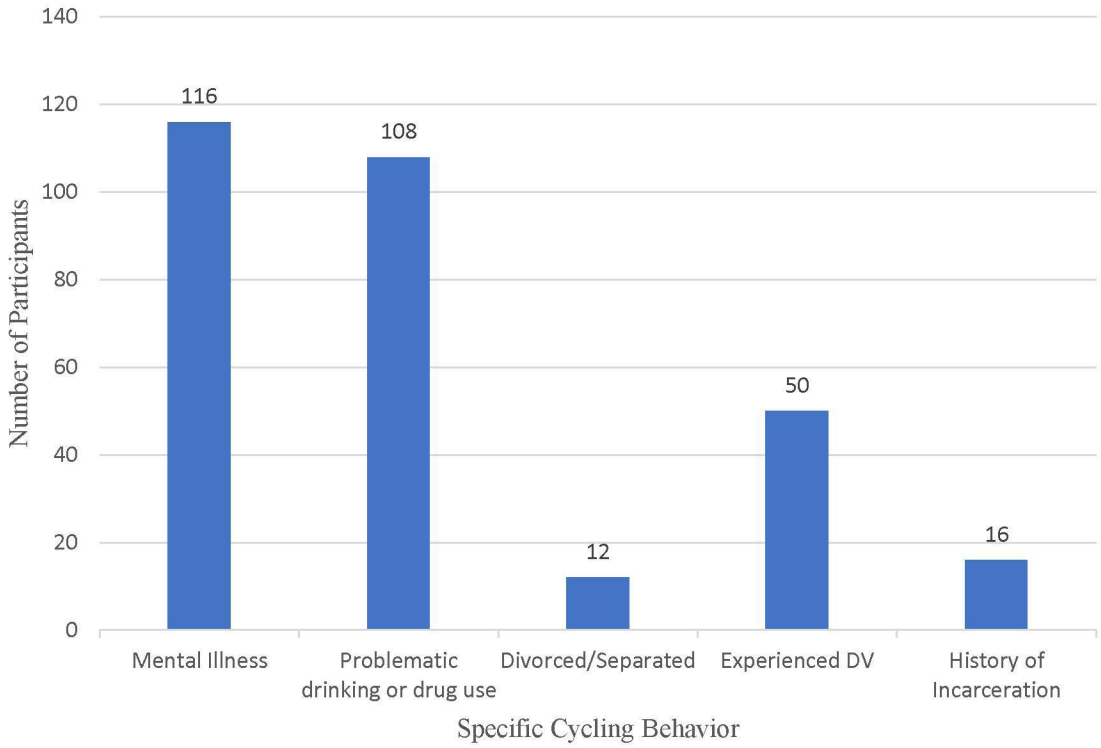

Figure 3. Specific ACE-like behaviors reported by N=212 participants.

Frequency of Reported Cycling Behaviors

Frequencies of reported adverse adult behaviors reflecting a cycling pattern of ACE were 51% (n =108) participants endorsing problematic drinking, substance use, or both, 55% (n =116) endorsing clinical symptoms of mental illness based on the PHQ-9 and GAD-7 scores for moderate to severe anxiety or depression, 6% (n =12) are currently divorced or separated, 24% (n =50) report involvement in domestic violence, 8% (n =16) have a history of incarceration. The most frequently reported cycle score was mental illness from 55% of the participants (n =116) who endorse clinically significant levels of anxiety or depression.

Figure 4. Frequency of Reported Cycling Behaviors

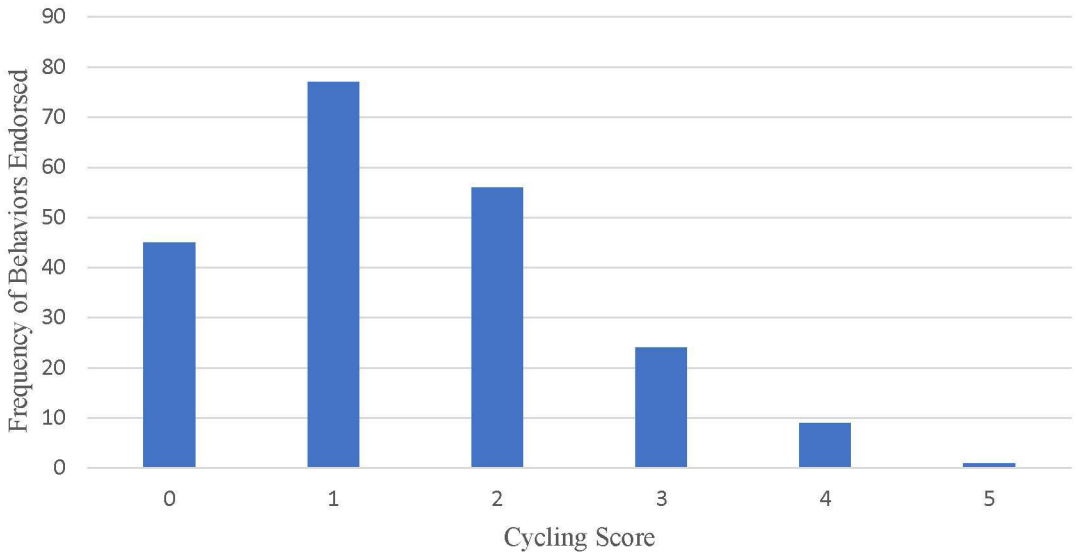

Figure 4. Frequency of Cycling Score indicating pattern of behaviors repeated in adult.

Forty-five participants (21%) deny endorsing any adverse adult behaviors, 167 participants (79%) endorse at least one or more adverse behaviors during adulthood congruent with ACEs, representing a cycling pattern. The mode number of endorsed adverse adult behaviors was one behavior reported by 77 participants (36%). Participants endorsing a combination of two cycling behaviors represented 26% of the total group (n =56), 24 participants (11%) endorse three cycling behaviors, 9 people (4%) endorse four cycling behaviors, and one person endorsed all five cycling behaviors.

Data Analysis

IBM SPSS Statistics 25 was used for running a linear regression statistical analysis using the predictor variable of a self-reported ACE score ranging from 0 to 10 to predict the likelihood of adverse behaviors being endorsed during adulthood. The predicted variable, Cycling Score, was deduced from collecting data from the self-reported measures on the survey including marital status, history of incarceration,

domestic violence experience, mental illness determined by PHQ-9 and GAD-7 scores, and alcohol or substance abuse. The Cycling Score was analyzed as a scale variable from 0 to 5.

A multiple linear regression analysis was run for statistical significance of separate ACE scores and the possible predictive nature of subsequent adult behaviors. The categorical predictor variables included each level of the ACE score ranging between 0 and 10. The goal was to assess any variation between the number of ACEs and the influence on current behaviors quantified in a Cycling Score, analyzed as the predicted variable.

Multiple linear regression analyses were run and assessed for relationships and significance between all demographic data from participants including gender, age range, geographical region in the US, income range, work status, education level, and race, and adverse adult behaviors tallied in the Cycling Score.

Findings

A linear regression was used to analyze data from participants (N =212) for significance between ACE scores (mean =2.57, SD = 2.49) and Cycling Score (mean =1.42, SD = 1.10). A one-way ANOVA, $F(1, 210) = 33.01$, $p < .001$, 95% CI {0.81, 1.12} demonstrated a statistically significant prediction between the predictor ACE variable and the predicted Cycling Score variable representing the number of cycling behaviors, therefore rejecting the null hypothesis that ACE has no effect on endorsement of adverse behaviors in adulthood. A positive correlation between ACE scores and Cycling Score was significant ($R^2 = .14$, $p < .001$).

Figure 5. Scatterplot with Regression Line: ACEs and Cycling Score

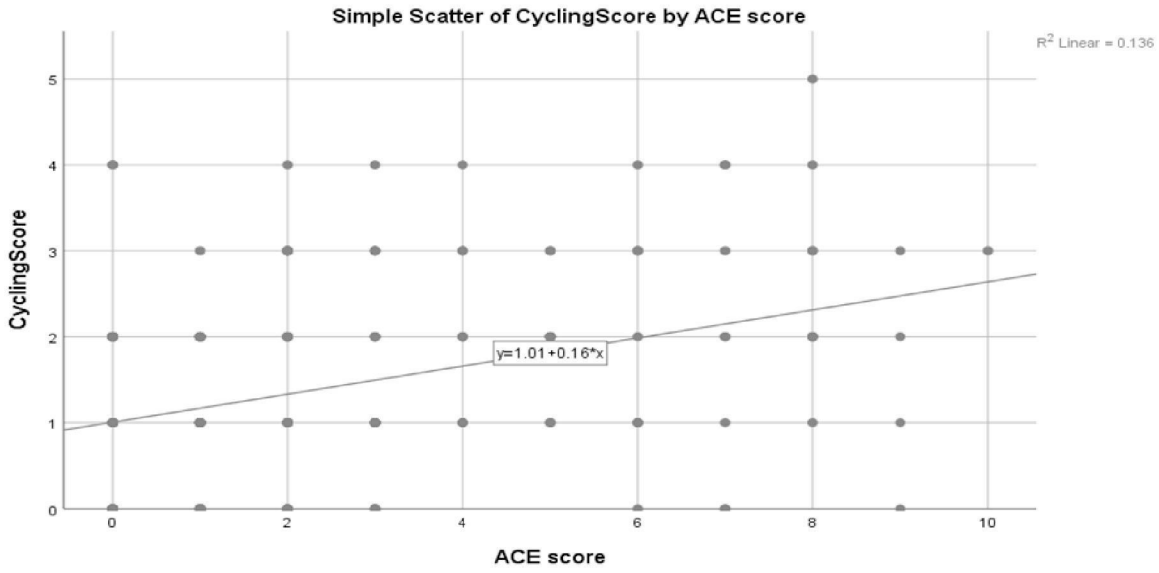

Figure 5. Regression line indicates a positive correlation between ACE and Cycle Score.

A multiple linear regression was used to analyze data from participants (N =212) for significance between individual ACE scores ranging from 0 to 10 and Cycling Score (mean =1.42, SD = 1.10). A one-way ANOVA, $F(1, 201) = 4.07$, $p < .001$, 95% CI {.707, .129} demonstrated a statistically significant prediction between select ACE scores and cycling outcome behaviors. A negative correlation exists between an ACE score of zero (R = -.209, $p < .01$) and one (R = -.180, $p < .01$) and Cycling Scores. A positive correlation exists with four or more ACEs ($R^2 = .17$, $p < .001$) indicating a tipping point of ACEs can predict a greater likelihood of cycling behaviors among participants, consistent with the body of research.

Several multiple linear regressions were used to analyze correlational significance from predictor variables relating to participant demographic details. Significant relationships were found in participant's level of education, employment status, and current annual income. Participants with a high school level of education were positively

correlated (R = .121, $p < .05$) to predict cycling behaviors in adulthood, and participants with a master's level education were negatively correlated (R = -.118, $p < .05$). Participants reporting a disabled employment status were positively correlated (R = .195, $p < .01$) to predict cycling behaviors in adulthood, and participants reporting a retired employment status were negatively correlated (R = -.129, $p < .05$). Participants reporting an annual income between $50,000 and $100,000 showed a slight positive correlation with the predicted Cycling Score (R = .120, $p < .05$). There was no significant relationship between participant's gender, age, race, or region living in the United States.

Summary

The current study offers several significant findings providing new insights into the cyclical pattern of ACEs. Results from N =212 participants surveyed show that ACE scores have a significant positive effect on the prediction of adverse behaviors in adulthood quantified in a Cycling Score. Individuals who report more ACEs are predicted to endorse more adverse behaviors during adulthood including a higher likelihood to have moderate to severe mental health presentations, problematic drinking or substance use, divorce or separation, domestic violence, or time incarcerated. This new information augments the already growing body of research because a cyclical pattern of ACE has yet to be discussed by researchers.

In addition, this new finding is immediately relevant to other aspects of the current study regarding the concern of generational transmission. Considering the probability that individuals with ACEs will become parents during their lifetime, the risk of children being exposed to the cycling pattern of their parents' adverse behaviors remains a reasonable risk. As children are raised in home environments where among one

or both parents, there is mental illness, problematic drinking or drug use, divorce or separation, domestic violence, or incarceration, they are exposed to ACEs in their own life, thus perpetuating a cycle of ACE from parent to child.

Individual ACE scores of zero and one were negatively related to the predicted outcome of cycling adverse behaviors. This suggests that individuals with either a zero or one ACE were less likely to endorse adverse adult behaviors, indicating the two lowest incidences of ACEs may provide a buffer against repeating a cycle of adversity. Perhaps these individuals experienced little stress during childhood, or enough stress to motivate personal change in adulthood. Low levels or sporadic bursts of stress may activate a positive response in an individual developing resilience to insulate subsequent stressful events. It is unlikely that a person experiences no stress, but perhaps other types of stress such as economic, cultural, or medical stress is mitigated by a family support network. Depending on the single ACE score category, it may be possible for a single household stressor to also strengthen the family network.

An ACE of four or more is a positive predictor of repeating a pattern of problematic behaviors in adulthood. This supports the graded dose response highlighted in the literature indicating four or more ACEs are related to worse pathologies (Elliott et al. 2014; Felitti et al., 1998; Qin et al., 2008; Rothberg, Bernstein & Strunin 2010). The current study adds to the body of research on this key piece of data. The correlation between four or more ACEs is stronger ($R^2 = 1.7$, $p < .001$) than the ACE score predictor variable ($R^2 = .14$, $p < .001$) in the prediction of adverse behaviors in adulthood that indicate a cycling pattern. A person reporting four or more ACEs will have a greater

likelihood of repeating the cycle in their own lives and possibly drive a greater negative outcome to themselves and their family, especially children.

Individuals with only a high school education endorse a cycling pattern of behavior in adulthood. This may be attributed to the cognitive, neurological, or developmental challenges associated with growing up in an adverse environment (Dube et al. 2002) or the challenges of having limited vocational opportunities available. Master's level graduates experience a negative correlation with adverse behaviors. Perhaps this is due to knowledge benefits applied to physical and mental well-being, coping strategies developed during arduous educational experiences, life skills supporting internal determination, or family and friend networks.

Individuals currently earning an income between $50,000 and $100,000 are positively correlated with cycling behaviors quantified in the Cycling Score variable. This income range may be a challenging place for some due to their level of education and limited opportunities for expanding earning potential. Maybe financial pressures of lower middle-class Americans are felt in not qualifying for social services while absorbing similar financial stress as those in higher socio-economic statuses.

Being retired has a negative relationship to adverse behaviors possibly because retirees may be enjoying less stress during the latter part of life, are spending time with loved ones, and reflecting on unhealthy behaviors with a renewed motivation for healthy living. Disabled employment status may be positively correlated with adverse adult behaviors due to physical or neurological limitations that add layers to psychosocial stressors of receiving care, reduced mobility, depression, social isolation, financial stress, and chronic health challenges.

Chapter Five: Discussion

Interpretation

Among the many negative biological, psychological, social, vocational, and behavioral outcomes of ACEs, five specific behaviors endorsed in adulthood are highlighted in this study: Mental illness, alcohol and substance abuse, domestic violence, divorce or separation, and incarceration. These behaviors contribute to a cycling pattern and have been shown to be significantly predictable by the incidence of ACEs. Results of this study show that individuals who grow up with adverse experiences are likely to endorse behaviors perpetuating their own psychological pain and potentially expose others to stressful events and experiences.

The cycling pattern of self-perpetuating adverse experiences similar to one's childhood is supported in literature (Dube et al., 2002; Elliott et al., 2014; Rothberg, Bernstein, & Strunin, 2010). This study augments current research with insight on endorsing adverse behaviors in adulthood that repeat a pattern from childhood. In addition, the current study illuminates possible exposure risks to offspring of adverse conditions, a vital key to understanding generational transmission of adversity. This study supports a cycling pattern indicating a problematic repetition of pathology from childhood experiences in adulthood, and possible exposure of ACEs to the next generation.

The current study suggests protective factors and risk factors may have influence on the outcomes of adverse adult behaviors. Cultural, environmental, and societal mediation may either increase or decrease the number of cycling behaviors. Potential risk factors may influence the likelihood an individual endorses adverse behaviors later in life

that are not related to the measured ACE criteria. For example, the number of adverse behaviors endorsed in adulthood may reflect environmental factors such as poverty, racial discrimination, military life, political consternation, health care accessibility, immigration status, educational resources, or neighborhood crime. According to Mersky et al. (2013), environmental risk factors play a role in negative life outcomes including mental illness, alcohol, drug, and tobacco use. They found the effects of childhood adversity were exacerbated by added challenges faced in urban minority populations.

Societal norms on vocational expectations, socio economic status, financial decisions, or family dynamics may also compound cycling behaviors among individuals already coping with adverse childhoods. Hillis et al. (2001) discuss several co-occurring problems among individuals with ACEs such as drug use, high-risk sexual behaviors, poor academic performance, lower graduation rates, and less vocational opportunities. These individuals may intensify their existing challenges by finding limited work opportunities, physically demanding manual labor jobs, and possibly more somatic complaints of work-related pain. They may also struggle financially due to limited vocational skills while maintaining work and family obligations.

Cultural identities may be protective or risk factors influencing the incidence of cycling behaviors. Strong religious ties may buffer an individual's stress, provide group protection, or perhaps vulnerability to discrimination. Immigration, refugee, or asylum seekers may find strength among individuals fleeing war-torn countries. They may also be at risk to adverse adult behaviors due to increased stress and culture clashes, in addition to possible trauma from war or famine. Different cultural norms may unintentionally become catalysts to increased risk of adverse behaviors among group

members. Barriers to care include cultural stigmas such as showing emotions, expressing pain, or receiving mental health services. In addition, values conflicts may divide culture or religious groups on issues of drug or alcohol use, norms of accepted abuse, or partner violence. While a prediction model is helpful for developing prevention measures, considering cultural and societal components to stress and stress-related behaviors must be considered.

Integration

This study supports already existing evidence that ACEs negatively impact the trajectory of an individual's long-term functioning, behavior choices, and overall health (Felitti et al., 1998; Giordano et al., 2014; Mersky et al., 2013). Dube et al. (2002) discuss concerns of ACE and alcohol abuse in adulthood. Duke et al. (2010) address a cycle of interpersonal violence among individuals reporting multiple types of ACE. DiLillo et al. (2009) associate ACE with marital conflict and divorce. Munoz et al. (2018) show a strong relationship between ACE and anxiety, and De Lissnyder et al. (2012) relate ACE with depressive disorders; all maladaptive responses to ACEs and highlighted in the current study as attributes of cycling patterns.

According to Felitti et al. (1998) individuals who experience one ACE have a high probability of reporting more than one. Edwards et al. (2003) found children who report a single incident of abuse also reported multiple types of concurrent ACEs. Anda et al. (2002) report family chaos being common in alcoholic homes where a single ACE of parental alcoholism influences other ACEs such as abuse, domestic violence, divorce, and neglect. In the current study, 77% of the participants report one or more adverse experiences as predictors for cycling behaviors in adulthood and 79% endorse at least one

adult behavior consistent with a cycling pattern. Although the highest reported adverse adult behaviors were mental illness (55%) and problematic substance use (51%), it is possible the incidence of either behavior affects other domains of functioning including interpersonal effectiveness, vocational competence, economic decisions, emotion regulation, and parenting.

Reflection of the current research study also integrates concerns consistent with previously published literature on the potential intergenerational cycling of adverse experiences (Dube et al., 2002). In the current study, 37% of participants (n =80) report having children under 18 years old. It is unknown how many children are among the 79% of respondents who endorse one or more adverse adult behaviors, because participants simply responded to a yes/no question. Potentially, these children are living in environments where 55% of the parents have clinical levels of depression or anxiety (or both) and 51% of the parents endorse current problematic drinking behaviors or use of substances in the home.

Studies by Anda et al. (2002), Conger et al. (2013), Levey et al. (2017), and Wiig et al. (2017) address a generational transmission of problems from parent to child showing an undeniable relationship between parental behaviors and functioning, and the effect on direct offspring. According to these researchers, a chaotic home environment, living is constant stress, and physically and emotionally aggressive parenting styles explained why children in these homes had an increased likelihood of becoming alcoholics, report depressive symptoms and other mental disorders, exhibit antisocial behaviors, and experience re-victimization of abuse in partner relationships. Wiig et al. (2017) report that women who had a parent addicted to drugs also experienced violence

and neglect in childhood. These women had become addicts themselves and while some perpetuated the same cycle, others were working toward sobriety, determined to mitigate the cycle of violence and addiction, protecting their children from exposure to adversity.

Parents who exhibit chronic symptoms of anxiety and depression create a transgenerational burden of mental health concerns to children in the home. Offspring of anxious or depressed parents have significantly greater risks of developing mental health disorders later in life (Beidel & Turner, 1997). Since home life plays a role in the formation and transmission of possible psychopathologies (Ohannessian, 2012), compartmentalizing adult behavior choices and the subsequent effect on children is not prudent.

The current study suggests individuals repeat patterns of behaviors in their adulthood reflective of experiences in childhood. It also elucidates an exposure risk to offspring of adverse experiences during childhood. If the children referenced in the current study were assessed for ACEs, it is possible they would report an experience involving parent mental illness, parental alcohol or drug abuse, parent involved in domestic violence, parents divorced, or parent incarceration. A positive prediction from ACE to adult behavior means children who experience adverse conditions in their youth will likely grow up endorsing behaviors that reinforce a pattern. They will likely endorse problematic behaviors that create distress and unintentionally perpetuate a cycle of ACE to their children unless it is disrupted by intervention.

Clinical applications of research findings. Integrating the new data from the current study into clinical applications is an integral part of this research. Finding a significant prediction between an individual's childhood adversity and emulating a cycle

of similar behaviors in their adulthood is a very useful tool in appropriating treatment in the clinical setting, to the individual. It also provides informed care when addressing family systems concerns and problematic behaviors in children and adolescents.

By nature, a cycle is bi-directional and if A and B represent opposite sides of a diameter, a relationship exists between both points. One can predict the future from A to B, for example. One can also evaluate the past from B to A. This is a critical approach to treatment and patient care using the findings from the current study. Where a prediction is seen from ACE to cycling behaviors, there is also insight from cycling behaviors to ACE. Furthermore, intervening the cycle at any part—childhood, adolescence, or adulthood can effectively disrupt the cycle of ACE shifting the life trajectory of the individual and potentially their future offspring.

First, assessing for ACEs early allows clinicians to develop treatment plans specific to the younger person's current need. Teaching stress management techniques and healthy coping behaviors, boundary training and communication of needs, self-efficacy and goal setting, affirmation statements, emotion regulation, and proactively developing support networks are ways a child or teen may benefit from early identification of ACEs. Utilizing the school platform of communication for teaching students how to identify ACEs helps normalize feelings, develop peer support, and allocate prevention measures against substance use and health risk behaviors often adopted at this time (Layne et al., 2014; Rothberg et al., 2010).

Second, educating the adult population on the origins of ACEs, validating their own experiences, teaching helpful coping and life skills to mitigate personal stress responses, teaching emotion regulation skills, boundary setting, mindfulness, and helpful

communication tools will likely decrease unhealthy coping behaviors. Early intervention of therapeutic techniques will empower individuals who have suffered silently in a prison of secret ACEs. A patient able to identify adverse experiences involving his or her parents may feel relieved that their childhood stress impacted confidence growing up and choice of behaviors. Validating childhood loneliness or victimization in adults brings a visible sense of freedom and restored hope.

Third, a retrospective view of ACEs gives insight to the clinician on appropriate treatment for the patient at any place on the downward trajectory. For example, a 32 year old male who presents with concerns about his drug use may deny experiencing trauma but endorse emotional abuse by his alcoholic mother (two ACEs). Treatment will include CBT and metacognitive awareness to identify negative scripts from childhood. Appropriately placed techniques interrupt negative thought patterns that lead to depression and challenge habitual cognitive distortions that possibly explain substance use motives.

Perhaps a woman struggling with obesity endorses poor eating habits to cope with her anxiety. Identifying anxiety as the precursor to eating behaviors, the clinician assesses for ACEs. Realizing the woman was raised by a narcissistic mother who criticized and demeaned the patient, compared her to others, and withheld affection throughout her childhood, informs the clinician how to proceed. The informed clinician now focuses on cognitive distortions and anxiety specific coping tools more than food and weight.

According to Layne et al. (2014) and Levey et al. (2017), victims of childhood abuse are at greater risk of re-victimization in adulthood and increased domestic violence. The clinician with ACE informed care will assess for ACEs for a patient seeking

domestic violence resources and related mental health services. ACE education is a vital intervention that may validate the patient's unresolved trauma and equip her with tools before entering a new relationship and risking re-victimization. Often, children are born in the early stages of these relationships before the partner becomes dangerous, leaving a legacy of violence to a vulnerable population.

Understanding ACE data when applying treatment interventions is best practice. Using data from the current study, clinicians can address specific root causes for many pathologies. Substance use treatment, for example, viewed from the biopsychosocial perspective integrated with knowledge of the ACE prediction illuminates reasons why the person started on a path of substance use. Unfortunately, focusing on sobriety without addressing ACEs only adds to the burden of pain with unrealistic expectations. Treatment is often applied to presenting complaints which may serve to reduce symptoms temporarily, not address the underlying cause of use at its root.

Current findings have applications to the generational impact from parent to child. A patient who presents with anxiety and hypervigilance about protecting her children may report experiencing childhood sexual abuse and live in terror of the risk to her children. Meanwhile, her anxiety and hypervigilance are transferred to her children, and they grow up with similar fear and worry. Assessing for ACE informs treatment approaches and educates patients on the impact their behaviors have on their children. Using this data in clinic will validate, educate, and empower patients who have been stuck in their own cycle of ACE.

Limitations

Although an important missing piece in the body of literature on ACE was exposed in this study, limitations should be considered. The present study relied on self-reported data from participants, and although utilizing an online data collection was intended to mitigate concerns of anonymity, responses were not verified for accuracy. The digital platform used was simple and allowed participants to quickly complete all 44 questions of the survey under five minutes, however controlling the distribution was not possible. Survey links were sent to large numbers of people to post to social media sites. While this allowed for a large number of responses (218) in a short period of time (40 days), it may have led to potential bias in the distribution "by friends to friends" and was possibly received and answered by people clustered within similar social, geographical, cultural, educational, or socioeconomic groups. Furthermore, people who are active on social media were more likely to respond than non-social media users which may be an unresearched culture on its own.

Creating a Cycling Score to quantify the number of adverse behaviors reported by participants that indicate a cycling pattern helped quantify the five specific adult behaviors the study was attempting to analyze for significant prediction. Each point of the Cycling Score was accurately tabulated and scored according to published guidelines (Kroenke et al., 2010; Spitzer et al., 2006). However, the difference between mild and moderate depression or mild and moderate anxiety is one point on the mental health screens (PHQ-9 and GAD-7). There may be a slight variation between a participant's current level of functioning at the time of the survey and past experiences. The substance use criteria of the Cycling Score was determined by validated measures for problematic

drinking, but other substance use may or may not be problematic. For example, patients who use marijuana for anti-anxiety or medical reasons may not experience function impairment. Conversely, patients who deny alcohol use but are prescribed a mood stabilizer may not have been considered for any substances. Last, the opiate crisis is an example of prescribed drugs that were for medical reasons but taken longer than intended. A patient may endorse active opiate use, yet deny substance use on the survey since a prescription was issued by a medical provider.

Last, a few demographic questions may not have captured complete information on participant's life and family. Participants reported their current relationship status. This leaves the question of divorce most likely a lower number than reality as people who have been divorced and remarried would select married as the current status. Additionally, it is possible single or cohabitating participants endorse non-traditional family structures but experience similar upheaval in partner break ups as one who has been divorced. Participants were asked to identify if they had children under 18 years old. It is likely in a sample of 212 people that more respondents have children, but the children are in an older age category. It is likely more than 38% of the participants have more than one child. This may have omitted critical details related to a generational impact of ACE.

Future Studies

The goal of developing prevention measures to identify children exposed to the adverse adult behaviors within the home continues to be at the forefront of research. Prevention measures and interventions may simply involve awareness and education of available research to the general, non-scholarly population. Parent education of their own

ACE history and the typical trajectory of poor coping strategies, difficulty in school and work settings, chronic stress, and myriad health challenges may normalize an individual's struggle. Empowering personal change and teaching self-awareness may help individuals with ACEs lower the personal impact to themselves and their family members. Efficacy studies on dissemination of ACE information and training tools, or studies on resiliency and stress management are ways interventions will be developed and applied clinically.

While the current study provides insight into the cycling patterns of ACE and adult behaviors, 21% denied any adverse behaviors. A deeper understanding of how individuals with ACEs ameliorate the risks of adverse outcomes would provide tools for healthy coping and resilience. It is possible that personality, social, cultural, spiritual, and other contextual factors impact outcomes and disrupt the natural trajectory of adverse childhood experience. Conversely, broadening the scope of this research would help identify patterns leading to adverse adult behaviors. Targeting a population with low ACEs who endorse adverse adult behaviors would give insight into social determinants and contextual factors influencing poor behavior choices that affect long-term health.

Program evaluations for treatment approaches regarding prediction patterns and retrospective analysis of ACEs would allow for protocols and workflows to be implemented in clinical settings. Specific ACEs need informed care to ensure interventions target patients' deepest source of pain, not just address surface symptoms. Researching and developing a set of ACE specific interventions will educate clinicians on best patient care while delivering effective therapeutic services. Producing ACE informed care training would provide access of relevant clinical applications and assessments to medical and mental health providers, and improve patient quality measures.

Due to the capacious scope of ACEs' negative impact over the lifespan, it would be beneficial for research to expand to other social applications such as ACE informed marriage dynamics, sibling dynamics, or adult child-parent interactions at end of life. Unresolved ACEs may impact quality of care to aging parents or other family members. Scars from childhood likely contaminate relational health throughout the lifespan causing a wake of loneliness and depression.

Conclusion

Individuals growing up in homes where adverse experiences create a chronically stressful environment are likely to repeat behaviors implicated in poor quality of life. As young children experience adversity, they are susceptible to cognitive disruption, psychological challenges, neurobiological changes, poor social behaviors, and declining health exacerbating negative effects on development, quality of life, and life course (Anda et al., 2006; Jääskeläinen et al., 2016).

This study concludes that adverse childhood experiences can predict endorsement of adverse behaviors in adulthood. Five outcome behaviors were studied: Mental illness, alcohol and substance abuse, domestic violence, divorce or separation, and incarceration. These five behaviors are also five of ten criteria screening an individual for ACEs. Considering the body of research demonstrating the persistent, multi-faceted impact on an individual with many ACEs physiologically and psychologically, results of this study augment the importance of identifying the impact on later life experiences that influence the next generation. Where adults endorsing adverse behaviors are also parents, the prediction of repeating a pattern of adversity concerns offspring risk exposure and a cycling of generational adversity in families.

Using the prediction data from the current study in clinical settings will provide intervention and treatment to people in ages along the continuum of development. For a younger person, prevention measures can help inform and educate risks of leaving ACEs unaddressed. For older patients, gaining a better understanding of ACEs and normalizing childhood pain may interrupt a cycle of ACE and bring a sense of healing. Assessing for ACEs when patients present with ACE like behaviors will help inform clinicians the appropriate treatment plans. Addressing the specific adverse experience in a patient's childhood will give insight into the current condition and provide information for therapeutic tools.

Undoubtedly ACEs predict multiple overlapping negative outcomes in a person's life, but of greater importance is the exposure of adverse events and experiences on the next generation. Children living in homes where adverse adult behaviors occur may be susceptible to exposure of ACEs. As adults endorse problematic drinking, substance use, divorce or separation, clinically significant levels of depression or anxiety, engage in relationships vulnerable to domestic violence, or activities at risk of incarceration, the children living in these environments are not immune to the destructive consequences.

The far reaching, lifelong, negative impact of adverse childhood experiences cannot be overstated. This study focused on the adverse behaviors endorsed in adulthood that replicate a pattern of behaviors reported on the ACE measure. While the scope of the current research was to detect patterns of five cycling behaviors taken from household dysfunction criteria on the ACE, unhealthy, destructive behaviors not collected in this study may have a greater impact on the individual's health such as physical, emotional, or sexual abuse, and emotional or physical neglect. These added adversities transmit

chronic, toxic levels of stress to the developing body and incite a biochemical cascade of physiological damage difficult to measure (Burke-Harris, 2018).

Adverse childhood experiences have a destructive physiological, psychological, and social effect on the growing individual. Narius and Porter (2017) report higher ACEs being recorded in younger populations, and as neuroscience research quantifies developmental interference due to ACE (Burke-Harris, 2018), there is a greater concern for the next generation, particularly the adolescents. Early identification and intervention in younger populations will assuage chronic stress impairment as a child approaches adolescence, the next generation entering parenthood. Broadening knowledge on the ACE trajectory and disseminating information to the public will potentially disrupt the cycle of ACE. It will also inform practitioners to provide appropriate treatment aimed at elevating patient self-efficacy and functional improvement, not just symptom reduction.

Continued research and intervention are vital to mitigating the unpredictable exposure risk of adverse experiences to children. Children living with parents who exhibit cycling behaviors are at greater risk of exposure to ACEs than children living with parents not exhibiting a cycling pattern. An individual's ACEs are implicated in a cyclical pathway (Dube et al., 2002) replicating an environment in which future ACEs are experienced by others within the network system. The ability to predict, intervene, and mitigate adverse behaviors in adulthood may interrupt a cycle of ACE from generation to generation.

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Appendix A

Institutional Review Board Application

Research survey distributed on SurveyMonkey.com

Institutional Review Board Full Application
Upon completion, please submit to irb@northwestu.edu

Name	Gretchen Gendreau
Telephone	[redacted]
Email	[redacted]
Department/College	College of Social and Behavioral Sciences
Faculty/Staff (Y/N*)	Yes (Dissertation Committee)

*Students must have a faculty supervisor who is responsible for overseeing the research project including design, data collection, and communication with the IRB Committee.

*Faculty Supervisor Name ____Dr. Matt Nelson_____

Proposed Start Date ____November 1, 2018_____

Proposed Title _____Adverse Childhood Experiences: Predicting Cyclical Patterns of Adverse Experiences and Offspring Exposure Risk of a Second Generation of ACE__

Section I: Form Use Verification. Respond *yes* or *no* to each question.

1. __No__ Will participants be video or audio recorded?
2. __No__ Will participants be identifiable to anyone other than the researcher(s)?
3. __No__ If participation or responses were known beyond the research project, could participants be at risk of criminal or civil liability, damage to employment, financial loss, or undue embarrassment?
4. __Yes_ Does this research project deal with sensitive topics (i.e. illegal behavior, drug/alcohol use, or sexual conduct)?
5. __No_ Does this research project use existing data sources not publicly available (documents, records, specimens etc.)?
6. __No_ Will participants be deceived in any way?
7. __No_ Does this research project involve participants who are under 18 years old?
8. __Yes_ Does the research project involve participants who are not healthy adults (mentally, physically, or emotionally)?
9. __No_ Does this research project involve prisoners, pregnant woman, developmentally disabled adults, or any other special population?
10. __No_ Does the research project involve any medical or dietary procedures?

Consent Form
Dissertation Quantitative Research Study

If you agree to participate, please confirm you are over 18 years old.
☐ Yes, I am over 18 years old.

You are invited to participate in a research study conducted by a graduate student in counseling psychology at Northwest University. The purpose of this study is to detect if there is a cyclical pattern of adverse experiences. This study will collect information on what your experiences were like throughout your childhood until you turned 18 and what current experiences you can relate to as an adult.

If you agree to participate in the study you will be asked to simply fill out a survey with 5 parts. All responses are anonymous; there is not a place for you to list any identifying information. There are risks associated with participation. Some individuals may be uncomfortable answering personal questions, questions about their parents, or be reminded of past events. If you feel uncomfortable at any time, you are free to discontinue completing the Survey without any penalty. If you would like to seek professional help after completing the Survey, please locate a therapist on psychologytoday.com therapist finder for someone in your local area.
Participation in this study is voluntary. You may choose not to participate in this study at any time and for any reason. You may refuse to answer any questions asked without any negative consequences. You may keep this consent form for your records. By completing this questionnaire, you are giving permission for your unidentified responses to be used in research. The results from this study will be presented at a future date and you may contact me for a copy of the results if you are interested. All data collected will be destroyed by May 2019.

If you have any questions about this study, contact Gretchen Gendreau at gretchen.gendreau14@northwestu.edu. If you have further questions, please contact my faculty advisor, Dr. Matt Nelson at Northwest University at . You may also contact the Chair of the Northwest University Institutional Review Board, Dr. Molly Quick, at irb@northwestu.edu or .

Thank you for your consideration of this request.

Gretchen Gendreau
Doctoral Student in Counseling Psychology
College of Social and Behavioral Sciences
Northwest University

Matt Nelson, PhD
Dean, College of
Social and Behavioral Sciences

Demographic Information

Currently:

1. Age
   - ☐ 18-29
   - ☐ 30-49
   - ☐ 50+
2. Gender
   - ☐ Female
   - ☐ Male
   - ☐ Prefer not to answer
3. What is your current relationship status?
   - ☐ Single
   - ☐ Cohabiting
   - ☐ Separated/Divorced
   - ☐ Widowed
   - ☐ Married
4. Do you have children under 18?
   - ☐ Yes
   - ☐ No
5. Geographical region in US
   - ☐ Northwest
   - ☐ Southwest
   - ☐ Central
   - ☐ Northeast
   - ☐ Southeast
6. Income range
   - ☐ 0-50,000
   - ☐ 50,000-100,000
   - ☐ 100,000-150,000
   - ☐ 150,000+
7. Current work status
   - ☐ Unemployed
   - ☐ Part time/seasonal
   - ☐ Full time
   - ☐ Retired
   - ☐ Disabled
8. Have you ever been incarcerated?
   - ☐ Yes
   - ☐ No
9. Have you ever felt trapped in an abusive relationship by a romantic partner?
   - ☐ Yes
   - ☐ No
10. Highest level of education attained
    - ☐ Some high school
    - ☐ High School/GED
    - ☐ Associates
    - ☐ Bachelors
    - ☐ Masters/Doctorate
11. Racial Identity
    - ☐ American Indian
    - ☐ Alaskan Native
    - ☐ Asian
    - ☐ Black/African American
    - ☐ Hispanic/Latino
    - ☐ Pacific Islander
    - ☐ White
    - ☐ Other

ACE Questionnaire

1. Did a parent or other adult in your house **often** swear at you, insult you, put you down, or humiliate you? **OR** Act in a way that made you afraid that you might be physically hurt?	**Yes**	**No**
2. Did a parent or other adult in your house **often** push, grab, slap, or throw something at you? **OR** Ever hit you so hard that you had marks, bruises, or were injured?	**Yes**	**No**
3. Did any adult or person at least 5 years older than you **ever** touch or fondle you or have you touch their body in a sexual way? **OR** Did anyone attempt to have oral, anal, or vaginal intercourse with you?	**Yes**	**No**
4. Did you **often** feel like no one in your family loved you or thought you were important or special? **OR** Did you feel like your family members didn't look out for each other, didn't feel close to each other, and didn't support each other?	**Yes**	**No**
5. Did you **often** feel like you didn't have enough to eat, had to wear dirty clothes, or had no one to protect you? **OR** Were your parents ever too drunk or high to take care of you or take you to the doctor if you needed to go?	**Yes**	**No**
6. Were your parents **ever** separated or divorced?	**Yes**	**No**
7. Was your mother or step-mother **often** pushed, grabbed, slapped, or had something thrown at her? OR **Sometimes**, **often**, or **very often** kicked, bitten, hit with a fist, or hit with something hard? OR **Ever** repeatedly hit at least a few minutes or threated with a gun or knife?	**Yes**	**No**
8. Did you live with anyone who was a problem drinker or alcoholic or used drugs on a regular basis?	**Yes**	**No**
9. Was anyone in your household depressed, mentally ill, or ever talked about or tried to commit suicide?	**Yes**	**No**
10. Did anyone in your household ever go to prison?	**Yes**	**No**

Adverse Childhood Experiences (ACE) Measure
(Felitti et al., 1998)

Patient Health Questionnaire-9
(Kroenke, Spitzer, Williams, & Löwe, 2010)

How often have you been bothered by any of the following:	Not at all	Several days	Over half the days	Nearly every day
1. Little interest or pleasure in doing things				
2. Feeling down, depressed, or hopeless				
3. Trouble falling/staying asleep, sleeping too much				
4. Feeling tired or having little energy				
5. Poor appetite or overeating				
6. Feeling bad about yourself-or that you are a failure, or let yourself or your family down				
7. Trouble concentrating on things, such as reading the newspaper or watching television				
8. Moving or speaking slowly that others have noticed. Or the opposite, restless/fidgety more than usual				
9. Thoughts that you would be better off dead or of hurting yourself in some way				
If you checked off any problems on this questionnaire so far, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?	Not difficult at all	Somewhat Difficult	Very difficult	Extremely difficult

Generalized Anxiety Disorder-7
(Spitzer, Kroenke, Williams, & Löwe, 2006)

How often have you been bothered by any of the following problems?	Not at all	Several days	Over half the days	Nearly every day
1. Feeling nervous, anxious, or on edge				
2. Not being able to stop or control worry				
3. Worrying too much about different things				
4. Trouble relaxing				
5. Being so restless that it's hard to sit still				
6. Becoming easily annoyed or irritable				
7. Feeling afraid as if something awful might happen				
If you checked off any problems on this questionnaire so far, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?	Not difficult at all	Somewhat difficult	Very difficult	Extremely difficult

AUDIT-C (Mulvaney-Day et al., 2017)

1. How often do you have a drink containing alcohol?
    a. Never
    b. Monthly or less
    c. 2-4 times a month
    d. 2-3 times a week
    e. 4 or more times a week

2. How many drinks containing alcohol do you have on a typical day when you are drinking?
    a. 1 or 2
    b. 3 or 4
    c. 5 or 6
    d. 7 to 9
    e. 10 or more

3. How often do you have 6 or more drinks on one occasion?
    a. Never
    b. Less than monthly
    c. Monthly
    d. Weekly
    e. Daily or almost daily

4. How often do you use marijuana?
    - ☐ Daily
    - ☐ Weekly
    - ☐ Rarely/Seldom
    - ☐ Never
5. Have you used drugs other than those required for medical reasons? Yes No