

ABSTRACT

Title of Document: EXPLORING THE EFFECTS OF ADVERSE CHILDHOOD EXPERIENCES AND SOCIAL INTEGRATION ON ADOLESCENT SUICIDAL IDEATION: A SECONDARY ANALYSIS OF THE NATIONAL COMORBIDITY SURVEY REPLICATION ADOLESCENT SUPPLEMENT (NCS-A)

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Exposure to adverse childhood experiences is common among youth. Numerous studies have identified cumulative exposures to adversity during childhood as a serious public health issue. Studies have found a significant dose-response association between cumulative adversities and risk for negative behavioral and mental health outcomes in adults, and developmental delays and internalizing and externalizing disorders in children. Efforts to expand existing knowledge about childhood adversities and the factors that are protective has been a focus of recent efforts.

In this dissertation, two studies were conducted to assess the relationship of adverse childhood experiences and social integration on risk for adolescent suicidal ideation. Study 1 focused on assessing the predictability of a 20-item childhood adversity assessment versus a 9-item assessment for risk of suicidal ideation. Results from this study found that additional items in the expanded assessment were predictive of suicidal ideation and increasing exposures significantly increased risk for suicidal ideation.

However, the 20-item assessment was only slightly more predictive of suicidal ideation compared to the 9-item assessment.

Study 2 examined the protective effect of family, school, religious/spiritual, peer and teacher integration as a protective factor of the relationship of cumulative childhood adversity and adolescent suicidal ideation. Results indicate family, school and religious/spiritual integration reduce risk for suicidal ideation for adolescents reporting 1-3 adversities. Only family integration significantly reduced risk for suicidal ideation for youth reporting 4-6 adversities. None of the five social integration factors reduced suicidal ideation risk for youth reporting 7 or more adversities. Further, peer and teacher integration were not found to be a protective influence across any of the adverse childhood experiences risk groups.

Future public health research must focus on identifying those childhood experiences that may increase risk for poor behavioral and mental health outcomes. Current priorities should also focus on youth who have experienced higher levels of adversity so that more appropriate prevention and intervention programs and policies can be developed. Finally, given the impact of childhood adversities on health and wellbeing over the life-course, more efforts are needed to reduce or eliminate childhood adversities.

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THE NATIONAL COMORBIDITY SURVEY REPLICATION ADOLESCENT SUPPLEMENT
(NCS-A)**

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Dedication

This dissertation is dedicated to the many girls and young women who I have had the honor to meet. Graciously you each have shared your lived experiences that too often have included tremendous amounts adversities. Your bravery, will to find the bright spot in each day, and sheer brilliance is my inspiration.

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Chapter 1: Introduction

Introduction

Exposure to cumulative interpersonal violence and other stress inducing adverse life events is a serious public health issue common to many children and adolescents living in the United States. This silent epidemic among youth often goes unidentified and untreated with devastating short and long-term consequences. Exposure to interpersonal violence and other stressful life events during childhood has been associated with numerous negative behavioral, mental and physical health, and social outcomes over the life course (Fang, Brown, Florence, & Mercy, 2012; Felitti et al., 1998). Further, exposures to interpersonal violence and other life stressors during childhood have been linked to financial costs to society as a whole. According to the Centers for Disease Control and Prevention (CDC), in 2012 the cost associated with just one year of confirmed cases of child maltreatment (n = 580,740) in the form of physical, sexual, psychological, or negligent abuse in the U.S. had an estimated total lifetime financial cost of approximately \$124 billion (Fang et al., 2012). Cost estimates for the 1,740 fatal and 579,000 non-fatal confirmed child maltreatment cases ranged between \$8,000 to \$1,200,000 in costs associated with childhood and adult medical care, productivity loss, child welfare, criminal justice, and special education services for this population (Fang et al., 2012).

While much research has been conducted to better understand the prevalence (Child Trends, 2013; Finkelhor, Turner, Shattuck, & Hamby, 2015; U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion, 2015) and effects of these experiences on behavior, health and social outcomes (Anda et al.,

2007, 2008; Bethell, Newacheck, Hawes, & Halfon, 2014; Chapman et al., 2004; Dube et al., 2003, 2006, 2009; Felitti et al., 1998; 2001; Kalmakis & Chandler, 2015; Kelly-irving et al., 2013), early identification and treatment of childhood exposure to these experiences among youth must continue to be a public health priority. As noted in the literature, there are numerous exposures that may produce stress responses among youth that must be more fully assessed, not all populations experience stressful life events at the same rate, and individual responses to these events vary depending on the presence of risk and protective factors such as family and peer social support and individual coping styles that may attenuate the effects of these exposures on youth outcomes (Rosenthal, Wilson, & Futch, 2009).

This dissertation seeks to expand existing knowledge about the effects of adversity and stressful events during childhood on behavioral and mental health outcomes during adolescence. Specifically, in this secondary data analysis of the National Comorbidity Survey Replication Adolescent Supplement (NCS-A), the researcher examines a broader range of exposures as potential stressors during childhood, the role of social integration as a protective factor of suicidal ideation, and how these relationships vary across different levels of cumulative childhood adversity.

Problem Statement

Measuring Youth Exposure to Adversity and Stressful Events

It is difficult to know the true scope of adversity experienced by youth. Estimates of prevalence rates of events such as interpersonal violence alone vary based on a host of factors such as how interpersonal violence is defined, the methods used to collect data, policies regarding reporting requirements, and how abuse, neglect and stressful life

experiences are documented and classified (Voisin, 2007). For example, some researchers may assess exposure with a broadly worded question such as “Have you ever been physically abused?” while others may assess the same concept with more specific language such as “Have you ever been hit, slapped, or pushed by a boyfriend/girlfriend?” Further, nearly half of all victimizations among youth are not reported and therefore go undocumented, resulting in an underestimation of the pervasiveness of the problem (Office of Juvenile Justice and Delinquency Prevention, 2000). However, while it is difficult to estimate the prevalence of these types of exposures among our youth, a number of annual reports and nationally representative studies provide a glimpse into the nature of this epidemic in the U.S. (Finkelhor et al., 2015; Kann et al., 2014; U.S. Department of Health & Human Services, Administration for Children and Families, Administration on & Children, Youth and Families, Children’s Bureau, 2016).

Prevalence of Adversity and Stressful Events Among Youth

Every year, the U.S. Department of Health and Human Services (DHHS) publishes an annual national report on referrals and cases of child maltreatment (U.S. Department of Health & Human Services, Administration for Children and Families, Administration on & Children, Youth and Families, Children’s Bureau., 2016). According to the DHHS Office of Administration on Children and Families (2016), approximately 3 million referrals for child maltreatment are made annually to state Child Protective Service (CPS) agencies. Of these referrals, in 2014 approximately 702,000 cases of child maltreatment (9.4 per 1,000) were substantiated (U.S. Department of Health & Human Services, Administration for Children and Families, Administration on & Children, Youth and Families, Children’s Bureau., 2016). The vast majority of these

documented CPS cases were for neglect (75%) with the remaining cases being for physical abuse (17%), sexual abuse (8%), and other forms of maltreatment such as threats of abuse, exposure to parental drug and alcohol abuse, and lack of parental supervision (10%) (U.S. Department of Health & Human Services, Administration for Children and Families, Administration on & Children, Youth and Families, Children's Bureau., 2016).

DHHS also reports that boys and girls are almost evenly represented among documented CPS cases and exposure to child maltreatment is reported to occur among youth from the point of infancy throughout adolescence or until they reach the age of 18 when they are no longer considered a child. Most often, the perpetrators identified in CPS cases are individuals most trusted and proximal to the child (i.e., one or both parents and acquaintances), and infants, under 1 year of age were reported to be the most vulnerable of all age groups (i.e., rate of 24.4 per 1000 compared to 12.3 or less per 1000 for children 1 year of age and older). Finally, race/ethnic disparities exist among documented CPS cases. In 2014, African American children had the highest rates of victimization (15.3 per 1,000 children) compared to American Indian/Alaska Natives (13.4), Multiracial youth (10.6), Pacific Islanders (8.6), Hispanics (8.8), Whites (8.4), and Asian youth (1.7)(U.S. Department of Health & Human Services, Administration for Children and Families, Administration on & Children, Youth and Families, Children's Bureau., 2016).

The Youth Risk Behavior Surveillance (YRBS) study is an annual national survey of students in grades 9-12. This annual study provides a snapshot of adolescent health indicators nationally, and is one of the primary sources of data used to measure progress towards the DHHS Healthy People objectives among adolescents (Kann et al., 2014).

Based on self-report information, this annual survey also provides a glimpse of the pervasive nature of violence and victimization among adolescents (Kann et al., 2014).

As noted in Table 1.1 between 3.1% and 24.7% of study participants reported being exposed to some form of violence in the past year. For example, nearly one quarter of participants reported being in at least one physical fight (24.7%), nearly 20% reported being electronically bullied, and approximately 10% of all youth who were dating at the time of the survey stated they had either been physically or sexually assaulted by someone they were dating or involved with intimately (Kann et al., 2014). The YRBS also documented gender differences for certain categories of interpersonal violence exposure. Females were more likely than male students to report not going to school for safety reasons, being electronically bullied, being bullied on school property, being forced to have sexual intercourse, and experiencing physical and sexual dating violence (Kann et al., 2014).

Additional studies have attempted to quantify the prevalence of interpersonal violence and abuse among youth. Among the most cited, is Finkelhor, Turner, Ormrod, & Hamby's 2009 nationally representative study (N = 4,549), where they concluded approximately 60% of all youth experience at least one form of direct or indirect violence annually (e.g., physical assaults, robbery and other property crimes, child maltreatment, sexual victimization, or witnessing violence in their communities or families) (Finkelhor, Ormrod, & Turner, 2009; Turner, Finkelhor, & Ormrod, 2010). Further, Finkelhor and colleagues (2009) concluded victimization among youth often is not an isolated occurrence but may occur multiple times and in varying forms. For example, researchers found that nearly 40% of participating youth had been exposed to 2 or more direct forms

of violence, slightly more than 10% had been exposed to 5 or more direct victimizations, and nearly 3% had experienced 10 or more exposures to violence during the prior year.

Item	Percentage
Threatened or injured with a weapon	6.9%
Physical fight one or more times	24.7%
Sustained an injury requiring medical care due to a physical fight	3.1%
Electronically bullied via emails, chat rooms, instant messaging, websites, or texting;	14.8%
Reported being bullied on school property	19.6%
Reported ever being physically forced to have sexual intercourse when they did not want to	7.3%
Dating Violence - reported being hit, slammed into something, or injured with an object or weapon on purpose	10.3%
Dating violence -reported being kissed, touched, or physically forced to have sexual intercourse when they did not want to	10.4%

Exposure to adversity or stressful events is not restricted to direct experiences of violence among youth. Indirect exposure (i.e., witnessing or hearing about violence) within the proximal and distal environments of children is also very common, and has been associated with numerous negative outcomes among youth (Stein, Jaycox, Kataoka, Rhodes, & Vestal, 2003). For example, a 2006 study estimated that more than 15 million children reside in families in which partner violence has occurred within the past year, with approximately 7 million children living in families in which severe partner violence is present (Herman-Smith, 2013; McDonald, Jouriles, Ramisetty-Mikler, Caetano, & Green, 2006). Another study of 120 African American male youth living in New York City found that 70% had been indirectly exposed to violence by hearing of a serious injury to someone close to them (Voisin, 2003).

Further, there are a number of indirect exposures to stress inducing experiences that have been found to impact child wellbeing that are often overlooked in studies of cumulative childhood adversity. For example, the impact of homelessness, food scarcity, living in a single parent household, and being involved in the child welfare system through foster care are all potential stress inducing exposures that have been found to have negative impacts on child health (Alaimo, Briefel, Frongillo Jr, & Olson, 1998; Barth et al., 2007; Briggs et al., 2013; Cook et al., 2013; Edidin, Ganim, Hunter, & Karnik, 2012; Fawley-King & Snowden, 2012; Laraia, 2013; Leung, Epel, Willett, Rimm, & Laraia, 2015; Seligman, Laraia, & Kushel, 2010; Weinreb et al., 2002). Not only are these types of exposures widespread, they most often have a disproportionate impact on low-income and racial/ethnic minority youth (Voisin, 2007).

The Impact of Exposure to Adversity and Stressful Experiences

Recent advances in the fields of biological, behavioral, and social sciences have expanded our understanding of the impact of adversity and stress on short and long term health (Evans & Kim, 2013; S. B. Johnson, Riley, Granger, & Riis, 2013; Kolk, McFarlane, Weisaeth, & Greenberg, 1997; Middlebrooks & Audage, 2008; Shonkoff et al., 2012; van Der Kolk, McFarlane, & Weisæth, 1996; van Der Kolk & Saporta, 1991; Wadsworth, 2015). These advances have identified the physiological responses that act as protective mechanisms allowing humans to respond to and adjust to naturally occurring stressful events (Shonkoff et al., 2012). However, studies have also found that when stress becomes overwhelming, intense, and prolonged, the cumulative effect of exposures without appropriate supports can compromise the natural human coping response (Middlebrooks & Audage, 2008). What is typically considered “positive” or “tolerable”

stress, becomes what has been termed by the National Scientific Council on the Developing Child as “toxic stress” (National Scientific Council on the Developing Child, 2012). When left untreated, toxic stress has been found to disrupt normal brain development, compromise normal functioning of biological systems, and has been associated with a number of long-term physiological and mental health problems (Kolk et al., 1997; Middlebrooks & Audage, 2008; Shonkoff et al., 2012; van Der Kolk et al., 1996; Wadsworth, 2015).

Potential Protective Factors of Childhood Adversity and Adolescent Health

While there is much evidence supporting the association of childhood adversity with poor behavioral and health outcomes, individual responses to these exposures often vary. While some individuals may demonstrate resiliency, others may exhibit a range of maladaptive responses to the same or similar experiences (Lazarus & Cohen, 1977). Using the “Ecobiodevelopmental (EBD) Framework” as a guide to understanding the impact of stressful events on child development, it is speculated that these differences may be a result of varying environmental and individual factors, and that access to necessary supports and resources as well as individual coping styles may provide a better understanding of these differences across individuals and populations (Folkman, 1984a; Lazarus, 1966; Lazarus & Cohen, 1977; Shonkoff et al., 2012).

For example, social ties and relationships have been shown to act as “buffers” against negative behavior and health outcomes. It is postulated that these relationships or interactions provide a number of positive influences such as a sense of belonging and life purpose, access to necessary resources or information, and psychological support – all of which are believed to reduce maladaptive responses to stressful life situations (Cohen,

1988; Cohen, Underwood, Gottlieb, & Fetzer Institute, 2000). Additionally, higher ratings of positive family, peer, school, and religious support or connectedness have all been associated with lower rates of suicidality, depression, and perceived stress, as well as higher scores on psychosocial wellbeing indicators and global life satisfaction scores when compared to adolescents with lower ratings on these four domains of social ties and relationships (Matlin, Molock, & Tebes, 2011; Rose, Joe, Shields, & Caldwell, 2014; Siddall, Huebner, & Jiang, 2013; Stadler, Feifel, Rohrmann, Vermeiren, & Poustka, 2010; Tajima, Herrenkohl, Moylan, & Derr, 2011; Young, Berenson, Cohen, & Garcia, 2005). Having a better understanding of how these relationships interact and influence behavioral and mental health outcomes of adolescents who have experienced adversity, and how these relationships vary across populations may provide necessary information for the development of appropriate prevention and treatment services.

Justification for Current Study

As we continue to strive to reduce the prevalence of adversity experienced by our youth, how best to interrupt the devastating effects of these adversities on morbidity and mortality across the life-course must remain a priority of public health research. Prior research has identified a number of adverse and stressful exposures associated with negative short and long-term health outcomes (Felitti et al., 1998). However, current research must continue to assess and expand our understanding of the types of events that may cause toxic stress among youth, as well as how these exposures may vary among diverse populations. As previously noted, there are a number of experiences such as homelessness and food scarcity, that disproportionately impact certain populations, yet

have not been taken into consideration in prior studies of cumulative childhood adversity and child health.

The role of social relationships and connectedness as a potential protective factor may be key in developing effective interventions for youth exposed to adversity and stress. Positive social relationships and ties with family, school, peers, and religious involvement or spiritual connections have been found to act as protective factors against negative behavioral and health outcomes among youth (Matlin et al., 2011; Rose et al., 2014; Siddall et al., 2013; Stadler et al., 2010; Tajima et al., 2011; Young et al., 2005; Zhang, 2015). However, the role of family, peer, school, and religious connections as protective coping mechanisms among youth are most often examined individually and not as co-occurring protective factors. Further, these mechanisms as protective factors of the association of adverse childhood exposures and behavioral and mental health outcomes are rarely examined across varying levels of exposures, especially those with exposures reaching beyond four to five exposures.

In conclusion, increased understanding of the pathways of cumulative exposures to adversity and other stressors during childhood has numerous public health implications. Expanded knowledge among public health professionals would provide the necessary groundwork to develop improved methods for identifying high risk populations and development of effective prevention and treatment programs that are developmentally, culturally, and trauma informed. Finally, further insight into these relationships would assist in the implementation of appropriate social and health policies that recognize and appropriately address the impact of cumulative violence and stressful events during childhood on the developmental, behavioral, and health trajectories of

individuals exposed to these events during their lifetime (Dashiff, DiMicco, Myers, & Sheppard, 2009).

Research Questions and Study Aims

Study Aims and Hypotheses

The specific aims and hypotheses of this study are as follows:

Aim 1: To determine if an expanded assessment of adverse childhood experiences better predicts adolescent suicidal ideation.

H.1.a An expanded assessment of childhood adversity (i.e., 20-item assessment) will better predict variance in risk for suicidal ideation than a shorter assessment of childhood adversity (i.e., 9-item assessment) based on the original ACE assessment.

H.1.b Adolescents with higher cumulative childhood adversities will demonstrate greater risk for suicidal ideation compared to those with fewer cumulative childhood adversities.

Aim 2: To determine if social integration (i.e., family, school, religious/spiritual, teacher, and peer integration) influences the impact of adverse childhood experiences on risk for suicidal ideation among adolescents.

H.2.a Higher perceived family, school, religious/spiritual, teacher, and peer integration will each decrease risk for suicidal ideation among adolescents.

H.2.b Higher perceived social integration, while attenuated, will decrease risk for suicidal ideation among youth with a greater number of cumulative childhood adversities.

Definition of Terms

Adolescence or adolescent: Adolescence is most often defined as the period between puberty and adulthood in human development and is most associated with the “teen years.” For the purpose of this dissertation, adolescence or adolescent will refer to youth between the ages of 13 and 18 years.

Adverse Childhood Experiences: According to Kalmakis and colleagues (2014), adverse childhood experiences have five key characteristics. An experience is considered adverse if it is harmful, chronic, distressing, cumulative and varying in severity. Adverse childhood experiences are “operationally defined as childhood events, varying in severity and often chronic, occurring in a family or social environment and causing harm or distress” (Kalmakis & Chandler, 2014, pg. 1490). The concept is complex and includes numerous in-family and social-environmental sources (Kalmakis & Chandler, 2014).

Complex trauma: According to Courtois & Ford (2009), complex psychological trauma “represents extreme forms of traumatic stressors due to their nature and timing. In addition to often being life-threatening or physically violating, terrifying, or horrifying, these experiences are typically chronic rather than one-time or limited, and they compromise the individual’s personality development and basic trust in primary relationships” (Courtois & Ford, 2009, pg. 14).

Direct exposure or direct victimization: Direct exposure or direct victimization are considered “primary” exposures to violence where the child is the intended target of the exposure (Stein et al., 2003).

Indirect exposure or indirect victimization: Indirect exposure or victimization is most commonly used to describe exposures where the child is witness to violence but is

not the intended target. Such exposures include but are not limited to hearing violence transpire, hearing or learning about violence, knowing someone who has been victimized, and seeing violence on television or the movies (Stein et al., 2003)

Resiliency: Resiliency is the successful adaptation to negative life events, trauma, stress, and other forms of risk (Fraser, Richman, & Galinsky, 1999). It is the ability of people to achieve a positive outcome in the face of adversity (McEwen, Gray, & Nasca, 2015).

Risk Factor: Risk factors are a combination of individual, relational, community, and societal factors that increase risk for maladaptive behaviors, physical or mental disorders, and negative social outcomes.

Toxic Stress: Toxic stress is defined as the result of “strong, frequent, or prolonged activation of the body’s stress response systems in the absence of the buffering presence of protection of a supportive adult relationship” (Shonkoff et al., 2012, pg. e236).

Protective Factors: Protective factors are a combination of individual, relational, community, and societal factors that decrease risk for maladaptive behaviors, physical or mental disorders, and negative social outcomes.

Victim or Victimization: A victim is a person harmed, injured, or killed as a result of a crime, accident, or other event or action. Victimization is the act of making a person a victim.

Chapter 2: Literature Review

Introduction

Exposure to traumatic events across the lifespan among adults and youth is not uncommon. In the United States, more than half of all adults report experiencing at least one traumatic event in their lifetime and 60% of youth under the age of 18 report experiencing at least one exposure to violence, either directly as a victim or indirectly as a witness to a violent act, annually (Briere & Scott, 2014; Finkelhor et al., 2009). Efforts to better understand the extent of childhood adversity and to reduce its occurrence remains a public health priority. This is evidenced in its inclusion as a Healthy People 2020 (U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion, 2015) priority and the inclusion of the original Adverse Childhood Experiences index in the Behavioral Risk Factor Surveillance System (BRFSS) annual assessment of population health in a growing number of U.S. states, in a number of replication studies internationally (i.e., Canada, China, Jordan, Norway, the Philippines, and the United Kingdom), and as an addendum to documents published by the World Health Organization (Center for Disease Control and Prevention (CDC), 2015b; Centers for Disease Control and Prevention (CDC), n.d.). Unfortunately, while our understanding of the extent of exposures has grown, efforts to reduce such events within the lives of youth remains virtually unchanged.

In the 2013-14 National Survey of Children's Exposure to Violence, researchers found that exposures to violence, crime, and abuse continue to remain high and have not changed significantly in most exposure areas when compared to earlier studies (Finkelhor D, Turner HA, Shattuck A, & Hamby SL, 2015). In this nationally representative study of

4000 children under the age of 17, 37.3% of participants experienced a physical assault (e.g., physical intimidation, relational aggression, internet or cell phone harassment, gang and non-sibling peer assault, etc.), 5% experienced a sexual offense (e.g., sexual assault, attempted or completed rape, sexual harassment, flashing, internet sex talk, etc.), 15.2% experienced maltreatment from a parent or guardian (e.g., physical, sexual or negligent abuse, etc.), 27.1% had experienced a property crime (e.g., robbery, vandalism, theft, etc.), and 24.5% witnessed or were indirectly exposed to violence (i.e., family assault, physical abuse, assault in the community, shooting, etc.) in the prior 12 months to completing the survey. Progress towards significant reductions in violent exposures among adolescents were only noted for past-year exposure to dating violence and lifetime exposure to household theft (Finkelhor et al., 2015).

While prevention efforts to reduce exposures to stress inducing events among children must remain a priority of public health programs and policy efforts, findings such as those observed in the National Survey of Children's Exposure to Violence indicate that much work remains. Therefore, identifying how best to address the needs of children who are exposed to high levels of stress and trauma must remain a research priority. These efforts must include identifying the array of exposures that may cause stress and trauma among children, as well as expanding our understanding of the interpersonal and environmental factors most salient to increasing resiliency among children exposed to traumatic and stressful life events. Further, research efforts must continue to identify the extent to which adverse childhood experiences and the factors that influence the relationship between childhood trauma and health outcomes vary across populations.

In this chapter a summary of what is currently known about childhood adversity and stress is presented, specifically: what is currently known about the impact of cumulative exposures to adverse childhood experiences and stress; how adverse childhood experiences are currently defined; and what is currently known about adolescent health and the role of social relationships and social ties, especially in relation to Durkheim's theory of social integration.

An Ecobiodevelopmental Framework to Understanding Stress

The implementation of effective prevention and treatment programs to address the impact of childhood stressors requires a framework describing how adversity impacts the development of children both physically and mentally. While the study of childhood adversity and stress continues to be a growing field of inquiry, new advances in a broad spectrum of disciplines (i.e., neuroscience, molecular biology, genomics, developmental psychology, epidemiology, sociology, and economics) have expanded our understanding about the harms of stressful events during childhood on individual learning, behavior, and physical and mental health over the life course (Folkman, 1984b; Lazarus, 1966; Lazarus & Cohen, 1977; Shonkoff et al., 2012).

Exposure to stressful experiences has been found to be both beneficial and harmful – with three distinct categories of human stress responses (Shonkoff et al., 2012). “Positive” stress responses are physiological states that are characterized as brief, mild to moderate in magnitude, and typically includes appropriate and adequate supports (i.e., a caring and responsive adult) to assist the child to return to a normal functional state. Examples of positive stress inducing events may include stressors such as receiving an

immunization, normal frustrations, or anxiety resulting from events such as a child's first day at school (Shonkoff et al., 2012).

“Tolerated” stress responses occur when the individual is exposed to “non-normative” experiences such as a contentious divorce, death of a family member or friend, serious illness or injury, natural disasters, or an act of terrorism (Shonkoff et al., 2012). Again, these experiences are considered tolerable to the extent that protective adult relationships facilitate the child's adaptive coping and sense of control. Finally, there is the “toxic” stress response. This stress response is considered the most harmful and is characterized by strong, frequent, or prolonged activation of the body's stress response systems. Unlike “positive” or “tolerable” stress responses “toxic stress” is characterized by the absence of protective factors such as adequate and appropriate support of a caring adult or social systems. Examples of toxic stressors include child abuse or neglect, parental substance abuse or mental illness, and witnessing violence towards another.

The “Ecobiodevelopmental (EBD) Framework,” created by the Center on the Developing Child at Harvard University, provides a structure for understanding the etiology of childhood adversity and stress on health and development, and provides an outline for potential areas of intervention and treatment (see Figure 2.1: Ecobiodevelopmental Framework) (Shonkoff et al., 2012). The EBD framework suggests the consequences of adversity and stress during childhood are determined by interlocking relationships of three factors. These factors are biology (i.e., physiological adaptations and disruptions), ecology (i.e., social and physical environment), and health disposition and human development (i.e., learning, behavior, and physical and mental well-being)

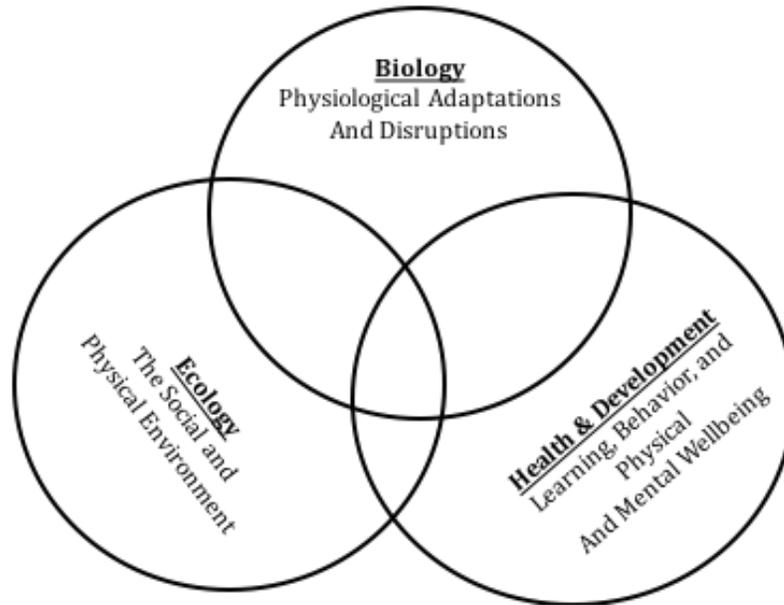
(Shonkoff et al., 2012). It is believed that environmental exposures (i.e., ecology) beginning as early as the prenatal period trigger and set the stage for current and future responses to adversity and stress (i.e., biology), which then influence future behavioral and psychological responses (i.e., health and development) throughout childhood and over the life-course (Committee on Psychosocial Aspects of Child and Family Health, 2012; Shonkoff et al., 2012).

It is currently thought the human body is biologically designed to respond to threatening or stress inducing experiences (i.e., “positive” and “tolerated” stress) through a series of hormonal responses that act as protective factors (Committee on Psychosocial Aspects of Child and Family Health, 2012; Compas, 2006; Shonkoff et al., 2012; Wadsworth, 2015). These protective responses to ecological exposures are centered within the brain and include a combination of immediate, unconscious biological reactions and less reactionary, conscious responses (i.e., appraisal of experiences) (Compas, 2006; McEwen, 1993; McEwen et al., 2015). In situations of adversity, threat or stress, these biological stress reactions set in motion the “fight or flight” response or a series of biological and psychological responses to the event or exposure (Compas, 2006).

For example, studies have demonstrated that biological reactions (i.e., the immediate and unconscious) to stressors include hormonal responses that activate the hypothalamic-pituitary-adrenocortical axis and the sympathetic-adrenomedullary system. When activated, these systems increase the levels of stress hormones produced by the body such as corticotropin-releasing hormones (CRH), cortisol, norepinephrine,

adrenaline, along with a number of other physiological responses such as elevated inflammatory cytokines and activation of the para-sympathetic nervous system.

Figure 2.1: Ecobiodevelopmental Framework
Figure 1: Ecobiodevelopmental Framework



When threats or stressors are minimal and the social and physical environment provide necessary protections (e.g., social support), these physiological responses most often return to normal homeostasis balance (Shonkoff et al., 2012; Shonkoff, Boyce, & McEwen, 2009). As noted by McEwen et. al., (2015), these early childhood experiences allow for healthy brain development and adaption to life stressors. They provide the basis for “good self-esteem, and a locus of control for effective self-regulation, not only of behavior but also of the physiological responses to stressors that are regulated by the central and peripheral nervous systems” (McEwen et al., 2015, pg. 2).

On the other hand, when individuals are exposed to repeated or chronic stress this process may become deregulated and may result in harmful physiological conditions known as “allostatic load or overloading” and maladaptive psychological coping skills

(McEwen, 1993). Studies focused on the biological impact of allostasis have found that chronic stressors and activation of the stress system may actually alter the structure of the brain, and normal biological and psychological functioning (McEwen et al., 2015; McEwen & Wingfield, 2003). For example, studies have found childhood adversity to be a significant predictor of physiological changes such as elevated blood pressure, elevated hypothalamic pituitary adrenal axis activity, dysregulation of metabolic activity, compromised immune function, increases in inflammatory markers, and elevated allostatic load increase risk for morbidity and mortality across the lifespan (Araújo et al., 2009; Berasain et al., 2009; Chen & Miller, 2007; Danese et al., 2008; Evans & Kim, 2013; Felitti et al., 1998; Middlebrooks & Audage, 2008; Slopen, Fitzmaurice, Williams, & Gilman, 2012; Slopen, Kubzansky, McLaughlin, & Koenen, 2013; Slopen, McLaughlin, Dunn, & Koenen, 2013). Further, exposure to toxic stress during childhood may lead to increased risk for a number of maladaptive psychological and behavioral responses such as depression and anxiety, suicidality, avoidance and dissociation, aggression, early sexual initiation and risky sexual behaviors, impaired school function and memory, and alcohol and tobacco consumption (Chapman et al., 2004; Dube et al., 2003; Felitti et al., 1998; Middlebrooks & Audage, 2008; Stein et al., 2003).

Defining Adverse Childhood Experiences and Stressors

Currently, the study of adverse childhood experiences lacks a consistent vocabulary and methodological approach to assessing childhood adversity (Kalmakis & Chandler, 2014). According to a recent literature review conducted by Kalmakis and colleagues, childhood adversity is generally defined by the specific exposures under investigation, and these exposures often vary in nature, severity, and frequency across

studies. The operationalization of childhood adversity may include single exposures or a varying combination of exposures that may or may not include experiences such as childhood physical, sexual and emotional abuse; war or terrorist attacks; natural disasters; transportation and/or vehicle accidents; witnessing various forms of family and community violence; rape and sexual assault; stranger physical assault; intimate partner violence; sex trafficking; witnessing the death or suicide of another; loss of a parent or significant care giver; persistent poverty; and life threatening events and/or medical conditions and other experiences with the potential of creating stress or trauma (Briere & Scott, 2014; Courtois & Ford, 2009; Felitti et al., 1998; Kalmakis & Chandler, 2014).

Further, assessment tools used to operationalize childhood adversity often vary across studies (Kalmakis & Chandler, 2014). These assessments differ in wording as well as how total exposure to adversity is scored. For example, the ACE index assesses ten potential adversities experienced prior to age 18 and produces a cumulative score of exposures ranging between 0 and 10 (Felitti et al., 1998). The ACE score indicates a lifetime exposure to an experience even if the experience occurred once or multiple times over an extended period of time. The Juvenile Victimization Questionnaire assesses a wide range of potential victimization exposures (i.e., child maltreatment, crime victimizations, and other exposures such as bullying and witnessing violence) using a 34-item assessment (Finkelhor, Hamby, Ormrod, & Turner, 2005). Unlike the ACE assessment, the JVC is designed to collect more than single lifetime exposures to victimization. The JVC collects information such as 12-month and lifetime exposure, frequency of the exposure, information on the perpetrator of violence, if an injury occurred, and the severity of the injury. The Conflict Tactics Scale-Parent Child Version

on the other hand uses an assessment that may include upwards of 39-items and is specifically intended to measure psychological and physical maltreatment and neglect of children by parents and modes of discipline used within the family (Straus, 1979; Straus, Hamby, Finkelhor, Moore, & Runyan, 1998). Finally, the review by Kalmakis and Chandler (2014) finds that the concept of childhood adversity is often described using a variety of interchangeable terms such as childhood trauma, childhood abuse and maltreatment, childhood stressors, childhood adversity, and polyvictimization, further obscuring the meaning and characteristics of the concept of adverse childhood experiences.

While a clear-cut definition of the construct “adverse childhood experiences” remains elusive, several key elements have been identified that distinguish this concept from other determinants of health. First, adverse childhood experiences are events that occur specifically during the formative developmental years of childhood, and have a unique impact on health outcomes when compared to individuals who are exposed to similar experiences during adulthood (Courtois & Ford, 2009; Kalmakis & Chandler, 2014; Terr, 1991). Second, the sources of childhood adversity are located within the social environmental context of the child and are stressors that occur “outside” of the individual (Lazarus & Cohen, 1977; Terr, 1991). In other words, adverse childhood events are not a result of actions controlled by the child but are a result of events controlled by others or factors within the environment of the child. These exposures are stressors that may be traumatic in nature and may have the potential to alter ordinary coping and defensive mechanisms of the individual (Terr, 1991). Finally, adverse childhood experiences are events that can be distinguished as either single-incident

traumas (e.g., a severe accident, a natural disaster, a terrorist attack, a single incident of direct abuse or witnessing of violence, etc.) or as repetitive or cumulative exposures to traumatic or stressful events (e.g., recurring abuse, domestic violence, community violence and crime, etc.). (Courtois & Ford, 2009; Terr, 1991; van Der Kolk et al., 1996). While prior research has established single traumatic events as significant predictors of health, the study of adverse childhood experiences is most often associated with the study of traumatic events that are chronic and/or cumulative in nature (Courtois & Ford, 2009; Kalmakis & Chandler, 2014).

The Impact of Cumulative Adversity and Stress on Health

The cumulative effect of traumatic or stressful experiences during childhood and its impact on behavioral, physical, and mental health outcomes is most commonly associated with the Adverse Childhood Experiences (ACE) Study (Felitti et al., 1998). The ACE study was a collaborative effort of the Centers for Disease Control and Prevention (CDC) and Kaiser Permanente that began in the 1990s. The ACE study was designed to explore childhood antecedents of health risk behaviors, disability, disease, and premature mortality amongst a cohort of over 17,000 adult patients who were members of Kaiser Permanente. Using a retrospective assessment of ten stressful childhood events (i.e., emotional, physical, and sexual abuse; emotional and physical neglect; living in a household where a mother was treated violently; living in a household with a substance abuser; living with someone with a mental illness; exposure to the separation or divorce of parents; and living in a household where someone had been incarcerated) the association of ACEs to the incidence of diseases, use of prescription pharmaceuticals, healthcare costs, premature mortality, causes of death, and a host of

other behavioral, social, and health outcomes was examined (Felitti et al., 1998; Larkin, Shields, & Anda, 2012).

There were a number of significant findings associated with this original study (Larkin et al., 2012; Nurius, Russell, Herting, Hooven, & Thompson, 2009). First, Felitti and colleagues (1998) found exposure to adversity or stressful events during childhood was not uncommon and often co-occurring (Dong et al., 2004; Felitti et al., 1998). Of a sample of 9,508 adults who completed a standardized medical evaluation survey that included seven items from the ACE index (i.e., psychological, physical, or sexual abuse, violence against mother, or living with a household member who was a substance abuser, mental ill or suicidal, or ever imprisoned), more than half responded positively to at least one adverse experience and one-fourth reported at least two or more exposures during their childhood.

Second, the literature produced from the original ACE study has consistently found a “dose-response” relationship between the number of reported exposures to adversity during childhood and increased risk for poor behavioral, mental and physical health outcomes, even after controlling for potential confounders (Larkin et al., 2012). Findings demonstrated that as the number of childhood exposures increased, so increased risk for conditions such as ischemic heart disease; lung cancer and chronic lung disease; smoking; alcohol and illicit drug use; obesity; mental health disorders such as depression and anxiety; memory disturbances; early initiation of and other sexual risk taking behaviors; unintended adult and teen pregnancy; poor-self rated health; headaches; impaired job performance; and premature mortality (Anda, 1999; Anda et al., 2004, 2008; Anda, Tietjen, Schulman, Felitti, & Croft, 2010; Brown et al., 2007; Chapman et al.,

2004, 2011; Dietz, 1999; Dong et al., 2004; Dube et al., 2001, 2003, 2006b, 2009b; Edwards, Anda, Felitti, & Dube, 2004; Edwards, Fivush, Anda, Felitti, & Nordenberg, 2001; Edwards, Holden, Felitti, & Anda, 2003; Hillis et al., 2004; Hillis, Anda, Felitti, & Marchbanks, 2001; Hillis, Anda, Felitti, Nordenberg, & Marchbanks, 2000; Williamson, Thompson, Anda, Dietz, & Felitti, 2002).

Third, findings from the original ACE study also demonstrated a consistent and significant increase in risk for poor behavioral, social, and health outcomes among individuals with ACE scores greater than or equal to four when compared to individuals with ACE scores equal to zero. Felitti and colleagues (1998), found a 4 to 12-fold increase in risk for alcoholism, drug abuse, depression, and suicide attempt; a 2 to 4-fold increase in smoking, poor self-rated health, fifty or more sexual partners, and sexually transmitted disease; and 1.4-1.6 fold increase in physical inactivity and severe obesity. Two studies conducted by Anda and colleagues (2007) found that individuals with ACE scores equal to or greater than five had a 3-fold increase in rates of psychotropic prescription drug use, a 2.6 times risk of prevalent chronic obstructive pulmonary disease (COPD), and a 2.0 time risk of COPD-related hospitalizations (Anda et al., 2008) compared to individuals with ACE scores equal to zero. Another study on depressive disorders found that individuals reporting five or more ACEs had a five-fold increased risk for a lifetime history of depressive disorders and a six or more greater risk for a recent depressive disorder or episode compared to individuals with ACE scores equal to zero (Chapman et al., 2004).

Adversity and Internalizing and Externalizing Behaviors Among Youth

While there is overlap, the behavioral and mental health manifestations of childhood adversity vary when comparing children to adults. For children, the effects of adversity and stress are most often associated with a number of disorders considered key indicators of maladaptive development that may impact health over the life course. These indicators are often categorized as externalizing and internalizing disorders.

Externalizing disorders are a classification of problem behaviors that are manifested in behaviors where the child is acting out negatively on the external environment, and are characterized by problems in emotional and behavioral self-control (Liu, 2004). Examples of externalizing disorders include but are not limited to oppositional defiant disorder (ODD), conduct disorder (CD), attention-deficit/hyperactivity disorder (ADHD), substance use disorders, and a range of eating disorders (American Psychiatric Association, 2013). Internalizing disorders on the other hand most often refer to problems that more centrally affect the child's internal psychological environment as opposed to their external environment (Liu, 2004). Examples of internalizing disorders include but also are not limited to depressive disorders and dysthymia, posttraumatic stress disorder (PTSD), and a range of anxiety disorders (i.e., separation, generalized, obsessive-compulsive disorders, phobias, and panic disorders) (American Psychiatric Association, 2013). It has also been noted, that while these internalizing and externalizing behaviors are typically diagnosed as distinct disorders, there is significant and substantial co-morbidity (Liu, 2004).

Exposure to adversity and stress has been linked to a number of internalizing and externalizing behaviors among youth such as higher rates of posttraumatic stress

disorders, depression, distress, aggression, dissociation, and anxiety disorders (Buka, Stichick, Birdthistle, & Earls, 2001; Clarke, 2006; Cloitre et al., 2009; Dunn, Gilman, Willett, Slopen, & Molnar, 2012; Gaylord-Harden, Cunningham, & Zelencik, 2011; Haller & Chassin, 2012; Hunt, Martens, & Belcher, 2011; Lilly & Valdez, 2012; Luthra et al., 2009; McLaughlin et al., 2013; Mohammad, Shapiro, Wainwright, & Carter, 2014; Nooner KB et al., 2012; Turner, Finkelhor, & Ormrod, 2006). For example, a 2009 study using the original ACE index, found similar graded-risk responses on health indicators such as emotional distress (i.e., depression, anxiety, hopelessness and anger), life stress (i.e., number of stressful events, effect of stress, and family distress), suicide risk (i.e., suicide ideation, suicide exposure, and lethality of prior attempts), and risk behaviors (i.e., alcohol, illicit drug use, high risk behaviors, and peer high risk behaviors) – all of which are key indicators of adolescent and child health (Nurius et al., 2009).

Limitations of the Adverse Childhood Experience Study

While much has been learned from the original ACE study, limitations of the original study design and assessment instrument have been noted in the literature (Cronholm et al., 2015; Finkelhor, Shattuck, Turner, & Hamby, 2013, 2015a; Wade et al., 2015; Wade, Shea, Rubin, & Wood, 2014). One such limitation is that the study relied on retrospective assessments of events that occurred prior to the age of 18 using a study sample of adults with more than 50% of participants over 50 years of age (Felitti et al., 1998). While this original approach has been validated as a reliable method for assessing stressful events that occurred during childhood, it has been noted that assessing adversity during childhood may offer improvements to our understanding of the impact of adversity to individual health outcomes (Dube, Williamson, Thompson, Felitti, & Anda,

2004). As noted by Finkelhor et. al. (2013), assessments conducted during childhood would provide a more accurate and comprehensive reporting of stressors due to improved recall of events. Further, assessments conducted during childhood would provide a better understanding of the causal sequencing of the relationship of these experiences and future health outcomes (Finkelhor et al., 2013).

It has also been noted that the 10-item scale is limited in its assessment of adversities experienced during childhood (Cronholm et al., 2015; Finkelhor et al., 2013; Finkelhor, Shattuck, et al., 2015; Wade et al., 2015). In a 2013 study, the original ACE assessment was expanded using items from the Juvenile Victimization Questionnaire - an inventory of childhood victimization (Finkelhor et al., 2013). This study compared explained variance in childhood distress using the 10-item ACE assessment and an expanded 30-item adversity assessment. Three important findings were noted from this study.

First, when examining the original 10-items only, results found that two childhood experiences (i.e., having in incarcerated household member and parental separation or divorce) were not significantly associated with increased childhood distress. Second, when the additional adversity items were included in the analysis, several items on the original ACE assessment were no longer significant predictors of childhood distress (i.e., household substance abuse, mother treated violently, and incarcerated household member) but 10 of the new childhood stressor items (i.e., peer victimization, parents arguing, property victimization, someone close having a bad accident or illness, exposure to community violence, no good friends, socioeconomic status, below-average grades, someone close died from illness/accident, parent lost their job) were significant

predictors of childhood distress (Finkelhor et al., 2013). Finally, the enhanced childhood adversity assessment explained a significantly greater amount of the variance in the outcome measure of childhood distress ($R^2 = .34$) compared to the original 10-item assessment ($R^2 = .21$) (Finkelhor et al., 2013).

Generalizability of the original ACE study findings has also been questioned given that the study population was a predominantly White, middle to upper income, and highly educated population (Cronholm et al., 2015). Recent qualitative and quantitative studies within predominantly Black, low-income young adult populations have found significant differences in types of adversity experienced compared to the original ACE study assessment (Cronholm et al., 2015; Wade et al., 2014). The qualitative study (n = 119) found single-parent homes, family related violence, exposure to community violence such as shootings and other crimes, negative adult activities and criminal behavior, personal victimization such as child abuse and neglect, economic hardship and struggles of parents to make ends meet, and less cited hardships such as bullying by peers, loss of friends to death or incarceration, and discrimination were considered the most significant stressors or adversities among this study sample (Wade et al., 2014). Further, participants did not endorse divorce and separation or living with a caregiver that was mentally ill as an adverse experience during their childhood (Wade et al., 2014).

A quantitative study (n = 1,784) of predominantly White (45.2%) and Black (43.6%) adults between the ages of 18-97 (mean age 48.6 years) was also conducted to assess the effectiveness of an expanded ACE assessment that included the original ACE items as well as items assessing exposure to experiencing racism or discrimination, witnessing violence, living in an unsafe neighborhood, experiencing bullying, and having

a history of living in foster care (Cronholm et al., 2015). There were a number of significant findings from this study that further supports the need for an expanded assessment of the original ACE instrument.

First, when examining outcomes of the original ACE assessment, participants in the study reported a greater number of ACE exposures compared to the original ACE study sample. Approximately, 21% of participants in this current study reported four or more exposures, compared to approximately 13% of the participants in the original Kaiser study. Second, half of the respondents in the study experienced at least one exposure that was assessed with the expanded ACE survey; 13.4% experienced three or more of the expanded ACE items; and 13.9% of the respondents only experienced items from the expanded assessment and no exposures from the traditional ACE items – indicating they would have gone unrecognized if only the traditional ACE index had been used as the primary assessment of childhood adversity (Cronholm et al., 2015). Finally, comparison of demographic associations with the original ACE assessment versus the expanded ACE assessment found that males, individuals identifying as Black/African American, Hispanic/Latino, Asian/Pacific Islander, or other; individuals who were divorced or separated; and those living below 150% of the poverty line were between 1.51 and 5.93 times more likely to have been exposed to one or more of the expanded ACE items during childhood (Cronholm et al., 2015).

Other Potential Childhood Adversities and Stressors

Given these findings further research is warranted to identify other potential stressful events during childhood that may impact individual wellbeing and how these different stressors may vary across different populations. For example, there is evidence

that exposure to marginal-to-severe hunger or food insecurity during the life course is significantly associated with higher levels of negative internalizing behaviors, physical health problems, poor diets, and chronic disease even after controlling for known correlates (Alaimo, Olson, Frongillo Jr, & Briefel, 2001; Cook et al., 2013; Laraia, 2013; Weinreb et al., 2002). Further, past studies have found that food scarcity is most prevalent among low-income families and may have specific relevance to child behavior and mental health among communities living in poverty (Alaimo et al., 1998).

Individuals with a history of foster care placement have been identified as a high-risk population for a number of negative behavioral and mental health outcomes. According to the U.S. DHHS Administration on Children and Families, in 2012 approximately 397,000 children were in foster care (Children's Bureau, 2014). While involvement in the foster care system is most often a result of exposure to violence and neglect, other factors inherent to the foster care system have been found to be significantly associated with negative outcomes among system-involved children. Placement instability is one of many factors noted as having a negative impact on foster care youth. Researchers have found that nearly a fifth of children in foster care have had four or more placements within a 3-year period (Barth et al., 2007) and multiple placements are a significant predictor of increased mental health symptomology, use of outpatient mental health services, and future psychiatric hospitalization (Fawley-King & Snowden, 2012).

Homelessness or housing instability has also been found to have negative health and social outcomes among youth. According to Child Trends, it was estimated that approximately 1.4 million children under the age of 18 who were registered as students

during the 2013-14 school year were homeless (Child Trends, 2015). When compared to other low-income youth living in stable housing conditions, youth experiencing homelessness or housing instability were more likely to demonstrate acute and chronic health problems such as infections, respiratory disorders, gastrointestinal problems, and other injuries; more likely to encounter food insecurity and scarcity; less likely to access necessary medical care; and were less likely to attain a high school diploma or general equivalency diploma by age 18 (Briggs et al., 2013). Further, homeless children, especially those who are unaccompanied by an adult, were at increased risk for child sexual exploitation; to have psychiatric disorders; to engage in substance and alcohol use; and to demonstrate developmental delays compared to other youth living in stable housing conditions (Edidin et al., 2012).

Family structure or more specifically single-parent households, has also been associated with poor behavioral and mental health outcomes for children. According to the U.S. Census Bureau, in 2013 there were approximately 12 million single-parent households in the U.S. (U.S. Census Bureau, 2013). Of these households, 83% were headed by single-parenting mothers and approximately 35% of all single-parent households were living below poverty (U.S. Census Bureau, 2013). A study examining lifetime drug use (i.e., marijuana, inhalants, and amphetamines) among adolescents in 8th, 10th, and 12th grade (n = 37,507) found that children living in single-parent families (i.e., both male and female headed households) were significantly more likely to use drugs when compared to intact or dual-headed households (Hemovich & Crano, 2009). This study also found that girls living in father-only households were significantly more likely

to use all three drugs compared to youth residing in mother-only and dual-parent households (Hemovich & Crano, 2009).

Further, analyses of data from the National Survey of America's Families study (n = 67,558) of children between the ages of 0 to 17, found significant differences in parent reported physical and mental health status of children based on family structure (Ziol-Guest & Dunifon, 2014). As with prior studies, children residing in dual-parent households were found to fair better than children living in a variety of family structures such as single-parent households (i.e., both mother and father), step-parents (i.e., both step father and mother), cohabiting adults (i.e., biological parents or only one biological parent), and custodial grandparents. Children living in foster families were found to have the worst mental and physical health outcomes compared to all other family structures studied (Ziol-Guest & Dunifon, 2014).

Potential Protective Factors of Childhood Adversity and Health

Durkheim's Theory of Social Integration as a Protective Factor of Health

As previously noted, healthy child development is dependent on adequate and appropriate supports and connections within children's ecological environment. These social relationships and ties are believed to affect mental and physical health by having a positive influence on individual emotions, cognitions, and behaviors (Berkman, Glass, Brissette, & Seeman, 2000; Cohen, 2004; Seeman, 1996). Cohen (1988) proposed two models – the “main effect” and “stress-buffering” models - to explain how social ties and relationships influence health and behavioral outcomes (Cohen, 1988; Cohen et al., 2000).

The “Main Effect Model” theorizes that individuals engaged in a range of positive social relationships or ties are subject to social controls and pressures that assist the individual to engage in behaviors that are beneficial to their well-being (Cohen, 2004; Cohen et al., 2000). These controls and pressures are believed to influence health behaviors (e.g., exercising, eating healthy diets, not smoking, etc.), provide positive psychological states (e.g., generalized positive affect, sense of predictability and stability, life purpose, sense of belonging and security, and self-worth, etc.), provide multiple sources of information that may reduce risk for engaging in harmful behaviors or assist in accessing necessary care, treatment and services; and reduce a sense of isolation which may be both psychologically and physiologically harmful.

The “Stress-buffer Model” on the other hand views social relationships or ties as a means of preventing harmful responses to stressful events by influencing individual perceptions of or actual availability of support when stressful events occur (Cohen, 1988; Cohen et al., 2000). Cohen proposes that the belief or perception that existing social relationships or ties will provide necessary resources and supports may in itself mitigate negative psychological and maladaptive behavioral responses to stressful events and may increase an individual’s perceived ability to cope. Further, Cohen proposes that receiving actual support in response to a stressful event may impact how one appraises a stressful event – this may lead to solutions, reduce the perceived importance of a situation, or provide a distraction from the presenting problem.

Durkheim’s theory of social integration and regulation was one of the first theories to examine the impact of social relationships and social ties on human health and behavior, and is reflective of the two models proposed by Cohen (Berkman et al., 2000).

Specifically, Durkheim examined variations in rates of suicide as a consequence of the quality of social relationships or connectedness (i.e., “social facts”) which he referred to as social integration and social regulation and risk for suicide (Durkheim, 1951).

Durkheim theorized the loss of organized and supporting relationships (i.e., family, community, and work ties) or social integration and social constraints as a result of individuals migrating to more industrialized, less organized communities would have a negative impact on their psychological wellbeing, resulting in increased risk for suicidality (Cohen et al., 2000).

According to Durkheim, suicide rates could be predicted based on levels of social integration (i.e., social support) and social regulation (i.e., social control). Social integration was theorized to provide an interchange of ideas and feelings that form the social bonds that attach individuals to common goals and shared social causes. Social regulation, expressed through religious, political and moral beliefs, were theorized to control individual behaviors that would prevent individuals from acting in opposition to the benefit of society. The quantity and intensity of these relationships determine how attached individuals are to each other, whether they have common goals, and the extent to which natural human desires are regulated through the use of socially accepted authority figures to limit individual desires and passions (Durkheim, 1951).

Durkheim believed that rapid social change and turbulence at the macro-level leads to a weakening of social controls and norms, a deregulation of values, beliefs and general norms, and creates social conditions that prevent effective integration and regulation of the individual into society. He postulated that the more attached or integrated the individual is to the social group, the more the individual will conform to

group norms in their behaviors, and the individual will strive to maintain the affective ties of important relationships or connections. Further, Durkheim's theory of social integration suggests that effective social integration of the individual also provides a positive means of social supports and interactions that lead to better psychosocial outcomes for the individual, whereas ineffective integration leads to negative outcomes or in the case of Durkheim's investigations, higher rates of suicide (Rose et al., 2014). Finally, it is suggested that social integration is the central construct of Durkheim's theoretical framework, and that without strong social integration or bonds, social regulation would have limited or no impact on the individual (Thorlindsson & Bjarnason, 1998).

Criticisms of Durkheim's theory of social integration and regulation on rates of suicide have primarily focused on the lack of clarification of the role of macro-level (i.e., social) and micro-level (i.e., interpersonal) social factors as measures of social integration and regulation and their impact on suicide (Thorlindsson & Bjarnason, 1998). Critics have sited that Durkheim's approach often fluctuated unsystematically between social and interpersonal factors, and that while factors at the macro level may be anomic (i.e., socially unstable, alienated, and disorganized), individuals may be highly integrated and regulated at the interpersonal level - mitigating the effects of societal disintegration. Finally, critics of Durkheim's theory highlight the lack of clarity regarding the concepts of integration and regulation. In other words, critics were unclear if Durkheim's theory viewed social integration and social regulation as independent, uncorrelated constructs or as a series of correlated concepts that made up one construct of social factors impacting individual suicidality (Thorlindsson & Bjarnason, 1998).

Studies of Durkheim's Theory of Social Integration and Health

Prior studies focused on Durkheim's theory of social integration have demonstrated a positive association between social integration and health outcomes (Berkman & Syme, 1979; Crittenden et al., 2014; Easton & Renner, 2013; House, Robbins, & Metzner, 1982; Kuramoto, Wilcox, & Latkin, 2013; Knoester & Haynie, 2005; Rose et al., 2014; Schoenbach, Kaplan, Fredman, & Kleinbaum, 1986; Tenorio & Lo, 2011). One early, better known study examined levels of social integration (i.e., summary index reflecting ties with a spouse, close friends and relatives, and participation in church and other types of groups) was a 9-year probability study of mortality among a cohort of adults (ages 30 to 69 years) who had completed a health survey in 1965 in Alameda County (N = 4775) (Berkman & Syme, 1979). After controlling for sociodemographic variables, findings from this study showed that lower levels of social integration were associated with higher mortality. The findings from this study on mortality were replicated in follow up studies in Tecumseh, Michigan as well as Evans County, Georgia (House et al., 1982; Schoenbach et al., 1986)

Thorlindsson and Bjarnason (1998) investigated Durkheim's theory of social integration and regulation by examining "social facts" at the micro-level with a specific focus on the role of family integration and parental regulation on youth suicidality. Using a nationally representative sample of 4,314 high school students, the relationship of family social support (i.e., social integration), parental regulation (i.e., social regulation), social anomie, and social norms regarding suicide as expressed by knowing others who were thinking about, attempted or committed suicide and their association to individual suicidality were examined. In this study, analyses demonstrated that the

concepts of social integration and social regulation were distinct constructs, with strong family integration or social support having a significant inverse effect on rates of suicidality among the sample population. Further, parental regulation was not found to be a significant mediator of suicidality amongst this sample population (Thorlindsson & Bjarnason, 1998).

A more recent study examined Durkheim's theory of social integration on mental health outcomes of a nationally representative sample of Black adolescents (n = 1,170) between the ages of 13-17 (Rose et al., 2014). Specifically, Rose and colleagues examined the relationship of family, school, and religious involvement and religious commitment to psychological wellbeing. The study finding supported Durkheim's theory of social integration and concluded that family, school, and religious integration are significant predictors of better mental health for Black adolescents. Further, among this cohort, school integration emerged as the strongest predictor of both positive and negative psychological well-being, and religious involvement was mediated by individual religious commitment – indicating that self-directed choice to attend religious services and activities actually play a greater beneficial role in adolescent health than rote religious involvement (Rose et al., 2014).

Conclusion

There is much evidence supporting the association of cumulative childhood adversity and stress with poor behavioral and mental health outcomes of children. While a clear definition does not currently exist and the operationalization of “adversity” varies, its associate to internalizing and externalizing disorders is evident. However, further research is needed to determine the impact of other potential childhood stressors, and

more importantly how these stressors vary across differing populations. As we continue to work towards reducing the prevalence of adversity and stress in the lives of youth, the development of effective interventions and treatments will require a better understanding of the environmental and individual factors that are protective against such exposures.

Chapter 3:

Study #1: Adverse Childhood Experiences and Adolescent Suicidal Ideation

Abstract:

Background: Exposure to adversity and stressful experiences during childhood is not uncommon. These experiences have been linked to numerous negative behavioral and mental health outcomes throughout the life course, and premature mortality. Suicide, which is the second leading cause of death among adolescents, has been associated with a variety of interpersonal adversities. While the original Adverse Childhood Experiences study has expanded our understanding about the influences of these early events, continued exploration of other potential adversities as influencers of adolescent health, especially as it relates to suicidal ideation, is needed.

Methods: Using logistic regression analyses, a secondary analysis of the National Comorbidity Survey Replication Adolescent Supplement (NCS-A) study was conducted to investigate the association of twenty adverse childhood experiences and suicidal ideation among a nationally representative cohort of adolescents (n = 10,128) between the ages of 13 and 18.

Results: Exposure to adverse childhood experiences was found to be high among this study population. Exposure to parental domestic violence, physical abuse, sexual abuse, physical neglect, parental mental health conditions, the death or adversities of another, having a serious or life-threatening illness, and exposures to other traumatic experiences not specified by the instrument were significantly associated with adolescent suicidality. Conclusion: Cumulative childhood adversities are significant predictors of suicidality among adolescent populations. Given these findings, public health

interventions geared towards reducing suicidal behaviors among adolescents should focus on early screening and detection of interpersonal adversities.

Introduction

Adverse childhood experiences among youth under age 18 are not uncommon and considered a serious public health issue. In a 2009 national study investigators found nearly 60% of all youth reported exposure to at least one form of direct or indirect violence annually (Finkelhor, Ormrod, et al., 2009). In 2014, the Department of Health and Human Services, Office of Administration on Children and Families documented approximately 3 million referrals for child maltreatment to state Child Protective Services (CPS) agencies, with over 700,000 cases being substantiated (U.S. Department of Health & Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau., 2016). Further, the 2014 Youth Risk Behavior Surveillance (YRBSS) survey of 9th– 12th graders found between 3.1% and 24.7% of study participants reported experiencing some form of violence such as being in a physical fight, electronically bullied, or experiencing dating violence in the past year (Kann et al., 2014).

While some level of adversity is considered normal and necessary for healthy development, many children experience toxic levels of stress and adversity that are often co-occurring or cumulative. These experiences often go unidentified and without appropriate supports and treatment with far reaching consequences over the life course (National Scientific Council on the Developing Child, 2012). Further, exposure to violence and stressors result in financial costs to society as a whole. According to the Centers for Disease Control and Prevention (CDC), in 2012 the cost associated with just one year of confirmed cases of child maltreatment in the form of physical, sexual,

psychological, or negligent abuse in the U.S. had an estimated total lifetime financial cost of approximately \$124 billion (Fang et al., 2012).

One of the most well-known investigations of cumulative childhood adversity is the Adverse Childhood Experiences (ACE) study (Felitti et al., 1998). The ACE study was a collaborative effort between Kaiser Permanente and the CDC. The study examined the association of cumulative exposure to ten childhood adversities related to abuse, neglect, and household dysfunction and long-term behavioral and health outcomes in a cohort of more than 1700 adults (Felitti et al., 1998). Results from this study have consistently shown graded increased risk for negative behavioral, physical and mental health outcomes, and a significant and substantial increase in risk when comparing those reporting no experiences of adversity and those reporting four or more exposures.

For example, outcomes from numerous studies have found a four to five-fold increased risk for negative physical health outcomes such as ischemic heart disease, lung cancer and chronic lung disease, headaches, and premature death; poor behavioral health outcomes such as smoking, alcohol and illicit drug use, obesity, early initiation of and other sexual risk taking behaviors, and unintended adult and teen pregnancy; and a variety of negative mental health disorders such as depression and anxiety, memory disturbances, poor-self rated health, and impaired job performance (Anda, 1999; Anda et al., 2004, 2008; Anda, Tietjen, Schulman, Felitti, & Croft, 2010; Brown et al., 2007; Chapman et al., 2004, 2011; Dietz, 1999; Dong et al., 2004; Dube et al., 2001, 2003, 2006b, 2009b; Edwards, Anda, Felitti, & Dube, 2004; Edwards, Fivush, Anda, Felitti, & Nordenberg, 2001; Edwards, Holden, Felitti, & Anda, 2003; Hillis et al., 2004; Hillis, Anda, Felitti, & Marchbanks, 2001; Hillis, Anda, Felitti, Nordenberg, & Marchbanks,

2000; Williamson, Thompson, Anda, Dietz, & Felitti, 2002). Similar studies among children exposed to extremely stressful or traumatic experiences have also shown an association between adversity and a variety of internalizing and externalizing disorders, that often are co-occurring (American Psychiatric Association, 2013; Liu, 2004).

While much has been learned from the ACE study, limitations of the original study design and assessment tool have been noted (Cronholm et al., 2015; Finkelhor, Shattuck, Turner, & Hamby, 2013, 2015a; Wade et al., 2015; Wade, Shea, Rubin, & Wood, 2014). Lack of generalizability of the original study to other populations is one such limitation (Cronholm et al., 2015). Where the original study was retrospective and conducted among an adult predominantly non-Hispanic white, middle to upper income, and well educated sample, recent studies among predominantly Black, low-income populations have found differences in the types of childhood experiences reported as significant stressors when compared to the ten items assessed in the original ACE study population (Cronholm et al., 2015; Wade et al., 2014). For example, a qualitative study conducted in Philadelphia, Pennsylvania (n = 119) found living in a single-parent home, exposure to community violence such as shootings and other crimes, negative adult activities other than criminal behavior, economic hardship, and peer bullying, loss of friends to death or incarceration, and racial discrimination were also considered significant stressors or adversities (Wade et al., 2014).

Others have noted the 10-item scale is limited, and that a more comprehensive assessment of childhood adversities may provide a more accurate understanding of the breadth of adversities experienced by youth that may influence child and adult health (Cronholm et al., 2015; Finkelhor et al., 2013; Finkelhor, Shattuck, et al., 2015; Wade et

al., 2015). Finkelhor and colleagues (2013) expanded the original ACE assessment using items from the Juvenile Victimization Questionnaire. Findings demonstrated several of the original adversities were not significantly associated with reported “distress symptoms,” while ten of the newly added adversities were significantly associated with “distress symptoms.” Further, the enhanced assessment explained a significantly greater amount of the variance (34%) in the outcome measure when compared to the original 10-item ACE assessment (21%) (Finkelhor et al., 2013).

Expanding our understanding about experiences that may be traumatic in nature or may cause toxic stress among children is a public health imperative. A more comprehensive understanding of such experiences will likely help inform the development of effective methods for assessing such childhood stressors early in life and may expand our understanding about which adversities have the most significant impact on child health and wellbeing. Further, improved understanding will likely contribute to the development and implementation of prevention and treatment programs and policies focused on reducing the prevalence of childhood exposures found to be most harmful to children. Not only would this expanded knowledge have a lasting impact on individual health, it would also likely reduce the social and financial burdens associated with these harmful experiences.

This study specifically seeks to expand existing knowledge by examining the impact of additional adversities on risk for suicidal ideation (the process of thinking about, considering, or planning to commit suicide) among a nationally representative sample of adolescents. Suicidal ideation was specifically selected because suicide is the second leading cause of death among youth (Center for Disease Control and Prevention

(CDC), 2015a). It is estimated 17% of students in grades 9-12 seriously consider attempting suicide and 13.6% make a plan about how they would commit suicide (Center for Disease Control and Prevention (CDC), 2015c). Further, while the impact of ACEs on a variety of youth behavioral and health outcomes have been conducted across a wide range of childhood adversities, few studies have specifically focused on suicidal ideation (Dube et al., 2001; Goldston et al., 2016; Hardt et al., 2008a; Perez, Jennings, Piquero, & Baglivio, 2016).

Using data from the National Comorbidity Survey Replication Adolescent Supplement (NCS-A), this study examined the impact of nine (9) adversities studied in the original ACE study and the influence of eleven (11) additional adversities on risk for suicidal ideation among a nationally representative sample of adolescents. Using the twenty (20) item adversity assessment, overall ACE scores were examined to determine if there was a graded impact on suicidal ideation as seen in other studies focused on other behavioral and health outcomes.

Methods

This study analyzes of the National Comorbidity Survey Replication Adolescent Supplement (NCS-A) study (Kessler, 2013). Data for the NCS-A were collected between February 2001 and January 2004 by the Survey Research Center of the Institute for Social Research at the University of Michigan as an add-on to the National Comorbidity Survey Replication (NCS-R) study, an investigation of the prevalence and correlates of mental health disorders among adults in the US (Kessler, 2013). The NCS-A study was considered the first nationally representative study on the prevalence, correlates and patterns of service use for DSM-IV mental health disorders among U.S. adolescents

(Kessler, Avenevoli, Costello, et al., 2009a). This seminal study was designed to provide the groundwork for follow-up studies of risk and protective factors, consequences, and early expressions of adult mental health disorders (Kessler et al., 2009a, 2009b; Merikangas et al., 2009).

NCS-A Eligibility and Sampling Frame. Participation in the NCS-A study was restricted to English-speaking, non-institutionalized adolescents between the ages of 13 and 18 (n=10,148) living in the United States. A dual-framed, complex cluster sampling methodology was used to draw a sample of adolescents for the study. The first sampling-frame included adolescents (n=904) living in households where an adult had participated in the National Comorbidity Survey-Replication (NCS-R) study. To supplement the low number of interviews completed, a second sampling-frame of adolescents (n=9,244) were recruited to the NCS-A study from a population of students attending 320 schools located in the same counties in which the NCS-R was conducted (Kessler et al., 2009b). Eligible schools included all accredited private and public middle, junior high, and high schools within the 62 primary sampling units (PSUs) used in the NCS-R study (Kessler et al., 2004, 2009b). A probability sampling methodology proportional to the size of the student body was used to select schools. Forty to fifty students were randomly selected from each school to participate in the NCS-A study. The overall adolescent response rate (i.e., both household and student sample populations) was 75.6%. The majority of non-responders (21.3%) refused to participate; the remaining 3.2% were unable to participate due to “circumstances” or “non-contact” (Kessler et al., 2009b). Further details regarding the sampling frame for the NCS-A study can be found elsewhere (Kessler et al., 2004).

NCS-A Adolescent Questionnaire. The NCS-A adolescent questionnaire includes data on a number of factors considered relevant to adolescent behavior and mental health. Areas assessed include individual level factors (e.g. demographics, developmental factors, cognitive and academic abilities-achievements, physical health, and stressful life events), family level factors (e.g. family structure, stability and adaptability, parenting behaviors, parental psychopathology, and family stress), and environmental level factors such as school and neighborhood characteristics (Merikangas et al., 2009). Further, a modified version of the fully structured Composite International Diagnostic Interview (CIDI) of behavioral and mental health disorders was used in the adolescent questionnaire to assess for fifteen DSM-IV disorders among participants such as mood, anxiety, behavior, and substance abuse disorders (Kessler et al., 2012).

Procedures. In the presence of a parent or guardian, adolescent interviews were administered face-to-face in the home of each respondent using a laptop, computer-assisted personal interview (CAPI). Trained survey interviewers from the Survey Research Center of the Institute of Social Research at the University of Michigan administered each adolescent interview. On average, the NCS-A adolescent interviews took approximately two and a half hours to complete, with interviews ranging between 69 to 347 minutes (Kessler et al., 2009b). This variation in interview length was primarily due to the number of lifetime disorders assessed for each adolescent (determined based on an initial screening tool administered at the beginning of each interview) (Kessler et al., 2009b; Merikangas et al., 2009).

This secondary analysis includes all participants in the NCS-A study (N = 10,123). Approval for this study was obtained from the University of Maryland, College

Park institutional review board and the University of Michigan Inter-University Consortium of Political and Social Research (ICPSR) institutional review board.

Measures

Adversity Measures. Forty-six (46) variables in the NCS-A were used to create the twenty (20) childhood adversity items for this study. These items were derived from a number of standardized assessment tools selected by the original NCS-A research team (Kessler et al., 2009a; Merikangas et al., 2009). Table 3.1 provides a summary of the twenty (20) categories of adversity used for this study and the NCS-A questions used to assess exposure for each category. Emotional neglect, which was among the 10-items assessed in the original ACE study, was not included in this study. Appropriate proxies for this item could not be identified in the NCS-A survey instrument. Therefore, only 9 of the 10 original ACE items are represented in this study.

A positive response to any question within an adversity category was coded as “1 = Yes” meaning the participant had been exposed to the adversity category. If all of the items within an adversity category received a negative response, the respondent was coded as “0 = No” indicating the respondent had not been exposed to that particular adversity category. A conservative approach was used to score adversity variables measured using a Likert scale. A respondent was coded “1= Yes” if the participant reported an event occurred “often or sometimes” and was coded “0 = No” if the participant reported “not very often or never.” Further, missing responses to any adversity question was coded as “0 = No” for not being exposed to the experience. An overall ACEs score was generated for each participant by summing all twenty adversity items to create an aggregate score for each participant ranging from 0–20. However, due to small

numbers, youth reporting seven or more adversities were coded as “7” to ensure better stability during the analyses. Therefore, the final ACE score for each participant ranged between 0-7 for this study.

Dependent Variable. To assess suicidal ideation, participants were asked if they had ever had this experience - “You seriously thought about committing suicide.” This item was used to determine if a participant had at any time in her/his life seriously considered suicide. Possible response options were “1 = Yes” and “0 = No.”

Control Variables. Several variables were examined as potential confounding variables. These variables included adolescent race/ethnicity (i.e., White, Black, Hispanic, or other), age at interview, gender (i.e., male or female), highest maternal or paternal education (i.e., less than high school, high school graduate, some college, college degree), poverty ratio (1 = “ ≤ 1.5 ”, 2 = “1.5 to 3”, 3 = “3 to 6” and 4 = “ ≥ 6 ” times the 2000 poverty threshold), type of region of residency (i.e., metropolitan [large city], other urban area [suburbs, small city, town/village], and rural area), and U.S. citizen status (i.e., yes or no). Using a significance level of .05, univariate analysis of each item indicated a significant relationship to suicidality, therefore each item was controlled for in the analyses.

Table 3.1: Childhood Adversity Items and Related NCS-A Questions
Parental domestic violence – “Yes” = 1, “No” = 0; “Often” or “Sometimes” = 1, “Not very often” or “Never” = 0
<ul style="list-style-type: none"> • Ever witness serious physical fights at home, like when your father beat up your mother? • How often did (woman/man) who raised you insult, swear, shout, yell, scream, threaten to hit each other? • How often did (woman/man) grab, shove, throw something, slap or hit each other? • How often did (woman/man) kick, bit, hit with a fist, beat up, choke, burn or scald, threaten with a knife or gun each other?
Emotional abuse – “Often” or “Sometimes” = 1, “Not very often” or “Never” = 0
<ul style="list-style-type: none"> • How often did woman/man who raised you insult, swear, shout, yell or scream, or threatened to hit you? • How often did sibling insult, swear, shout, yell or scream, or threaten to hit you? • How often did someone you were dating insult, swear, shout, yell or scream, or threaten to hit you?
Physical abuse – “Yes” = 1, “No” = 0; “Often” or “Sometimes” = 1, “Not very often” or “Never” = 0
<ul style="list-style-type: none"> • Ever badly beaten up by your parents or people who raised you? • Ever badly beaten up by someone you were dating or with whom you were romantically involved? • Were you ever badly beaten up by anyone else (other than parent or someone you were dating)? • When growing up, how often did woman or man who raised you push, grab or shove, throw something, slap or hit you? Kick, bit or hit with a fist, beat up, choke, burn or scald, or threaten with a knife or gun? • When growing up, how often did sibling push, grab or shove, throw something, slap or hit you? Kick, bit or hit with a fist, beat up, choke, burn or scald, or threaten with a knife or gun?
Parental divorce – “Yes” = 1, “No” = 0
<ul style="list-style-type: none"> • “Biological parents were divorced”.
Sexual abuse – “Yes” = 1, “No” = 0
<ul style="list-style-type: none"> • Have you ever been raped? • Have you ever been sexually assaulted or molested (other than rape)? • Have you ever been stalked?
Physical neglect – Responses = “Often” or “Sometimes” = 1, “Not very often” or “Never” = 0
<ul style="list-style-type: none"> • How often made to do chores that were too difficult or dangerous for someone your age? • How often left alone or unsupervised when you were too young to be alone? • How often go without things like clothes, shoes, or school supplies because parent spent money on themselves?

<ul style="list-style-type: none"> • How often did parents/caregivers make you go hungry or not prepare regular meals? • How often did parents/caregivers ignore or fail to get you medical treatment when sick or hurt?
Parental mental health – Any question “Yes” = 1, “No” = 0
<ul style="list-style-type: none"> • Was the (man/woman) who raised you ever sad or depressed lasting two weeks or more? • Was the (man/woman) who raised you ever nervous, edgy, or anxious more than a month? • Did the (man/woman) who raised you ever have anxiety attacks? • Did the (man/woman) who raised you ever attempt or commit suicide?
Parent drug/alcohol abuse “Yes” = 1, “No” = 0
<ul style="list-style-type: none"> • Did the (man/woman) who raised you ever have a problem with drugs? • Did the (man/woman) who raised you ever have a problem with drinking alcohol?
Parent criminal/arrest history “Yes” = 1, “No” = 0
<ul style="list-style-type: none"> • Was the (man/woman) who raised you ever arrested or sent to prison? • Was the (man/woman) who raised you ever involved in criminal activities like burglary or selling stolen property?
Single parent household
<ul style="list-style-type: none"> • Participant reported living mostly in a single parent household.
Foster care involvement
<ul style="list-style-type: none"> • Ever in foster care?
Homelessness – “Yes” = 1, “No” = 2
<ul style="list-style-type: none"> • Have you ever been homeless?
Food scarcity – “Yes” = 1, “No” = 0
<ul style="list-style-type: none"> • In the past 12 months, did you go hungry because there was not enough money for food? • In the past 12 months, did you eat less because there was not enough money for food?
Major disaster – “Yes” = 1, “No” = 0
<ul style="list-style-type: none"> • Ever involved in a major disaster like a flood, hurricane, fire, bomb explosion, or earthquake?
Community violence – “Yes” = 1, “No” = 0
<ul style="list-style-type: none"> • Were you ever mugged, held up, or threatened with a weapon? • Did you ever see someone being badly injured or killed, or unexpectedly see a dead body?
Death or stress of other – “Yes” = 1, “No” = 0

<ul style="list-style-type: none"> • Anyone close to you die unexpectedly (e.g., killed in accident, murder, committed suicide, or fatal heart attack)? • Anyone close to you ever have a stressful or life-threatening experience, like kidnapping, torture or rape?
War, revolution, political coup, refugee – “Yes” = 1, “No” =0
<ul style="list-style-type: none"> • Ever in a place where there was war, revolution, military coup or ongoing terror? • Were you ever a refugee?
Car or other life-threatening accident – “Yes” = 1, “No” =0
<ul style="list-style-type: none"> • Ever involved in a very serious or life-threatening car accident? • Did you ever have any other very serious or life-threatening accident?
Serious illness, poison or chemical – “Yes” = 1, “No” =0
<ul style="list-style-type: none"> • Ever exposed to poisonous chemical or substance that could cause serious harm? • Did you ever have a very serious or life-threatening illness?
Any other stressor or trauma not mentioned – “Yes” = 1, “No” =0
<ul style="list-style-type: none"> • Ever experience other extremely upsetting or life-threatening event that I haven’t asked about yet?

Analysis

The complex sample module of the Statistical Package for the Social Sciences (SPSS) version 24 was used for the analyses. Missing data were assessed for each variable included in the study. For all predictor variables it was determined that less than 5% of the data was missing, therefore, list-wise deletion was used for the study analyses. Multicollinearity of the study predictor variables was assessed using tolerance and variance inflation factors (VIF) statistics and were found to be acceptable.

Several logistic regression models, controlling for covariates, were conducted to assess the relationship of exposure to adversity during childhood and the dependent variable “suicidal ideation.” Univariate analyses were conducted to obtain adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for each of the twenty adversity items to determine if there was a significant relationship to the dependent variable. Next, two full regression models were conducted first with the 9-item ACE assessment and then the 20-item ACE assessment. Model fit and R^2 statistics were examined to determine if including all 20 adversity items was a better predictor of risk for suicidal thoughts when compared to the model with the 9-item ACE assessment. Finally, logistic modeling was used to examine the graded cumulative effect of the 20-item ACEs assessment and suicidal ideation. Model results include mean and prevalence estimates, model statistics, overall classification, R^2 estimates, and odds ratios with 95% confidence intervals.

Results

Characteristics of Study Population. Demographic characteristics and prevalence of the nine original ACEs of the study sample (weighted $n = 10,123$) is provided in table 3.2. The study sample was nearly evenly divided between males (51.3%) and females (48.7%), with a mean age of 15.2 years (S.E. = .063). The majority were non-Hispanic

Whites (65.6%) and citizens of the United States (95.1%). Approximately 45% of parents and/or guardians of participants had received a high school diploma or less and 35% had received a college degree. Slightly more than 84% of participants lived in either a metropolitan or other urban community, and more than 60% lived in households with incomes three times greater than the 2000 poverty level. For those who responded (n = 9878) to the question “Have you ever seriously considered suicide?” 12.1% (S.E. = 0.6%) responded positively. Of those youth who reported they had thought seriously about suicide, 8.7% reported no exposures to adversity, 50.1% reported 1 – 3 exposures, 36.1% reported 4 – 6 exposures, and 5.0 % reported 7 – 9 exposures on the 9-item adversity scale.

		%	N	Original ACE Score by Group			
				0	1 – 3	4 – 6	7 – 9
Age, mean = 15.2 (.063)							
	13	15.2%	1652	24.4%	60.9%	13.5%	1.2%
	14	21.0%	2218	24.6%	60.1%	13.9%	1.4%
	15	20.5%	1887	24.3%	59.3%	15.5%	0.9%
	16	21.0%	2010	20.3%	59.5%	19.0%	1.2%
	17	16.8%	1758	18.5%	59.7%	20.0%	1.8%
	18	5.4%	598	22.4%	55.5%	20.1%	2.1%
Gender							
	Female	48.7%	4953	21.7%	58.6%	17.9%	1.7%
	Male	51.3%	5170	23.1%	60.5%	15.4%	1.0%
Race/Ethnicity							
	White	65.6%	5634	24.6%	58.5%	15.7%	1.2%
	Hispanic	15.1%	1953	16.2%	64.9%	17.2%	1.6%
	Black	14.4%	1914	19.9%	57.9%	20.6%	1.6%
	Other	5.0%	622	20.6%	62.1%	15.9%	1.3%
Poverty Ratio (2000)							
	< 1.5 of threshold	17.1%	1716	20.4%	58.6%	19.5%	1.4%
	<= 3 of threshold	19.3%	2021	21.2%	59.3%	18.1%	1.3%
	<= 6 of threshold	31.0%	3104	22.4%	59.3%	17.3%	1.1%
	> 6 of threshold	32.6%	3282	24.0%	60.5%	13.9%	1.6%
Urbanicity							
	Metropolitan	47.5%	4508	22.5%	59.4%	17.0%	1.1%

	Other Urban	37.6%	3304	21.3%	60.1%	17.1%	1.6%
	Rural	14.9%	2311	25.2%	59.0%	14.3%	1.6%
Parent(s) Highest Edu.							
	< High School	15.5%	1684	20.6%	58.7%	18.9%	1.8%
	High School grad.	29.7%	3081	18.1%	60.2%	19.8%	1.9%
	Some college	19.4%	1998	21.3%	56.6%	20.2%	1.8%
	College grad	35.3%	3360	27.5%	61.1%	10.9%	0.4%
U.S. Citizen							
	No	4.9%	409	28.9%	59.4%	11.6%	0.0%
	Yes	95.1%	9682	21.9%	59.8%	16.9%	1.4%
Suicidality ²							
	No	87.9%	8750	24.5%	60.7%	13.9%	0.9%
	Yes	12.1%	1128	8.7%	50.1%	36.1%	5.0%
¹ Unweighted N = 10,123							
² Unweighted valid N is 9878 due to missing data.							

Prevalence of ACEs and Univariate Analyses. Table 3.3 provides the prevalence rates and univariate results for each of the 20 ACEs items. The prevalence rate for the adversity items ranged from a low of .3% (war) and a high of 41.7% (physical abuse). The five highest reported exposure categories were physical abuse (41.7%), emotional abuse (35.1%), community violence (33.5%), parent(s) with a mental health condition (28.7%), and exposure to parental domestic violence (26.2%).

Examination of individual ACE scores showed a mean ACE score of 1.97 (S.E. = .041) for the 9-item ACEs assessment and a mean ACE score of 3.03 (S.E. = .058) for the 20-item assessment. Compared to the original 9 ACE items, the expanded 20-item adversity assessment identified fewer participants reporting no exposures (22.4% vs. 12.4%) or 1-3 exposures (59.6% vs. 51.8%) to adversity and more participants reporting 4 or more adversities (18.0% vs. 35.9%).

Univariate logistic regression analysis for each of the 20 adversity items indicated eighteen (18) exposures were significantly associated with increased risk for suicidal ideation. The adjusted odds ratios ranged between 1.25 to 4.72 increased risk. The

adversities with the five highest risk were sexual abuse (AOR = 4.72), foster care involvement (AOR = 4.61), parental mental health issues (AOR = 3.17), other stressors/traumas (AOR = 2.97), and parental domestic violence (AOR = 2.95). Living in a single parent household and war related exposures were not significantly associated with suicidal ideation.

Table 3.3: Prevalence and Univariate Risk of Suicidal Thoughts by ACE Item		
	Prevalence, %	AOR (95%, CI) ¹
Original ACEs ²	Yes	Thought about Suicide? ³
Parent domestic violence	26.2%	2.95 (2.46 – 3.54)
Emotional abuse	35.1%	1.56 (1.27 - 1.91)
Physical abuse	41.7%	1.89 (1.59 - 2.25)
Parental divorce	17.2%	1.25 (1.00 - 1.58)
Sexual Abuse	9.3%	4.72 (3.48 – 6.39)
Physically neglected	10.4%	2.44 (1.88 – 3.17)
Parent mental illness	28.7%	3.17 (2.56 – 3.93)
Parent drug/alcohol	17.7%	2.32 (1.86 - 2.89)
Parent criminal/arrest	12.4%	2.02 (1.62 – 2.51)
Additional ACEs		
Single parent household	11.6%	1.24 (.87 - 1.77)
War	0.3%	.89 (.56 - 1.43)
Foster care involvement	1.3%	4.61 (1.72 – 12.35)
Homeless	12.9%	2.63 (1.33 – 5.20)
Disaster	3.1%	1.44 (1.04 – 2.01)
Food scarcity	7.6%	2.76 (1.83 - 4.18)
Community violence	33.5%	2.82 (1.98 – 4.01)
Death/stress of other	2.6%	1.83 (1.50 – 2.24)
Car/other accidents	15.2%	1.70 (1.22 - 2.35)
Serious illness, poison	8.3%	2.06 (1.57 - 2.72)
Other stressors/trauma	9.2%	2.97 (2.47 - 3.57)
¹ Model odds ratios adjusted for age, gender, race/ethnicity, poverty ratio, parent(s) highest educational status, urbanicity, and U.S. citizenship. ² Referent for each item is “No” exposure to the adversity. ³ Referent is “No” the participant has not thought about suicide.		

Multivariate Analysis. Table 3.4 shows the adjusted odds ratios and 95% confidence intervals for each adversity item for the two regression models that included all 9-ACEs items from the original assessment and then a separate model including all

twenty (20) adversity items. The overall model with the original nine ACE items was statistically significant (Wald (X^2) = 1064.82, df = 23, $p < .001$). The model had an overall model classification of 88.5% and a Nagelkerke's R^2 of .190, indicating an estimated prediction in variance among risk groups of approximately 19%.

Predictor Variables ¹	Original ACE Items (n = 9451) ³		Expanded ACE Items (n = 9418) ⁴	
	AOR ²	95% CI	AOR ²	95% CI
Original ACEs				
Parent domestic violence	1.99	1.62 – 2.45	1.93	1.57 – 2.37
Emotional abuse	.99	.73 – 1.36	1.02	.74 – 1.40
Physical abuse	1.53	1.23 – 1.89	1.46	1.17 – 1.82
Parental divorce	1.09	.85 – 1.40	1.01	.78 – 1.32
Sexual Abuse	3.22	2.31 – 4.51	2.67	1.89 – 3.79
Physical neglect	1.48	1.08 – 2.04	1.40	1.04 – 1.91
Parent mental health	2.20	1.78 – 2.72	2.04	1.66 – 2.51
Parent drug/alcohol	1.33	.95 – 1.85	1.30	.94 – 1.80
Parent criminal/arrest	1.01	.73 – 1.38	.96	.69 – 1.32
Additional ACEs^a				
Single parent household			1.15	.78 – 1.69
War			.57	.35 – .93
Foster care involvement			1.07	.32 – 3.58
Homeless			.75	.30 – 1.88
Disaster			1.02	.73 – 1.42
Food scarcity			1.23	.80 – 1.90
Community violence			1.45	.91 – 2.32
Death/stressful of other			1.31	1.06 – 1.62
Car/other accidents			1.04	.72 – 1.49
Illness/poisoning			1.45	1.09 – 1.94
Other stressor/trauma			1.72	1.32 – 2.23
<p>Note: Model odds ratios adjusted for age, gender, race/ethnicity, poverty ratio, parent(s) highest educational status, urbanicity, and U.S. citizenship.</p> <p>¹ Referent for each item is “No” exposure to the adversity.</p> <p>² Referent is “No” the participant has not thought about suicide.</p> <p>³ Overall model fit: Wald (X^2) = 1064.82 (23), $p < .001$; Overall classification = 88.5%; Cox and Snell = .098, Nagelkerke R^2 = .190, McFadden = .142</p> <p>⁴ Over all model fit: Wald (X^2) = 6154.64 (34), $p < .001$; Overall classification = 88.5%; Cox and Snell = .106, Nagelkerke R^2 = .206, and McFadden = .155</p>				

In this model sexual abuse (AOR = 3.22), parental mental health (AOR = 2.20), parental domestic violence (AOR = 1.99), physical abuse (AOR = 1.53), and physical neglect of the child (AOR = 1.48) were statistically significantly associated with increased risk for suicidal ideation.

The second model, which included all twenty (20) adversities was statistically significant (Wald (X^2) = 6154.64, $df = 34$, $p < .001$). The model had an overall model classification of 88.5%, and a Nagelkerke's R^2 of .206 indicating an estimated prediction in variance among risk groups of approximately 21%. While slightly attenuated, the same five adversities - sexual abuse (AOR = 2.67), parental mental health (AOR = 2.04), parental domestic violence (AOR = 1.93), physical abuse (AOR = 1.46), and physical neglect of the child (AOR = 1.40) - were significantly associated with increased risk for suicidal thoughts. Of the additional 11 adversity items, other stressors and/or traumatic events (AOR = 1.72), having a serious illness and/or poisoning (AOR = 1.45), and the death and/or stressful situation of another (AOR = 1.31) were statistically significantly associated with increased risk for suicidal ideation.

Table 3.5 shows the estimated risk for suicidal ideation by ACE score. This model was statistically significant (Wald (X^2) = 1020.58, $df = 21$, $p < .001$), the overall model classification was 88.7%, and the Nagelkerke's R^2 was .170, indicating an estimated prediction in variance of approximately 17%. While those reporting only one exposure to adversity was not statistically significant, there was a graded effect on risk for suicidal ideation as individual ACE scores increased and significant risk increasing substantially for those reporting 4 or more exposures.

20-item ACE Score	Model ²	
	AOR	95% CI
0	Referent	Referent
1	1.23	.71 – 2.13
2	2.17	1.22 – 3.88
3	2.71	1.47 – 5.01
4	5.27	3.07 – 9.05
5	6.69	4.02 – 11.14
6	7.49	4.01 – 13.99
7 or more	14.76	8.94 – 24.39

¹Note: Model odds ratios adjusted for age, gender, race/ethnicity, poverty ratio, parent(s) highest educational status, urbanicity, and U.S. citizenship.
²Overall model fit: Wald (X^2) = 1020.58 (21), $p < .001$; Overall classification = 88.7%; Cox and Snell = .088, Nagelkerke $R^2 = .170$, McFadden = .126

Discussion

The Adverse Childhood Experiences study by Felitti and colleagues (1998) was a seminal study that expanded our understanding of the long and short-term impact of traumatic experiences during childhood. Since that time, researchers have sought to better understand how these experiences influence behavioral, psychological, and physiological responses to such exposures (Cronholm et al., 2015; Finkelhor et al., 2013; McLaughlin et al., 2013; National Scientific Council on the Developing Child, 2012; Wade et al., 2015, 2014). This study similarly seeks to advance our current understanding of the prevalence of various adversities children may be exposed to during their formative developmental years and the association of such exposures with adolescent suicidal ideation.

This study confirms adversity during childhood is not uncommon and may in fact be more prevalent than noted in the original ACE study. The original Felitti (1998) study found 36% of adult participants reported no exposures to childhood adversities using a

10-item childhood adversity assessment. In the current study 22% of participants reported no exposures based on a 9-item assessment of similar adversities assessed in the original ACE study and 12% reported no exposures when using an expanded 20-item adversity assessment. Finally, several adversities included in the expanded assessment were reported by a substantial number of study participants. Of the eleven additional adversities included in this study, exposure to community violence, car and other potentially fatal or serious accidents, homelessness, living in a single parent household, and exposure to other stressors or traumas were among the five highest reported exposures in the expanded assessment. These findings support the need to expand existing assessments to include a broader range of experiences that may cause stress and harm during important developmental stages.

This study further confirms that interpersonal adversities are significant predictors of adolescent suicidal ideation and perhaps other suicide related behaviors (Johnson et al., 2002). Regression models using both the 9-item assessment and the 20-item assessment found a significant association of exposure to parental domestic violence, physical abuse, sexual abuse, physical neglect, parental mental health conditions, the death or adversities of another, and having a serious or life-threatening illness as significant predictors of risk for suicidal ideation. Perhaps most notable is that the variable “other stressors and traumas” not assessed by the NCS-A was statistically significant in the fully regressed 20-item model. This finding suggests other potential stressors not identified in the original ACE assessment as well as the expanded assessment for this study may play a significant role in suicidal ideation. As demonstrated in prior studies experiences such as exposure to discrimination, living in unsafe neighborhoods, school failure, and being

bullied may be significant adversities not included in many studies focused on childhood adversities and health outcomes, and may be specific to populations that are more racially, ethnically, and economically diverse compared to the original ACE study population (Cronholm et al., 2015; Finkelhor et al., 2013; Johnson et al., 2002). Hence, expanding our knowledge about the influence of other exposures among diverse populations is warranted.

There were several unexpected outcomes of this study. First, unlike other childhood adversities, exposure to “war” related experiences were found to reduce risk for suicidal thoughts when included in the full 20-item regression model. A possible explanation, is a variety of other factors associated with children who have survived experiences of war may be playing a role in children’s reduced risk for suicidal thoughts and sense of resilience among this sample population. For example, it has been noted that ecological factors such as meaning making of the experience, family functioning and other social supports and networks unique to those who have experienced war related exposures may increase resiliency and reduce risk for future negative behavioral and mental health outcomes including suicidal ideation as seen in this study population (Betancourt & Khan, 2008; Slone & Mann, 2016).

Second, while the original hypothesis suggested that additional adversities would be additive to the model, the full 20-item model in this study only slightly better predicted risk for suicidal ideation among adolescents, with three additional adversities found to be significantly associated with the outcome. It is theorized this result may be related to the specific nature of the risk factors associated with suicidal behaviors which are most often interpersonal in nature (i.e., witnessing parental domestic violence,

physical and sexual abuse, exposure to serious illness, and death of a significant person) versus other forms of stressful events that may be attributed to factors not as personal in nature and may be more socially driven (Johnson et al., 2002). For example, while prior research has supported the theory that exposures to experiences such as living in a single parent household, being involved in foster care, and exposure to food scarcity may have short and long-term impacts on overall health and wellbeing (Cook et al., 2013; Courtney, Piliavin, Grogan-Kaylor, & Nesmith, 2001; Cronholm et al., 2015; McLaughlin et al., 2012; Weinreb et al., 2002), these findings were not confirmed in multivariate analyses in this study on suicidal ideation. Another possible reason for these findings may be due in part to rarity of exposures such as foster care involvement and exposure to disasters or how well the specific questions captured the adversity in this study. Further research on these items as potential adversities that may influence suicidal ideation is warranted.

Limitations

There are several limitations that should be considered when interpreting the results of this study. First, due to the cross-sectional observational design, temporal precedence and causation cannot be determined. It is unclear whether the adversities were a precursor to the outcome measure of interest or if the suicidal ideation preceded the reported adversities. However, these results are consistent with current theory and other studies assessing cumulative childhood exposures to adversity and health related outcomes including suicidal ideation and behaviors (Dube et al., 2001; Felitti et al., 1998). A second limitation is possible recall bias due to the retrospective reporting of exposures to various stressors and adversities. While this potential bias is present with

any retrospective assessment, exposures for this study were assessed during adolescence rather than during adulthood, providing a shorter time span between actual events and reporting. Further, studies have indicated that retrospective assessments of traumatic or stressful events is an appropriate approach (Dube, Williamson, Thompson, Felitti, & Anda, 2004). Finally, the rarity of several adversities included in this study may have prevented an accurate assessment of the association between these exposures and suicidal ideation.

Conclusion

This study confirms adversity during childhood is common and may include additional exposures not assessed in the original Adverse Childhood Experiences Study. These experiences may have dramatic effects on child and adult behavioral and health outcomes, and in this case, suicidal ideation among children during their adolescence. Therefore, prevention and treatment interventions among youth geared towards reducing youth suicide must consider the multiple factors that may act as drivers to the second leading cause of death among adolescents and young adults.

Chapter 4:

Study #2: Adolescent Social Integration as a Protective Factor of Cumulative Adverse Childhood Experiences and Adolescent Suicidal Ideation.

Abstract:

Background: Adverse Childhood Experiences have been associated with numerous negative behavioral and mental health outcomes over the life-course. While much has been learned about the physiological impact of cumulative childhood adversities and trauma, research is needed to better understand the factors that protect those exposed to potentially toxic levels of adversity and stress.

Methods: Guided by Durkheim's theory of social integration and regulation, an analysis of the National Comorbidity Survey Replication Adolescent Supplement (NCS-A) study was conducted to investigate the influence of adolescent social integration on the relationship of childhood adversity and suicidal ideation among a nationally representative sample of adolescents (n = 10,128) between the ages of 13 and 18. Family, school, peer, teacher, and religious/spiritual integration or connectedness were assessed as protective factors for suicidal ideation among those with childhood adversities using multigroup path analysis.

Results: Social integration was found to reduce risk for suicidal ideation. However, only family, school and religious integration or connectedness were found to be significant protective factors in this study. Further, the effect of these three integration factors was only demonstrated among youth reporting 1-3 adversities, and only family connectedness reduced risk for suicidal ideation for youth reporting 4 – 6 exposures.

Social integration did not reduce risk for suicidal ideation for youth reporting 7 or more adversities.

Conclusion: Family, school, and religious/spiritual integration and connectedness reduce risk for suicidal ideation among youth reporting low to medium levels of cumulative adverse experiences. However, the findings of this study suggest that the impact of higher exposures to adversity (i.e., 7 or more exposures) mitigate the positive influence of social integration. Further research is warranted to address the specific needs of youth exposed to higher levels of stress and adversity with a specific focus on how best to reduce or eliminate childhood adversities and trauma.

Introduction

Adverse childhood experiences among youth under age 18 are common and considered a serious public health issue. In 2009, a national study found nearly 60% of all youth reported exposure to at least one form of direct or indirect violence annually (Finkelhor, Ormrod, et al., 2009). While exposure to adversity is considered normal and necessary for healthy development, many children experience toxic levels of stress and adversity that are often co-occurring or cumulative. These experiences often go unidentified and without appropriate supports and treatment with far reaching consequences over the life course (National Scientific Council on the Developing Child, 2012).

Suicidal ideation (the process of thinking about, considering, or planning to commit suicide), which often precedes suicide related behaviors is one of many factors that have been associated with cumulative childhood adversities (Beautrais, 2000; Choi et al., 2017; Dube et al., 2001; Hardt et al., 2008b; Johnson et al., 2002). Led only by accidental injuries, suicide is the second leading cause of death among youth and young adults between the ages of 15 and 25 (Center for Disease Control and Prevention (CDC), 2015a). It is estimated that 17% of students in grades 9-12 seriously consider attempting suicide and 13.6% make a plan about how they would commit suicide (Center for Disease Control and Prevention (CDC), 2015c). While estimates are not available specifically for youth under the age of 18, estimated national cost of suicides and suicide attempts range between \$58.4 to \$93.5 billion annually (Shepard, Gurewich, Lwin, Reed, & Silverman, 2016). Given our understanding of the connection between childhood adversity and the devastating impact of suicide among youth and young adults,

identifying the factors that increase resiliency among at risk populations is a public health imperative.

One of the most well-known investigations of cumulative childhood adversity is the Adverse Childhood Experiences (ACE) study (Felitti et al., 1998). The ACE study was a collaborative effort between Kaiser Permanente and the Centers for Disease Control and Prevention (CDC) that examined the association of cumulative exposure to ten childhood adversities related to abuse, neglect, and household dysfunction and long-term behavioral and health outcomes in a cohort of more than 1700 adults (Felitti et al., 1998). Results from this study and many other studies focused on childhood adversity have consistently shown a graded increased risk for negative behavioral, physical and mental health outcomes among adults and children (Anda, 1999; Anda et al., 2004, 2008; Anda, Tietjen, Schulman, Felitti, & Croft, 2010; Brown et al., 2007; Chapman et al., 2004, 2011; Dietz, 1999; Dong et al., 2004; Dube et al., 2001, 2003, 2006b, 2009b; Edwards, Anda, Felitti, & Dube, 2004; Edwards, Fivush, Anda, Felitti, & Nordenberg, 2001; Edwards, Holden, Felitti, & Anda, 2003; Hillis et al., 2004; Hillis, Anda, Felitti, & Marchbanks, 2001; Hillis, Anda, Felitti, Nordenberg, & Marchbanks, 2000; Williamson, Thompson, Anda, Dietz, & Felitti, 2002). Since the ACE study, advances in a broad spectrum of disciplines (i.e., neuroscience, molecular biology, genomics, developmental psychology, epidemiology, sociology, and economics) have expanded our understanding about the influence of stressful events on child development (Folkman, 1984b; Lazarus, 1966; Lazarus & Cohen, 1977; Shonkoff et al., 2012).

The “Ecobiodevelopment (EBD) Framework,” created by the Center on the Developing Child at Harvard University, provides a structure for understanding the

etiology of childhood adversity and stress on health and development, and provides an outline for potential areas of intervention and treatment (see Figure 1: Ecobiodevelopmental Framework) (Shonkoff et al., 2012). The EBD framework suggests the consequences of adversity and stress during childhood are determined by interlocking relationships of biology (i.e., physiological adaptations and disruptions), ecology (i.e., social and physical environment), and health disposition and human development (i.e., learning, behavior, and physical and mental well-being) (Shonkoff et al., 2012). It is thought that environmental exposures (i.e., ecology) beginning as early as the prenatal period trigger and set the stage for current and future responses to adversity and stress (i.e., biology), which then influence future behavioral and psychological responses (i.e., health and development) throughout childhood and over the life-course (Committee on Psychosocial Aspects of Child and Family Health, 2012; Shonkoff et al., 2012).

At the biological level, it is understood that the human body is designed to respond to stress inducing experiences through a series of hormonal responses that act as protective factors (Committee on Psychosocial Aspects of Child and Family Health, 2012; Compas, 2006; Shonkoff et al., 2012; Wadsworth, 2015). These protective responses to stressful ecological exposures are centered within the brain and include a combination of immediate, unconscious biological reactions and less reactionary, conscious responses (i.e., appraisal of experiences) (Compas, 2006; McEwen, 1993; McEwen et al., 2015). In situations of adversity, threat or stress, these biological stress reactions set in motion the “fight or flight” response or a series of biological and psychological responses to the event or exposure (Shonkoff et al., 2009). Evidence has suggested these responses can either facilitate healthy development through “positive” or

“tolerable” stressful events or disrupt normal development in children when exposures become “toxic” (Shonkoff et al., 2012).

“Toxic” stress, which is the most harmful to healthy development, is characterized by strong, frequent, or prolonged activation of the body’s stress response systems in the absence of protective factors (Shonkoff et al., 2012). When individuals are exposed to repeated or chronic stress the human stress response may become deregulated and may result in harmful physiological conditions known as “allostatic load or overloading” and maladaptive psychological coping skills (McEwen, 1993). For example, studies have found toxic levels of adversity to be a significant predictor of physiological changes such as elevated blood pressure, elevated hypothalamic pituitary adrenal axis activity, dysregulation of metabolic activity, compromised immune function, increases in inflammatory markers, and elevated allostatic load - all of which increases risk for morbidity and mortality (Araújo et al., 2009; Berasain et al., 2009; Chen & Miller, 2007; Danese et al., 2008; Evans & Kim, 2013; Felitti et al., 1998; Middlebrooks & Audage, 2008; Slopen et al., 2012; Slopen, Kubzansky, et al., 2013; Slopen, McLaughlin, et al., 2013). In children, toxic stress has been associated with increased risk for a number of maladaptive psychological and behavioral responses such as depression and anxiety, avoidance and dissociation, aggression, early sexual initiation and risky sexual behaviors, impaired school function and memory, alcohol and tobacco consumption, and suicidality (Chapman et al., 2004; Dube et al., 2003; Felitti et al., 1998; Middlebrooks & Audage, 2008; Stein et al., 2003).

It is understood that healthy child development in the face of adversity and trauma is dependent on adequate and appropriate supports and connections within the ecological

environment. These social relationships and ties are thought to affect mental and physical health by having a positive influence on individual emotions, cognitions, and behaviors (Berkman et al., 2000; Cohen, 2004; Seeman, 1996). Durkheim was one of the first to examine the impact of social relationships and social ties on human health and behavior, and more specifically suicide, through his theory of social integration and regulation (Berkman et al., 2000). Durkheim theorized that variations in rates of suicide were a consequence of the quality of social relationships or connectedness (i.e., “social facts”) (Durkheim, 1951). Further, the loss of organized and supporting relationships (i.e., family, community, and work ties) and lack of social constraints as a result of individuals migrating to more industrialized, less organized communities would have a negative impact on their psychological wellbeing, resulting in increased risk for suicidality (Cohen et al., 2000).

Social integration, which many consider to be the central construct of Durkheim’s theoretical framework, was posited to provide an interchange of ideas and feelings that form the social bonds that attach individuals to common goals and shared social causes (Thorlindsson & Bjarnason, 1998). Effective social integration of the individual is also believed to provide a positive means of social supports and interactions leading to better psychosocial outcomes for the individual, whereas ineffective integration leads to negative outcomes or higher rates of suicide (Rose et al., 2014). Social regulation, expressed through religious, political and moral beliefs, were theorized to control individual behaviors that would prevent individuals from acting in opposition to the benefit of society. The quantity and intensity of these relationships determine how attached individuals are to each other, whether they have common goals, and the extent to

which natural human desires are regulated through the use of socially accepted authority figures to limit individual desires and passions (Durkheim, 1951).

Prior studies focused on Durkheim's theory of social integration have demonstrated a positive association between social integration and health outcomes (Berkman & Syme, 1979; Crittenden et al., 2014; Easton & Renner, 2013; House, Robbins, & Metzner, 1982; Kuramoto, Wilcox, & Latkin, 2013; Knoester & Haynie, 2005; Rose et al., 2014; Schoenbach, Kaplan, Fredman, & Kleinbaum, 1986; Tenorio & Lo, 2011). For example, a 9-year probability study of mortality among a cohort of adults ages 30 to 69 years (N = 4775), found that lower levels of social integration (i.e., summary index reflecting ties with a spouse, close friends and relatives, and participation in church and other types of groups) were associated with higher mortality (Berkman & Syme, 1979).

Thorlindsson and Bjarnason (1998) investigated Durkheim's theory of social integration and regulation by examining "social facts" at the micro-level with a specific focus on the role of family integration and parental regulation on youth suicidality. Using a nationally representative sample of 4,314 high school students, the relationship of family social support (i.e., social integration), parental regulation (i.e., social regulation), social anomie (i.e., a condition of instability resulting from a breakdown of standards and values or lack of purpose or ideas), and social norms regarding suicide (i.e., knowing others who were thinking about, attempted or committed suicide) and their association to individual suicidality were examined. Results from their study demonstrated the concepts of social integration and social regulation were distinct constructs, with strong family integration or social support having a significant inverse

effect on rates of suicidality among the sample population. Further, parental regulation was not found to be a significant predictor of suicidality amongst this sample population (Thorlindsson & Bjarnason, 1998).

Finally, Rose and colleagues (2014) examined Durkheim's theory of social integration (i.e., family, school, and religious involvement and religious commitment) on mental health outcomes of a nationally representative sample of Black adolescents (n = 1,170) between the ages of 13-17. The findings from this study supported Durkheim's theory of social integration and concluded that family, school, and religious integration are significant predictors of better mental health for Black adolescents, with school integration emerging as the strongest predictor of positive psychological well-being (Rose et al., 2014).

Using the Ecobiodevelopmental (EBD) Framework as a guide, this study focused on expanding our understanding of the role of social integration or connectedness as a protective factor for adolescent suicidal ideation. Unlike prior studies, this investigation used an expanded assessment of childhood adversity to assess the prevalence and influence of higher levels of adversity on suicidal ideation. This investigation also expanded on the Rose and colleagues (2014) study by examining the co-occurrence of family, school and religious connectedness with two additional factors (i.e., peer and teacher integration) commonly viewed as important positive influences on early child and adolescent developmental on suicidal ideation. Based on Durkheim's theory of social integration, it was hypothesized that each of the five social integration factors would have a significant protect effect on risk for suicidal ideation across each childhood adversity

group, and while attenuated, this protective relationship would remain significant across each adversity group.

Methods

This study is an analysis of the National Comorbidity Survey Replication Adolescent Supplement (NCS-A) study (Kessler, 2013). Data for the NCS-A were collected between February 2001 and January 2004 by the Survey Research Center of the Institute for Social Research at the University of Michigan and was an add-on to the National Comorbidity Survey Replication (NCS-R) study, an investigation of the prevalence and correlates of mental health disorders among adults in the US (Kessler, 2013). The NCS-A study was considered the first nationally representative study on the prevalence, correlates and patterns of service use for DSM-IV mental health disorders among U.S. adolescents (Kessler, Avenevoli, Costello, et al., 2009a). This seminal study was designed to provide the groundwork for follow-up studies of risk and protective factors, consequences, and early expressions of adult mental health disorders (Kessler et al., 2009a, 2009b; Merikangas, Avenevoli, Costello, Koretz, & Kessler, 2009).

NCS-A Eligibility and Sampling Frame. Participation in the NCS-A study was restricted to English-speaking, non-institutionalized adolescents between the ages of 13 and 18 (n=10,148) living in the United States. A dual-framed, complex cluster sampling methodology was used to draw a sample of adolescents for the study. The first sampling-frame included adolescents (n=904) living in households where an adult had participated in the National Comorbidity Survey-Replication (NCS-R) study. To supplement the low number of interviews completed, a second sampling-frame of adolescents (n=9244) were recruited to the NCS-A study from a population of students attending 320 schools located

in the same counties in which the NCS-R was conducted (Kessler et al., 2009b). Eligible schools included all accredited private and public middle schools, junior high schools and high schools within the 62 primary sampling units (PSUs) used in the NCS-R study (Kessler et al., 2004, 2009b). A probability sampling methodology proportional to the size of the student body was used to select schools. Forty to fifty students were randomly selected from each school to participate in the NCS-A study. The overall adolescent response rate (i.e., both household and student sample populations) was 75.6%. The majority of non-responders (21.3%) refused to participate; the remaining 3.2% were unable to participate due to “circumstances” or “non-contact” (Kessler et al., 2009b). Further details regarding the sampling frame for the NCS-A study can be found elsewhere (Kessler et al., 2004).

NCS-A Adolescent Questionnaire. The NCS-A adolescent questionnaire includes data on a number of factors considered relevant to adolescent behavior and mental health. Areas assessed include individual level factors (e.g. demographics, developmental factors, cognitive and academic abilities-achievements, physical health, and stressful life events), family level factors (e.g. family structure, stability and adaptability, parenting behaviors, parental psychopathology, and family stress), and environmental level factors such as school and neighborhood characteristics (Merikangas et al., 2009). Further, a modified version of the fully structured Composite International Diagnostic Interview (CIDI) of behavioral and mental health disorders was used in the adolescent questionnaire to assess for fifteen DSM-IV disorders among participants such as mood, anxiety, behavior, and substance abuse disorders (Kessler et al., 2012).

Procedures. In the presence of a parent or guardian, adolescent interviews were administered face-to-face in the home of each respondent using a laptop, computer-assisted personal interview (CAPI). Trained survey interviewers from the Survey Research Center of the Institute of Social Research at the University of Michigan administered each adolescent interview. On average, the NCS-A adolescent interviews took approximately two and a half hours to complete, with interviews ranging between 69 to 347 minutes (Kessler et al., 2009b). This variation in interview length was primarily due to the number of lifetime disorders assessed for each adolescent that was determined based on an initial screening tool administered at the beginning of each interview (Kessler et al., 2009b; Merikangas et al., 2009).

This analysis includes all participants in the NCS-A study. Approval for this study was obtained from the University of Maryland, College Park institutional review board and the University of Michigan Inter-University Consortium of Political and Social Research (ICPSR) institutional review board.

Measures

Adversity Measures. Forty-six (46) questions in the NCS-A were used to create the twenty (20) childhood adversity items for this study. These items were derived from a number of standardized assessment tools selected by the original NCS-A research team (Kessler et al., 2009a; Merikangas et al., 2009)(Kessler et al., 2009a; Merikangas et al., 2009). Table 4.1 provides a summary of the twenty (20) categories of adversity used and the NCS-A questions used to assess exposure for each category.

A positive response to any question within an adversity category was coded as “1 = Yes” meaning the participant had been exposed to the adversity category. If all of the

items within an adversity category received a negative response, the respondent was coded as ‘0 = No’ indicating he/she had not been exposed to that particular adversity category. A conservative approach was used to score adversity variables measured using a Likert scale in the NCS-A. A respondent was coded “1= Yes” if the participant reported an event occurred “often or sometimes” and was coded “0= No” if the participant reported “not very often or never.” Further, missing responses to any adversity question was coded as “0=No” for not being exposed to the experience.

An overall adverse childhood adversity (ACE) score was generated for each participant by summing all twenty adversity items to create an aggregate score for each participant ranging from 0–20. However, due to small numbers, youth reporting seven or more adversities were coded as “7” to ensure better stability during the analyses. Therefore, the final ACE score for each participant ranged between 0-7 for this study.

Dependent Variable. To assess suicidal ideation participants were asked if they had ever had the experience - “You seriously thought about committing suicide.” For this study, this item was used to determine if a participant had at any time in her/his life seriously considered suicide. Possible response options were “1=Yes” and “0=No.”

Social Integration Variables. Table 4.2 summarizes items used from the NCS-A used to generate each social integration variable. To construct the new social integration variables, first reverse coding was conducted to align negatively worded items or response options for directional consistency across each social integration item. The range of responses for each item was 0 to 4, with higher scores representing higher levels of perceived social integration or connectedness. Next, principal components analysis (using direct oblimin rotations) and scale reliability were used to create the five social

integration variables for the final analysis (Nunnally, 1975). While several items used in the NCS-A appeared to be consistent with a specific social integration construct, only those items with a component loading greater than .30 were included in each social integration scale (Kline, 2010). Finally, scale reliability was assessed for each of the newly constructed social integration variables to examine internal consistency of each integration scale and mean scores for each of the five social integration items was generated for each participant.

The religious/spiritual integration variable was derived from four items assessing religious engagement, importance, and emotional support. It included items such as “How often do you usually attend religious services” and “In general, how important are religious or spiritual beliefs in your daily life?” (Mean = 2.50, S.E. = .02, Cronbach’s Alpha = .882). The family integration item was derived from twelve items used in the NCS-A study and assessed family emotional support, engagement, and decision-making. It included items such as “How often did family members feel very close to each other” and “How often did the whole family do things together” (Mean = 2.86, S.E. = .01, Cronbach’s Alpha = .855).

Table 4.1: Childhood Adversity Items and Related NCS-A Questions
Parental domestic violence – “Yes” = 1, “No” = 0; “Often” or “Sometimes” = 1, “Not very often” or “Never” = 0
<ul style="list-style-type: none"> • Ever witness serious physical fights at home, like when your father beat up your mother? • How often did (woman/man) who raised you insult, swear, shout, yell, scream, threaten to hit each other? • How often did (woman/man) grab, shove, throw something, slap or hit each other? • How often did (woman/man) kick, bit, hit with a fist, beat up, choke, burn or scald, threaten with a knife or gun each other?
Emotional abuse – “Often” or “Sometimes” = 1, “Not very often” or “Never” = 0
<ul style="list-style-type: none"> • How often did woman/man who raised you insult, swear, shout, yell or scream, or threatened to hit you? • How often did sibling insult, swear, shout, yell or scream, or threaten to hit you? • How often did someone you were dating insult, swear, shout, yell or scream, or threaten to hit you?
Physical abuse – “Yes” = 1, “No” = 0; “Often” or “Sometimes” = 1, “Not very often” or “Never” = 0
<ul style="list-style-type: none"> • Ever badly beaten up by your parents or people who raised you? • Ever badly beaten up by someone you were dating or with whom you were romantically involved? • Were you ever badly beaten up by anyone else (other than parent or someone you were dating)? • When growing up, how often did woman or man who raised you push, grab or shove, throw something, slap or hit you? Kick, bit or hit with a fist, beat up, choke, burn or scald, or threaten with a knife or gun? • When growing up, how often did sibling push, grab or shove, throw something, slap or hit you? Kick, bit or hit with a fist, beat up, choke, burn or scald, or threaten with a knife or gun?
Parental divorce – “Yes” = 1, “No” = 0
<ul style="list-style-type: none"> • “Biological parents were divorced”.
Sexual abuse – “Yes” = 1, “No” = 0
<ul style="list-style-type: none"> • Have you ever been raped? • Have you ever been sexually assaulted or molested (other than rape)? • Have you ever been stalked?
Physical neglect – Responses = “Often” or “Sometimes” = 1, “Not very often” or “Never” = 0
<ul style="list-style-type: none"> • How often made to do chores that were too difficult or dangerous for someone your age? • How often left alone or unsupervised when you were too young to be alone? • How often go without things like clothes, shoes, or school supplies because parent spent money on themselves?

<ul style="list-style-type: none"> • How often did parents/caregivers make you go hungry or not prepare regular meals? • How often did parents/caregivers ignore or fail to get you medical treatment when sick or hurt?
Parental mental health – Any question “Yes” = 1, “No” = 0
<ul style="list-style-type: none"> • Was the (man/woman) who raised you ever sad or depressed lasting two weeks or more? • Was the (man/woman) who raised you ever nervous, edgy, or anxious more than a month? • Did the (man/woman) who raised you ever have anxiety attacks? • Did the (man/woman) who raised you ever attempt or commit suicide?
Parent drug/alcohol abuse “Yes” = 1, “No” = 0
<ul style="list-style-type: none"> • Did the (man/woman) who raised you ever have a problem with drugs? • Did the (man/woman) who raised you ever have a problem with drinking alcohol?
Parent criminal/arrest history “Yes” = 1, “No” = 0
<ul style="list-style-type: none"> • Was the (man/woman) who raised you ever arrested or sent to prison? • Was the (man/woman) who raised you ever involved in criminal activities like burglary or selling stolen property?
Single parent household
<ul style="list-style-type: none"> • Participant reported living mostly in a single parent household.
Foster care involvement
<ul style="list-style-type: none"> • Ever in foster care?
Homelessness – “Yes” = 1, “No” = 2
<ul style="list-style-type: none"> • Have you ever been homeless?
Food scarcity – “Yes” = 1, “No” = 0
<ul style="list-style-type: none"> • In the past 12 months, did you go hungry because there was not enough money for food? • In the past 12 months, did you eat less because there was not enough money for food?
Major disaster – “Yes” = 1, “No” = 0
<ul style="list-style-type: none"> • Ever involved in a major disaster like a flood, hurricane, fire, bomb explosion, or earthquake?
Community violence – “Yes” = 1, “No” = 0
<ul style="list-style-type: none"> • Were you ever mugged, held up, or threatened with a weapon? • Did you ever see someone being badly injured or killed, or unexpectedly see a dead body?
Death or stress of other – “Yes” = 1, “No” = 0

<ul style="list-style-type: none"> • Anyone close to you die unexpectedly (e.g., killed in accident, murder, committed suicide, or fatal heart attack)? • Anyone close to you ever have a stressful or life-threatening experience, like kidnapping, torture or rape?
War, revolution, political coup, refugee – “Yes” = 1, “No” =0
<ul style="list-style-type: none"> • Ever in a place where there was war, revolution, military coup or ongoing terror? • Were you ever a refugee?
Car or other life-threatening accident – “Yes” = 1, “No” =0
<ul style="list-style-type: none"> • Ever involved in a very serious or life-threatening car accident? • Did you ever have any other very serious or life-threatening accident?
Serious illness, poison or chemical – “Yes” = 1, “No” =0
<ul style="list-style-type: none"> • Ever exposed to poisonous chemical or substance that could cause serious harm? • Did you ever have a very serious or life-threatening illness?
Any other stressor or trauma not mentioned – “Yes” = 1, “No” =0
<ul style="list-style-type: none"> • Ever experience other extremely upsetting or life-threatening event that I haven’t asked about yet?

Principal component analysis found two distinct components among the education related observed variables - school and teacher connectedness. The school integration item was derived from seven observed items and included questions such as “I like school” and “Getting good grades is important to me” (Mean = 3.11, S.E. = .01, Cronbach’s Alpha = .748). The teacher integration item was derived from three observed variables focused on the participants connection with their teachers and included items such as “Most of my teachers treat me fairly” and “I like my teachers” (Mean = 3.27, S.E. = .01, Cronbach’s Alpha = .665). Finally, the peer integration item was derived from three observed variables that included items such as “How much can you rely on friends when you have a serious problem” and “How often do you let your friends know about your problems and worries” (Mean = 3.06, S.E. = .01, Cronbach’s Alpha = .632).

Control Variables. Several variables were examined as potential confounding variables. These variables included adolescent race and ethnicity (i.e., White/other, Black, and Hispanic), age at interview, gender (i.e., male or female), highest maternal or paternal education (i.e., less than high school, high school graduate, some college, college degree), poverty ratio (1 = “ ≤ 1.5 ”, 2 = “1.5 to 3”, 3 = “3 to 6” and 4 = “ ≥ 6 ” times the poverty threshold), type of region of residency (i.e., metropolitan [large city], other urban area [suburbs, small city, town/village], and rural area), and U.S. citizen status (i.e., yes or no).

Table 4.2: Social Integration Items
Religious/Spiritual Integration
<ul style="list-style-type: none"> • How often do you usually attend religious services? • In general, how important are religious/spiritual beliefs in your daily life? • When you have problems/difficulties in your family, work, etc. how often do you seek comfort through religious or spiritual means such as prayer, meditating, attending service, or talking to religious/spiritual advisor? • When you have decisions to make in your daily life, how often do you think about what your religious or spiritual beliefs suggest you should do?
Family Integration
<ul style="list-style-type: none"> • How often did family members feel very close to each other? (R) • How often could family members talk to each other about their feelings? (R) • How often did family members let each other know when they were sad or worried? (R) • How often did family members keep their feelings to themselves? • How often did the whole family do things together? (R) • How often did family members share interests/hobbies with each other? (R) • How often did family members avoid each other? • How often did family members go along w/ what the family decided to do? (R) • How often did each family member have input in major family decisions? (R) • How often did children have a say in their discipline? (R) • How often did everyone compromise when there were disagreements? (R) • How often was it difficult to get everyone to agree on decisions?
School Integration
<ul style="list-style-type: none"> • What sort of grades did you get in your last years at school? • I like(d) school • Getting good grades (is/was) important to me. • Homework (is/was) a waste of time. (R) • I try(ied) hard at school. • I Feel/felt as if I don't/didn't belong at school (R). • Most of the things I learn(ed) in school are unimportant. (R).
Teacher Integration
<ul style="list-style-type: none"> • Most of my teachers treat(ed) me fairly. • I care(d) a lot about what my teacher thinks/thought about me. • I like(d) my teachers.
Peer Integration
<ul style="list-style-type: none"> • How often do you talk on the phone/hangout/get together with your friend(s)? • How much can you rely on your friend(s) for help if you have a serious problem? • How much can you open up to your friend(s) if you need to talk about your worries?

The number of DSM-IV disorders were also controlled for in this study. This variable was generated based on the fifteen lifetime DSM-IV disorders (i.e., distress, fear, behavioral, substance abuse, and bipolar disorders) assessed and coded for each participant by the original NCS-A research team. The range of cumulative disorders was 0-5 in this study, indicating a participant had anywhere from 0 to 5 DSM IV disorder diagnoses. Given the small number of participants with five DSM IV disorders ($n = 59$), those with 4 and 5 disorders were combined into one category of 4 or more disorders ($n = 313$). Therefore, the range of DSM IV disorders for this study was between 0 to 4 disorders.

Analysis

The Statistical Package for the Social Sciences (SPSS) version 24 was used to test for assumptions, develop the social integration items, and prepare the dataset for further analyses. Missing data were assessed for each variable included in the study and it was determined that less than 5% of the data was missing. Next, multicollinearity was assessed using Tolerance ($R^2_{smc} < .10$) and Variance Inflation Factor ($1/1-R^2_{smc} > 10$) statistics (Kline, 2010) and were found to be acceptable.

Mplus version 7.4 was used to test the hypothesis using multi-group path analyses (Muthén & Muthén, 2018). The full sample was retained for this analysis and full information maximum likelihood (FIML) method was used to handle missing data. Weighted least squares (WLSMV) was used to estimate the path coefficients given the complex sampling methodology and the inclusion of both continuous and categorical variables. As recommended by Hu and Bentler (1999), data to model fit was examined using comparative fit index ($CFI > .95$) and the root mean square error of approximation

(RMSEA < .06) indices. Parameter estimates were examined and statistically significant path coefficients and R-square values for each multi-group analysis are reported (Kline, 2010).

Results

Characteristics of Study Population. Table 4.3 provides a description of the demographic characteristics of the study sample (weighted n = 10,123). The study sample was nearly evenly divided between males (51.3%) and females (48.7%), with a mean age of 15.2 years (range = 13 to 18 years). The majority were non-Hispanic Whites (65.6%) and citizens of the United States (95.1%). Approximately 45% of parents and/or guardians of participants had received a high school diploma or less and 35% had received a college degree. Slightly more than 84% of participants lived in either a metropolitan or other urban community, and more than 60% lived in households with incomes three times greater than the 2000 poverty level.

Prevalence rates of DSM-IV disorders in this study population showed that 51.0% of participants did not meet the diagnostic criteria for any of the fifteen behavioral and mental health disorders assessed. Of the remaining participants, 26.7% had one disorder, 13.1% had two disorders, 6.0% had three disorders, and 3.2% had four or five DSM disorders. For those who responded (n = 9878) to the question “Have you ever seriously considered suicide?” 12.1% (S.E. = 0.6%) responded positively.

		Column	
Age (mean = 15.2 years)		%	N
	13	15.2%	1652
	14	21.0%	2218
	15	20.5%	1887
	16	21.0%	2010
	17	16.8%	1758

	18	5.4%	598
Gender			
	Female	48.7%	4953
	Male	51.3%	5170
Race/Ethnicity			
	White	65.6%	5634
	Hispanic	15.1%	1953
	Black	14.4%	1914
	Other	5.0%	622
Poverty Ratio			
	< 1.5	17.1%	1716
	<= 3	19.3%	2021
	<= 6	31.0%	3104
	> 6	32.6%	3282
Urbanicity			
	Metropolitan	47.5%	4508
	Other Urban	37.6%	3304
	Rural	14.9%	2311
Parent(s) Highest Education			
	< High school	15.5%	1684
	High school graduate	29.7%	3081
	Some college	19.4%	1998
	College graduate	35.3%	3360
U.S. Citizen			
	No	4.9%	409
	Yes	95.1%	9682
Any DSM-IV Disorder			
	No	51.0%	5186
	Yes	49.0%	4937
¹ Unweighted N = 10,123			

Using the expanded childhood adversity assessment, 12.5% of participants reported no exposures to adversity (Table 4.4). Just over half of the participants (51.7%) of participants reported 1–3 exposures, 27.1% reported 4–6 exposures, and 8.8% of participants reported 7 or more exposures to childhood adversities (Table 4.4). Finally, as depicted in Table 4, 3.8% of participants reporting no adversity exposures indicated they had seriously considered suicide, 7.1% of participants reporting 1–3 adversities seriously

considered suicide, 18.1% of those reporting 4–6 adversities serious considered suicide, and 34.6% of those reporting 7 or more adversities seriously considered suicide.

ACE Group	Prevalence		Ever seriously consider suicide? ¹				Totals Count ²
			No		Yes		
	Est.	S.E.	Est.	S.E.	Est.	S.E.	
0	12.5%	0.7%	96.2%	0.8%	3.8%	0.8%	1185
1-3	51.7%	0.9%	92.9%	0.5%	7.1%	0.5%	5149
4-6	27.1%	0.7%	81.9%	1.1%	18.1%	1.1%	2739
7 =>	8.8%	0.7%	65.4%	2.8%	34.6%	2.8%	805
Totals	100%	0.0%	87.9%	0.6%	12.1%	0.6%	

¹ Unweighted valid N is 9878 for the sample due to missing data.
² All counts are unweighted valid Ns.

Multivariate Analysis. To assess the association of cumulative adverse childhood experiences to suicidal ideation, adjusted logistic regression modeling was used to examine this relationship (Table 4.5).

ACE Group	Model ¹	
	AOR	95% C.I.
0 ACEs group	Referent	Referent
1 – 3 ACES group	1.39	.811, 2.38
4 – 6 ACEs group	2.87	1.70, 4.84
7 or more ACEs group	4.11	2.56, 6.61

Note: Model odds ratios adjusted for age, gender, race/ethnicity (i.e., Black, Hispanic and Referent = white and other), poverty ratio, parent(s) highest educational status, urbanicity (i.e., metropolitan, other urban and Referent = rural), U.S. citizenship, and number of DSM-IV disorders.

¹ Overall model fit: Wald (X^2) = 1005.46, df = 20, p < .001; Overall classification = 88.9%; Cox and Snell = .144, Nagelkerke R^2 = .277, McFadden = .212.

This overall model fit was also statistically significant (Wald (X^2) = 1005.46, df = 20, p < .001). The overall model classification was 88.9%, and the Nagelkerke’s R^2 was .277, indicating an estimated prediction in variance of approximately 28%. Risk for suicidal ideation for those reporting 1–3 childhood adversities was not statistically significantly

different from those reporting no adversities (AOR=1.39, 95% C.I. [.81, 2.38]) in this model. Those reporting 4–6 childhood adversities (AOR=2.87, 95% C.I. [1.70, 4.84]) and 7 or more childhood adversities (AOR=4.11, 95% C.I. [2.56, 6.61]) were statistically significantly at greater risk for suicidal ideation compared to those reporting no exposures.

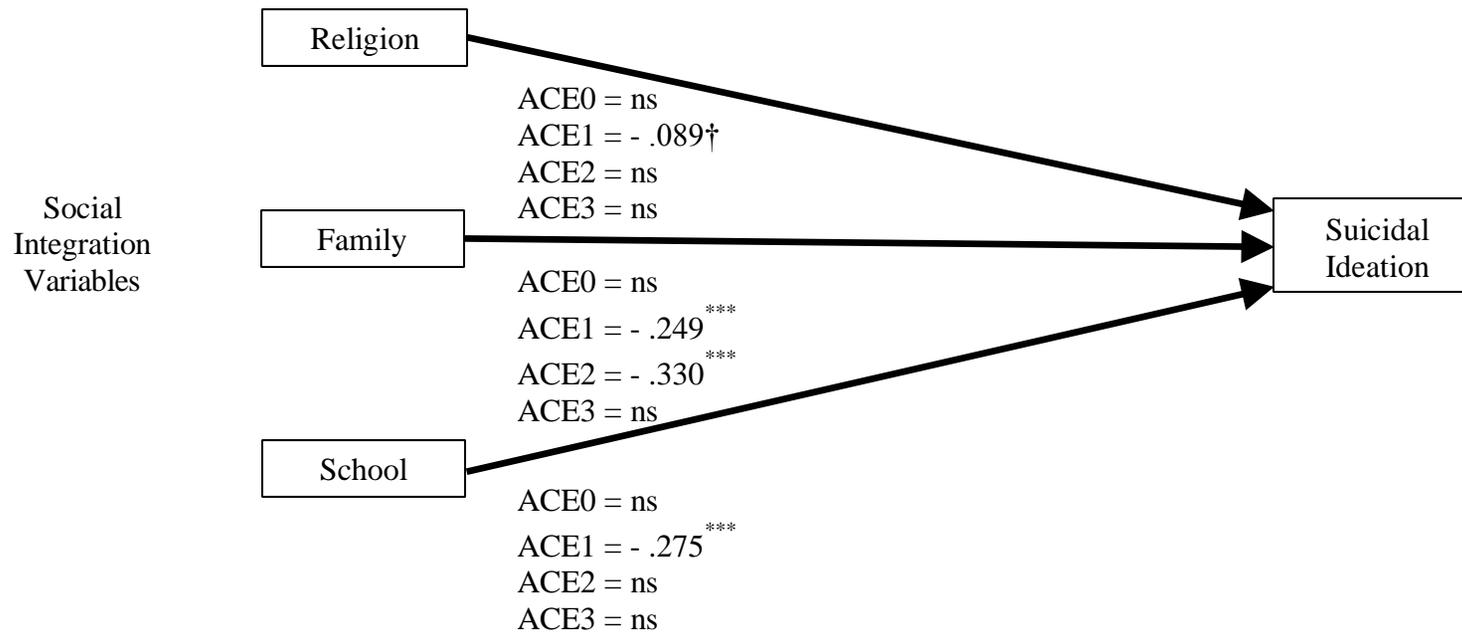
Multi-Group Path Analysis Results. Results of the multi-group path analysis examining the influence of cumulative adversities on the relationship of social integration and suicidal ideation are presented in Figure 4.1 and Table 4.6. Controlling for all covariates, model fit statistics determined that the multi-group model was an acceptable fit to the data, CFI/TFI = 1.00 and RMSEA = .000, 90% C.I. [.000, .000]. Results for group 1 (i.e., adolescents reporting no adverse childhood experiences) found no statistically significant effects of the five social integration factors to risk for suicidal ideation. Increasing age (Est.=.140, S.E.=.083, p=.092) was mildly associated with increased risk for suicidal ideation. Results for group 2 (i.e., adolescents reporting 1 to 3 adverse childhood experiences) indicated a statistically significant effect of three of the five social integration factors. Religious integration (Est.= - .089, S.E.=.049, p=.066) was mildly associated with decreased risk for suicidal ideation. Family integration (Est.= - .249, S.E.=.070, p < .001) and school integration (Est.= - .275, S.E.=.076, p < .000) were both statistically significantly associated with decreased risk for suicidal ideation. Examination of the covariates among this group found that age (Est.=.014, S.E.=.020, p = .041), higher parental education (Est.=.099, S.E.=.035, p = .004), and DSM IV disorders (Est =.443, S.E.=.043, p < .001) were statistically significantly associated with

increased risk for suicidal ideation. Females (Est.=.189, S.E.=.111, $p = .088$) were mildly associated with increased risk among this group.

Group 3 (i.e., adolescents reporting 4 to 6 adverse childhood experiences) results showed fewer social integration items as protective factors of suicidal ideation. Only family integration (Est.= - .330, S.E. =.096, $p = .001$) was associated with a statistically significant reduction in risk for suicidal ideation among this group. Females (Est.=.377, S.E.=.080, $p < .000$) and DSM IV disorders (Est.=.361, S.E.=.060, $p < .001$) remained statistically associated with increased risk for suicidal ideation. U.S. citizenship (Est.=.604, S.E.=.353, $p = .087$) was also mildly associated with increased risk for suicidal ideation among this group. Finally, results for group 4 (i.e., adolescents reporting 7 or more adverse childhood experiences) indicated none of the five social integration factors were associated with a reduction in adolescent risk for suicidal ideation. Both females (Est.=.591, S.E.=.178, $p = .001$) and DSM IV disorders (Est.=.341, S.E.=.102, $p = .001$) remained statistically significantly associated with increased risk for suicidal ideation among this high adversity exposure group.

Given these results, additional analyses were conducted to assess the moderating effect of ACE categories on the relationship of each social integration item and adolescent suicidal ideation. Pairwise comparisons of parameter estimates were found to be insignificant, indicating that a statistically significant moderating effect of cumulative adversities was not present in this study.

Figure 4.1: ACE Multigroup Path Analysis Results for Influence of Social Integration on Suicidal Ideation



Note: ns = not significant

Note: ACE0 = no adversities, ACE1 = 1-3 adversities, ACE2 = 4-6 adversities, ACE3 = 7 or more adversities

Note: Unstandardized coefficients are presented

† = .10; * = .05; ** = .01; *** < .001

Table 4.6: Path Analysis Results of Social Integration on Suicidal Ideation by ACE Group ¹				
Parameter Estimates	Participant ACE Category			
	0	1 – 3	4 – 6	7 or more
	Est. (S.E.)	Est. (S.E.)	Est. (S.E.)	Est. (S.E.)
Religion → Suicidal Ideation	.071 (.717)	-.089 (.049) [†]	-.010 (.125)	.011 (.100)
Family → Suicidal Ideation	-.178 (.926)	-.249 (.070) ^{***}	-.330 (.096) ^{***}	-.199 (.203)
Friend → Suicidal Ideation	-.305 (.510)	-.026 (.058)	-.006 (.120)	-.112 (.196)
Teacher → Suicidal Ideation	-.456 (.996)	-.109 (.082)	.000 (.161)	.028 (.195)
School → Suicidal Ideation	-.248 (2.243)	-.275 (.076) ^{***}	-.084 (.240)	-.243 (.153)
R-Square	.253 (.407)	.218 (.025) ^{***}	.311 (.101) ^{**}	.340 (.078) ^{***}
[†] = .10; * = .05; ** = .01; *** < .001 ¹ All estimates are unstandardized coefficients (S.E.).				

Discussion

The Adverse Childhood Experiences study by Felitti and colleagues (1998) was a seminal study that expanded our understanding of the long and short-term impact of traumatic experiences during childhood. Since that time, researchers have sought to better understand how these experiences influence behavioral, psychological, and physiological responses to such exposures, and the factors that are protective to such exposures. This study specifically examined the effects of cumulative childhood adversity on the relationship of social integration or connectedness to adolescent suicidal ideation.

This study confirms several findings in the existing literature. It confirms adversity during childhood is not uncommon (Felitti et al., 1998; Finkelhor et al., 2009; Finkelhor, Shattuck, Turner, & Hamby, 2015; Turner, Finkelhor, & Ormrod, 2010). Using an expanded childhood adversity assessment, eighty-eight percent of adolescents in this study reported experiencing at least one traumatic or stressful event in their lifetime, with another thirty-five percent reporting four or more adversities. Higher levels of childhood adversity were associated with increased risk for suicidal ideation. Risk for suicidal ideation among youth reporting four to six adversities were nearly three times the risk of those reporting no adversities, and more than four times the risk for youth reporting seven or more adversities compared to youth reporting no exposures to adversity. Finally, this study found social integration or connectedness as a protective factor against suicidal ideation was partially supported. In other words, the protective benefits of higher perceived social integration were not consistent across varying

adversity risk groups and only three of the five protective factors significantly reduced risk for suicidal ideation.

While this study supports the findings that family and school connectedness or integration act as protective factors for suicidal ideation (Czyz, Liu, & King, 2012; Eisenberg, Ackard, & Resnick, 2007; Eisenberg & Resnick, 2006; Kaminski et al., 2010; Matlin et al., 2011) this study indicates that these influences may vary as exposure to adversities increase. Results indicated individuals experiencing lower levels of adversity (i.e., 1 to 3 adversities) demonstrated a significant reduction in risk for suicidal ideation as perceived family, school and to a lesser extent, religious social integration increased. However, the benefits of these protective factors were not maintained for youth reporting higher levels of cumulative childhood adversities. Youth reporting 4 to 6 adversities experienced a statistically significant reduction in suicidal ideation from higher perceived family integration only, while youth reporting 7 or more adversities experienced no benefits from higher perceived family or school integration. These findings suggest as substantial negative childhood exposures accumulate the positive influences of school, family and other forms of social integration or connectedness may be mitigated by uncontrolled biological and psychological responses often associated with higher levels of stress. Such responses may overwhelm individual systems and coping skills and may diminish and interrupt healthy interactions with existing protective factors.

Finally, findings from this study did not support the hypothesized effect of higher perceived teacher or peer integration. Across all childhood adversity groups, higher perceived teacher and peer integration were not found to be statistically significant

protective factors against suicidal ideation. However, these results may be due in part to how these two factors were operationalized in this study. Further, prior studies focused on these factors have also demonstrated inconsistent findings (Eisenberg et al., 2007; McNeely & Falci, 2009).

For example, McNeely and colleagues (2009), conducted a longitudinal study to assess teacher support and social belonging as protective factors for several health risk behaviors among adolescents. While they found teacher support was a protective factor for initiation of sexual intercourse, weapon related violence, initiation of cigarette, drinking and marijuana use, and suicide attempts, it was not a protective factor for suicidal ideation. However, another study focused specifically on the protective influence of family, school safety, adult caring, and teacher caring for suicidal ideation and suicide attempts among youth with a history of sexual abuse did find “teacher caring” to be a protective factor (Eisenberg et al., 2007).

Similarly, studies on peer integration or connectedness as a protective factor to suicidal ideation has also found mixed results (Whitlock, Wyman, & Moore, 2014). A search for recent studies found four studies that examined peer support as a protective factor for suicidal ideation. Of these studies, two determined peer support was not a protective factor for suicidal ideation (Miller, Esposito-Smythers, & Leichtweis, 2015; Rojas et al., 2017), one study found peer connectedness to be a statistically significant protective factor (Kaminski et al., 2010), and the final study determined peer connectedness was a complex relationship that may be contingent on other factors and context (Czyz et al., 2012). For example, the longitudinal study of suicidal adolescents by

Czyz and colleagues (2012) found the influence of peer connectedness as a protective factor for suicidal ideation varied across gender, severity of baseline suicidal ideation, baseline status of multiple suicide attempts, and changes in perceived family and peer connectedness over time. Given the existing, yet limited evidence in the literature, further investigations on the influence of teacher and peer connectedness on suicidal ideation are warranted.

The findings of this study are important given the current focus of public health prevention and treatment efforts on the role of social connectedness as a protective factor for poor health outcomes resulting from exposures to adversity during childhood. Organizations such as the Center on the Developing Child at Harvard University have identified and endorsed the presence of a caring supportive adult and relationships with other caring individuals (i.e., immediate and extended family members, early care providers, teachers, and community members) as the most salient factor in supporting positive and healthy child development in the face of adversity (Center on the Developing Child, 2007; National Scientific Council on the Developing Child, 2007). Yet the findings of this study suggest the positive effects of various forms of social support and connectedness may be greatly attenuated by the harmful effects of high levels of adversity.

In this study, approximately 27% of participants reported experiencing four to six adversities in their lifetime, with another 9% reporting seven or more exposures. Research, program and policy efforts designed to address the harmful influence of childhood adversities, often times do not consider the social and environmental

conditions of children and adolescents exposed to untenable adversities. Many prevention and treatment programs identify the specific behavior or health condition as the focus of their efforts without considering the breath of contributing factors or root causes. For a significant number of youth, exposures to childhood adversity not only include many of the adversities assessed in this study, but other co-occurring adversities such as intractable intergenerational poverty, various types and intersecting forms of discrimination and oppression, persistent lack of access to quality education and housing, inadequate health related systems and care, inconsistent and inadequate access to transportation and other social systems, and living in isolated communities faced with a number of issues such as food deserts and high rates of unemployment and violence.

The impact of high levels of cumulative adversity can also be seen among some of our most socially disconnected youth – youth disproportionately impacted by school disciplinary policies and youth involved in the juvenile justice system – both of which are important predictors of lifelong health and well-being for children. A recently released report focused on school discipline disparities among Black youth by the Government Accountability Office (GAO) found that high rates of trauma related behaviors (i.e. increased anxiety, problems with self-regulation, aggressive and self-destructive behaviors, and a number of mental health problems such as depression) were reported by school administrators as a growing problem among school populations, and important drivers of school suspensions and expulsions (Office of U. S. Government Accountability, 2018). Recent studies among juvenile justice involved youth, who often come from poor communities of color, have also found exceptionally high rates of

childhood adversities among both boys and girls (Baglivio et al., 2014; Cannon, 2016). For example, an assessment of 220 incarcerated youth found 86% had experienced four or more adversities during their childhood – a figure that is seven times higher than that found in the original Adverse Childhood Experiences study (Baglivio et al., 2014).

Future efforts to address childhood adversity must be focused on our most vulnerable populations if our society is to make significant progress towards reducing adversity and trauma related morbidity and mortality. This will require substantial investments in research focused on uncovering the root cause of childhood adversity, and more importantly, in finding solutions that not only reduce but eliminate toxic levels of trauma and stress. Further this will require a fundamental shift in our beliefs. In other words, such a shift will require that our primary focus will move from increasing resiliency to investing in healthy viable communities that provide the social context necessary for health childhood development.

Limitations

There are several limitations that must be considered when interpreting the results of this study. First, this study is a cross-sectional design. This type of design limits our ability to determine temporal precedence and causation. However, these results are consistent with other studies assessing the influence of childhood exposures to adversity and the role of social integration or connectedness as a protective factor against negative health related outcomes including suicidal ideation and behaviors (Dube et al., 2001; Eisenberg et al., 2007; Felitti MD et al., 1998; Hardt et al., 2008a; Johnson et al., 2002; Rojas et al., 2017; Waldrop et al., 2007).

A second limitation is possible recall bias due to the retrospective reporting of exposures to various stressors and adversities. While this potential bias is present with any retrospective assessment, exposures in this study were assessed during adolescence rather than adulthood, providing a shorter time span between actual events and reporting. Further, studies have indicated retrospective assessments of traumatic or stressful events is an appropriate approach (Dube et al., 2004). Along with recall bias, this study relied on self-report data that was not confirmed with other sources. Given the nature of many of the questions used for this study, under reporting of adversities and negative social relationships are a possibility.

Instrument bias is also a serious consideration for this study. Since this study was a secondary analysis, the assessment of the social integration constructs was restricted to items included on the NCS-A questionnaire. Both teacher and peer integration scale items were derived from only three questions. Further, the three peer integration items did not reflect the influence of deviant peer relationships which could have a negative influence on thoughts of suicidal ideation. However, methods used to construct these items have been used previously (Rose et al., 2014). However, future studies with instruments that have been validated is recommended.

Conclusion

Much research has been focused on identifying factors that increase individual resilience of children exposed to adversity. Yet the findings of this study suggest the positive effects of various forms of social support and the harmful effects of untenable adversity may significantly attenuate connectedness. While individual and family

resilience should remain a priority, such approaches place the primary burden of responsibility on those most impacted (i.e., the children) by toxic levels of cumulative adversities and traumas – many of which may be a product of existing social conditions.

Given the findings of this study and what is currently known about toxic stress on child development, future research must focus on addressing the ecological factors that are the drivers of adversity and trauma during childhood. Early identification and intervention as a public health program and policy approach should be practiced as a strategy to reduce the lifelong harms of childhood adversity, especially among those working in early childhood health fields (Johnson, Riley, Granger, & Riis, 2013). Further, future public health investments must continue to link children and families who face significant adversities to supportive services such as trauma informed programs and systems such as the Nurse-Family Partnership program and trauma-focused cognitive behavioral therapeutic models. Each of these modalities have been shown to be promising or evidence-based prevention and treatment programs (Garner, 2013; Olds et al., 2013; Salloum, Scheeringa, Cohen, & Storch, 2014). Finally, and most importantly, there must be a paradigm shift in our thinking as a society where it is no longer acceptable for our youth to experience multiple childhood adversities. We must make the necessary social, financial and policy commitments to eliminate these exposures that so seriously harm our youth and adults.

Chapter 5: Summary

Using a secondary analysis of the National Comorbidity Survey Replication Adolescent Supplement (NCS-A), this dissertation sought to expand the existing literature focused on the impact of adverse childhood experiences and the role of social integration or connectedness as a protective factor to adolescent suicidal ideation. This chapter is a summary of the results of the two studies presented in this dissertation, the limitations, and implications for future research.

Study #1 Aim: To determine if an expanded assessment of adverse childhood experiences better predicts adolescent suicidal ideation.

The first study examined the influence of additional adversities on suicidal ideation by constructing a 20-item adversity assessment that included nine of the original ACE adversities and eleven additional adversities assessed in the NCS-A study. The nine items assessed in this study representing the original ACE adversities were physical, emotional, and sexual abuse; physical neglect; parental divorce; parental mental health disorders; parental drug and alcohol abuse; parental domestic violence; and parental criminal and arrest history. Additional exposures examined in the analyses included community violence, death of someone close, living in a single parent household, homelessness, foster care involvement, food scarcity and other items such as war related adversities, natural disasters, and life-threatening accidents and illness. Both individual items and cumulative adversity were examined as risk factors for suicidal ideation.

H.1.a. An expanded assessment of childhood adversity (i.e., the 20-item assessment) will better predict variance in risk for suicidal ideation than a shorter

assessment of childhood adversity (i.e., the 9-item assessment based on the original ACE assessment).

This hypothesis was partially supported by the findings in this study. Based on prior research, it was expected that the expanded adversity assessment would be a better predictor of suicidal ideation compared to the nine-item assessment. For example, Finkelhor and colleagues (2013) found that an expanded childhood adversity assessment was a better predictor of variance in childhood distress (34%) compared to a less exhaustive adversity assessment (21%). However, adjusted multivariate analyses determined the nine-item assessment predicted approximately 19% of variance in suicidal ideation, while the twenty-item assessment predicted approximately 21% of variance.

H.1.b. Adolescents with higher cumulative childhood adversities will demonstrate greater risk for suicidal ideation compared to those with fewer cumulative childhood adversities.

This hypothesis was supported by the findings in this study. As expected, exposure to childhood adversities was high among this cohort of adolescents. Using the twenty-item adversity assessment eighty-eight percent of study participants indicated they had been exposed to at least one adversity assessed in the NCS-A study. Thirty-five percent had been exposed to four or more adversities. Physical abuse by a parent or guardian, sibling, or intimate partner were extremely high in this cohort, along with exposure to community violence, emotional abuse, domestic violence between parents or guardian, and parental mental health disorders.

Univariate analysis determined that all of the adversities, except for living in a single parent household and exposure to war related adversities, were significantly associated with suicidal ideation. A Multivariate analysis that included all twenty adversity items found that five of the original childhood adversity items (i.e., parental domestic violence, physical abuse, sexual abuse, parental mental health disorders, and physical neglect) and three items from the expanded assessment (i.e., death or stressful or life-threatening experience, like kidnapping, torture or rape of another significant person, a life-threatening or serious illness or injury, and “other stressors or traumas” not assessed by the NCS-A study) were each significant predictors of suicidal ideation.

Cumulative adversities also had the expected dose-response relationship to the outcome variable. As cumulative exposures to adversities increased, so increased individual risk for suicidal ideation. However, it is noted that participants reporting seven or more adversities were at substantially higher risk for suicidal ideation compared to those reporting lower cumulative adversities. In the first full regression model adjusting for all covariates, the risk for suicidal ideation for those reporting seven or more adversities was nearly twice the risk of those reporting six or fewer exposures to adversity. It is also noted that participants reporting four or more cumulative adversities were at greater risk for suicidal ideation compared to any single adversity item assessed in this study, indicating that cumulative exposures to adversity may be a greater risk than single exposures to adversity.

Study #2 Aim: To determine if social integration (i.e., family, school, religious/spiritual, teacher, and peer integration) influences the impact of adverse childhood experiences on risk for suicidal ideation among adolescents.

The second study was guided by Durkheim's theory of social integration and regulation, with a focus on social integration as a protective factor of suicidal ideation. Principal components analysis was used to generate five new social integration items believed to be significant influences in healthy child development. These new social integration variables were family, school, religious/spiritual, peer, and teacher integration or connectedness. Mplus path analysis was used to examine the hypotheses regarding the protective effect of the five social integration items on the relationship of cumulative childhood adversities and suicidal ideation.

H.2.a Higher perceived family, school, religious/spiritual, teacher, and peer integration will each decrease risk for suicidal ideation among adolescents.

This hypothesis was partially confirmed by this study. While each social integration factor was expected to significantly reduce risk for suicidal ideation, only three of the five social integration items were found to be significant in this study. Higher perceived family, school and to a lesser extent, religious/spiritual integration were found to be significant protective factors for suicidal ideation. In other words, as perceived integration or connectedness increased for these factors, risk for suicidal ideation decreased. Finally, peer and teacher connectedness were not found to be positive protective factors for suicidal ideation regardless of the number of cumulative childhood adversity exposures. While this finding was not predicted for this study, it is in line with

the literature. The limited extant literature on the effects of peer and teacher integration or connectedness as a protective factor of suicidal ideation is inconclusive, meriting further research.

H.2.b Higher perceived social integration, while attenuated, will decrease risk for suicidal ideation among youth with a greater number of cumulative childhood adversities.

This hypothesis is partially confirmed by the findings in this study. Family, school, and religious/spiritual integration or connectedness were protective factors of the relationship between cumulative childhood adversities and suicidal ideation. As exposures to childhood adversities increased, this positive relationship of the three social integration factors were attenuated. However, we found it surprising that none of the social integration factors provided positive benefit among those reporting higher levels of adversity. The findings of this study demonstrated that family, school, and religious/spiritual integration decreased risk for suicidal ideation among youth reporting fewer than six adversities but did not reduce risk for youth reporting seven or more adversities.

Research Implications

Over the past few decades, there has been a dramatic growth in our understanding about the influences of childhood adversity on behavioral and mental health outcomes, including suicidal ideation. There is greater understanding about childhood adversities' influence on physiological and psychological development of children during their formative developmental years, and much research has been conducted to better understand the factors that build resiliency in children faced with

adversity or traumatic events. Prevention and treatment efforts have and continue to focus on the influence of healthy relationships and connectedness as the key factor to healthy coping skills for youth facing adversity. However, the findings of this study call into question this approach as the panacea to negative ecologic factors that have damaging impacts on health and wellbeing across the life-course.

Future research efforts therefore must continue to expand on our understanding about the ecological factors that may cause trauma during children's formative developmental years. Such research efforts require new approaches to identifying what individuals perceive to be stressful or traumatic experiences during childhood. The use of mixed methods study designs (i.e., the use of both quantitative and qualitative methods) is a suggested approach to providing a deeper understanding of various traumatic exposures, as well as a better understanding of those factors considered most supportive to prevention and recovery.

Investment in longitudinal studies must also be a focus of future research efforts. Many studies focused on the harms of childhood adversity are often cross-sectional, which limits our ability to determine causal relationships, and are subject to numerous limitations. Further, future studies must focus on examining risk and protective factors across diverse communities (i.e., race/ethnicity, gender, sexual orientation, rural versus urban communities, etc.). This will ensure that prevention and treatment efforts are appropriately designed to meet the specific needs of diverse communities and address the specific environments in which people live.

Research must also focus on developing standardized tools and assessments that can be used by systems and professionals (i.e., pediatricians and other medical staff, education administrators, therapist, etc.) working with youth to better assess the full breadth of adversities that place children at increased risk for poor behavioral and health outcomes. This will ensure appropriate interventions and treatments can be initiated in the early developmental years.

Finally, the previously mentioned research efforts should be multi-disciplinary in nature and must cross multiple systems of care and services. Children and families at greatest risk for multiple traumas and adversities, often times move through numerous public systems that provide limited solutions to the multiple problems they face. Coordinated efforts across systems would not only put us in a better position to address possible gaps in needed services, they would also be more efficient and cost effective.

Limitations

There are a few limitations to the findings presented in this dissertation. The cross-sectional nature of the study limits our ability to determine causal relationships between adverse childhood experiences and suicidal ideation, as well as other risk and protective factors examined in this study. However, these results are consistent with other studies assessing cumulative childhood exposures to adversity and health related outcomes including suicidal ideation and behaviors (Dube et al., 2001; Felitti et al., 1998).

This study also primarily relied on self-report data that was assessed retrospectively. This increases risk for poor recall of prior events, and under and/or over

reporting of certain behaviors, experiences, and perceptions on certain variables used for this study. However, this study was conducted during adolescence rather than during adulthood, providing a shorter time span between actual events and reporting. Further, studies have indicated that retrospective assessments of traumatic or stressful events is an appropriate approach (Dube et al., 2004)

Conclusion

The role of cumulative childhood adversities as a driver of many behavioral and mental health conditions and social issues must be recognized as a public health epidemic. Many of the adversities and traumas faced by children are often socially driven and avoidable. While our current goal of building resiliency is a worthy endeavor, reducing and/or eliminating childhood adversities must become a social and policy priority if we truly are committed to making a significant and permanent shift in trauma related morbidity and mortality. However, such an endeavor will require a clear commitment from community leaders, practitioners, and policymakers across disciplines and social systems to begin addressing the issues that drive many of the factors that are so harmful to our children, families and ultimately, our communities.

Appendices

Appendix A: Methods

The purpose of this dissertation was to expand existing knowledge on factors that may influence adolescent health. Using a nationally representative sample of youth between the ages of 13 and 18, an expanded 20-item adverse childhood experiences index was generated to explore the role of childhood adversities as risk factors for suicidal ideation. Using Durkheim's theory of social integration and social regulation as a guide, this dissertation also examined the role of five key ecological influences in the lives of adolescents – family, school, religious, teacher and peer integration - as potential protective factors to the relationships of childhood adversities and adolescent suicidal ideation. The following paragraphs provide a brief description of the NCS-A study and the methods used for the current dissertation (i.e., the conceptual model, study sample, and methods of analyses).

The National Comorbidity Survey Replication Adolescent Supplement Study

This dissertation involves secondary analysis of the National Comorbidity Survey Replication Adolescent Supplement (NCS-A) study (Kessler, 2013). Data for the NCS-A were collected between February 2001 and January 2004 by the Survey Research Center of the Institute for Social Research at the University of Michigan and was an add-on to the National Comorbidity Survey Replication (NCS-R) study, an investigation of the prevalence and correlates of mental health disorders among adults in the US (Kessler, 2013). The NCS-A study was considered the first nationally representative study on the prevalence, correlates and patterns of service use for DSM-IV mental health disorders among U.S. adolescents (Kessler, Avenevoli, Costello, et al., 2009a). Further, this

seminal study was designed to provide the groundwork for follow-up studies of risk and protective factors, consequences, and early expressions of adult mental disorders (Kessler et al., 2009a, 2009b; Merikangas, Avenevoli, Costello, Koretz, & Kessler, 2009).

NCS-A Eligibility and Sampling Frame.

Participation in the NCS-A study was restricted to English-speaking, non-institutionalized adolescents between the ages of 13-18 (n=10,148) living in the United States. A dual-framed, complex cluster sampling methodology was used to draw a sample of adolescents for the study. The first sampling-frame included adolescents (n=904) living in households where an adult had participated in the National Comorbidity Survey-Replication (NCS-R) study. Respondents to the NCS-R were selected from a four-stage area probability sample of the non-institutionalized civilian population using small area 2000 census data collected from the US Bureau of the Census. A probability sample of 84 primary sampling units (PSUs) and pseudo-PSUs representative of the US population were selected. Each PSU included all counties in a census-defined metropolitan statistical area (MSA) or individual counties representing themselves. Individual housing units were then identified and entered into a computer system. A random sample of housing units was then selected and all residents 18 years of age and older were identified in each housing unit. Probability sampling was then used to select one or two individuals within a housing unit to participate in the NCS-R study. Students living in campus group housing were also eligible to participate in the study if their permanent housing address was a housing unit selected for the study (Kessler et al., 2004). Further details regarding the sampling frame for the NCS-R study can be found in

Kessler's article on the design and field procedures used for the NCS-R study (Kessler et al., 2004).

To supplement the low number of interviews completed by adolescents living in households of adult participants in the NCS-R study, a second sampling-frame of adolescents (n=9244) were recruited to the NCS-A study from a population of students attending 320 schools located in the same counties in which the NCS-R was conducted (Kessler et al., 2009b). Eligible schools included all accredited private and public middle schools, junior high schools and high schools within the NCS-R counties. A probability sampling methodology proportional to the size of the student body in the classes relevant to the target population was used to select schools. This sample of schools included both unblinded schools (i.e., schools in which student rosters were provided to investigators to select and recruit adolescents and their families to participate in the study) and blinded schools (i.e., student identities were unknown until a signed consent was obtained from the school principals). Forty to fifty students were randomly selected from each school to participate in the NCS-A study. The overall adolescent response rate (i.e., both household and student sample populations) was 75.6%; the majority of non-responders (21.3%) were refusals to participate in the study with the remaining 3.2% unable to participate due to "circumstances" or "non-contact" (Kessler et al., 2009b).

NCS-A Adolescent and Parent Supplemental Questionnaires

The adolescent questionnaire included assessments of the known correlates to mental health of children and the fully structured Composite International Diagnostic Interview (CIDI) personifying fifteen DSM-IV disorders. The specific disorders assessed

via the CIDI include mood disorders (major depressive disorder and dysthymia, bipolar I-II disorder and subthreshold bipolar disorder), anxiety disorders (panic disorder with or without agoraphobia, agoraphobia without panic disorder, social phobia, specific phobia, generalized anxiety disorder (GAD), post-traumatic stress disorder, separation anxiety disorder), behavior disorders (attention deficit hyperactivity disorder, oppositional defiant disorder, conduct disorder, eating disorders) and substance abuse disorders (alcohol and drug abuse with and without dependency) (Kessler et al., 2012). All diagnoses were made using the DSM-IV distress and impairment criteria and organic exclusion rules (i.e., if a symptomatic episode occurs as a result of factors such as physical illness, injury, or the use of medication, drugs, alcohol, then the participant is not coded as having a disorder even if they meet all other criteria) (Kessler et al., 2012). Further, it is noted that diagnostic hierarchy rules were not used due to an interest in studying co-morbidity among hierarchy-free disorders (i.e., all disorders were coded as present even if they only occurred in the presence of another disorder) (Kessler et al., 2012).

In the presence of a parent or guardian, adolescent interviews were administered face-to-face in the home of each respondent using a laptop, computer-assisted personal interview (CAPI). Trained survey interviewers from the Survey Research Center of the Institute of Social Research at the University of Michigan administered each adolescent interview. Survey data was collected on a number of factors considered relevant to adolescent behavior and mental health including individual level factors (e.g. demographics, developmental factors, cognitive and academic abilities-achievements, physical health, and stressful life events), family level factors as reported by the

adolescent (e.g. family structure, stability and adaptability, parenting behaviors, parental psychopathology, and family stress), and finally, environmental level factors such as school and neighborhood characteristics (Merikangas et al., 2009).

On average, the NCS-A student interviews took approximately two and a half hours to complete, with interviews ranging between 69 minutes to 347 minutes (Kessler et al., 2009b). This variation in interview length was primarily due to the number of lifetime disorders assessed for each adolescent that was determined based on an initial screening tool administered at the beginning of each interview. Adolescent participants were each provided a \$50 incentive for their participation (Kessler et al., 2009b; Merikangas et al., 2009).

NCS-A Limitations

Limitations of the NCS-A as noted by the Merikangas and colleagues (2009) included: 1) exclusion of children 12 years of age and under, which restricts the generalizability of findings; 2) the cross-sectional design of the survey prevented the assessment of temporal precedence of risk and protective factors and their associations to outcomes of interest; and 3) parental/guardian information was collected from only one parent/guardian using a self-administered questionnaire, which did not allow for clarification of responses and may have introduced bias.

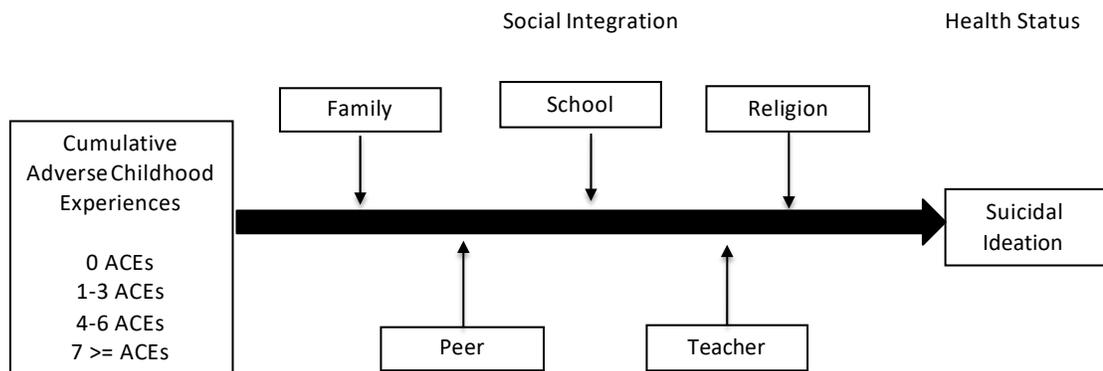
Dissertation Study Design

Conceptual Model

Durkheim's Theory of Social Integration was used to guide the analyses used in this dissertation. This theory posits that involvement in formal and informal organizations

provide necessary social supports and networks for positive wellbeing and coping (Durkheim, 1951). Individuals who are socially integrated into their social and environmental context are less likely to feel disconnected from their surroundings and have healthier dispositions and outcomes compared to those who are less socially integrated (Durkheim, 1951). In this study, it is proposed adolescents who experience

Figure 2: Conceptual Model Based on Durkheim’s Theory of Social Integration¹



¹Control Variables: age, gender, race/ethnicity, poverty ratio, parent(s) highest education status, urbanicity, US Citizen, comorbid DSM IV disorder

stressful events in the form of adverse experiences who are more highly integrated in their social context – families, school, teacher, religious/spiritual connections, and peer networks – will be at lower risk of suicidal ideation compared to adolescents who are less well integrated in their social context (Figure 2). This study also proposes that while social integration will continue to act as a protective factor, higher exposures to adversity will significantly attenuate this relationship.

Study Variables

Similar to prior studies, variables representing the constructs of interest for this study were constructed using items from the NCS-A questionnaire (Rose et al., 2014).

These new variables included five social integration variables representing the constructs of family integration, school integration, religious/spiritual integration, teacher integration, and peer integration.

Adverse Experiences. The “Adverse Experiences” variables used for this study were constructed using 46 observed exposures to adversity assessed in the NCS-A questionnaire (Table 2). Similar to the coding scheme in prior studies, each potential exposure was coded as a dichotomous variable (i.e., 0 = no exposure, 1 = exposure) and summed (Felitti et al., 1998). Higher ACE scores represented more exposures to adverse experiences and the range of ACE scores was 0 to 20. However, due to the small cell sizes of those reporting higher levels of adversity, all participants report 8 or more adversities were recoded into the category of 7 or more adversities. Therefore, for this dissertation ACE scores ranged between 0 to 7 or more adversities.

Social Integration Variables. Similar to prior studies, this dissertation examined three social contexts found to play a significant role in positive adolescent development (i.e., family, school, and religious/spiritual integration) (Rose et al., 2014). This dissertation expanded on Rose and colleague’s findings by also examining the role of positive peer and teacher integration on risk for suicidal ideation. The new social integration items for family, school, religious/spiritual, teacher and peer integration were derived from observed items assessed in the NCS-A questionnaire.

Family Integration. The “Family Integration” scaled variable included observed variables representing perceived constructs such as family emotional support, engagement, and decision-making (Table 3: Family Integration). Response options for

each item were measured on a 5-point Likert scale (i.e., 1 = “All of the time”, 2 = “Most of the time”, 3 = “Some of the time”, 4 = “A little bit of the time”, and 5 = “Never”).

Items were reverse coded for directional consistency with the other integration variables.

Higher scores represent higher levels of positive “family integration.”

Table 3: Family Integration
How often did family members feel very close to each other? (reverse)
How often could family members talk to each other about their feelings? (reverse)
How often did family members let each other know when they were sad or worried? (reverse)
How often did family members keep their feelings to themselves?
How often did the whole family do things together? (reverse)
How often did family members share interests and hobbies with each other? (reverse)
How often did family members avoid each other?
How often did family members go along with what the family decided to do? (reverse)
How often did family members find it easy to express their opinions to each other? (reverse)
How often did each family member have input in major family decisions? (reverse)
How often did children have a say in their discipline? (reverse)
How often did everyone compromise when there were disagreements? (reverse)
How often was it difficult to get everyone to agree on decisions?

School Integration. The variable “School Integration” was constructed using observed variables representing constructs such as academic achievement and school bonding (Table 4: School Integration). One observed questionnaire item – “What sort of grades did you get in your last year of school?” - will be used to measure academic achievement. Response options for “That sort of grades did you get in your last years at school?” was recoded to match a 4-point response option scale and were 1.33 = below average, 2.66 = average, and 3.99 = above average. The remaining items had response

options of 1 = very, 2 = somewhat, 3 = not very, and 4 = not at all. Where indicated, items were reverse coded so that higher scores represented higher levels of positive “school integration.”

Table 4: School Integration
What sort of grades did you get in your last years at school?
I like(d) school. (reverse coded)
Getting good grades (is/was) important to me. (reverse coded)
Homework (is/was) a waste of time.
I try(ied) hard at school. (reverse coded)
I Feel/felt as if I don't/didn't belong at school.
Most of the things I learn(ed) in school are unimportant.

Teacher Integration. The variable “Teacher Integration” was constructed using observed variables representing how connected the participant felt towards their teach (Table 5: Teacher Integration). Three observed questionnaire items were used to measure teacher integration. Response options for these items included 1 = very, 2 = somewhat, 3 = not very, and 4 = not at all. Where indicated, response options were reverse coded so that higher scores represented higher levels of positive “teacher integration.”

Table 5: Teacher Integration
Most of my teachers treat(ed) me fairly (reverse)
I care(d) a lot about what my teachers (think/thought) about me. (reverse)
I like(d) my teachers. (reverse)

Peer Integration. The variable “Peer Integration” was constructed using observed variables representing constructs such as peer emotional support items (Table 6). Response options for the first two items were 1 = a lot, 2 = some, 3 = a little, 4 = not at all. The last item was recoded to match a 4-option response pattern and included .8 = always, 1.6 = most of the time, 2.4 = sometimes, 3.2 = not very often, and 4 = never.

Where indicated, response options were reverse coded so that higher scores represented higher levels of positive “peer integration.”

Table 6: Peer Integration
How much can you rely on your friend(s) for help if you have a serious problem? (reverse)
How much can you open up to your friend(s) if you need to talk about your worries? (reverse)
When you have a problem or worry, how often do you let your friend(s) know about it? (reverse)

Religious/Spiritual Integration. The variable “Religious/Spiritual Integration” was constructed using observed variables representing constructs such as religious/spiritual engagement, importance, and emotional support (Table 7: Religious/Spiritual Integration). Religious/spiritual engagement was derived from the item – “How often do you usually attend religious services?” Response options for this variable were recoded to match a 4-point scale and were .8 = less than once a week, 1.6 = about once a week, 2.4 = 1 to 3 times a month, 3.2 = less than once a month, and 4 = never. The response options for the remaining items were 1 = very important, 2 = somewhat important, 3 = not very important, and 4 = not at all important. Where indicated, response options were reverse coded so that higher scores indicated more positive religious/spiritual integration.

Table 7: Religious/Spiritual Integration
How often do you usually attend religious services?
In general, how important are religious or spiritual beliefs in your daily life?
When you have problems or difficulties in your family, work, etc. how often do you seek comfort through religious or spiritual means such as prayer, meditating, attending service, or talking to religious/spiritual advisor?
When you have decisions to make in your daily life, how often do you think about what your religious or spiritual beliefs suggest you should do?

Control Variables. Several variables were examined as potential confounding variables. These variables were adolescent race/ethnicity, age at interview, adolescent educational level, highest parental/guardian education, U.S. citizenship (yes/no), and type of region of residency (i.e., metropolitan [large city], other urban area [suburbs, small city, town/village], and rural area). Family household income as a ratio to the 2000 census poverty threshold was also examined as a potential confounding variable. In the NCS-A study, family household income was reported on the parent questionnaire and the appropriate annual national poverty threshold based on family size was created by the NCS-A research team. A categorical variable called “poverty” was generated by the original study investigators that included four income-to-poverty ratio response options (i.e., 1=“Low income” or less than 1.5 times the poverty line, 2=“Low to average income” or 1.5 to 3 times the poverty line, 3=“Average to high income” or 3 to 6 times the poverty line, and 4=“High income” or more than 6 times the poverty line) (Kessler et al., 2012). The “poverty” variable was examined as a potential confounder.

Finally, a modified version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI) and a supplemental parent questionnaire were used to assess symptomology for fifteen DSM-IV disorders among adolescents participating in the NCS-A study. The questionnaires assessed symptoms occurring within the prior 30-days, 12-months, and ever during the participants’ lifetime. This dissertation focused on disorder outcomes over the lifetime. All diagnoses were made by NCS-A investigators at the completion of each interview using the DSM-IV distress and

impairment criteria and organic exclusion rules (Kessler et al., 2012). Final diagnostic outcomes were coded as “1” if the adolescent was confirmed as meeting DSM-IV criteria for a disorder and “5” if the adolescent did not meet the criteria for a disorder. For this dissertation, response options were recoded to “1” confirming a diagnosis and “0” for those not confirmed as meeting diagnostic criteria. A final cumulative DSM IV disorder variable was created for each participant indicating the total number of disorders diagnosed by the original NCS-A research team. Due to the small number of participants with five disorders, those with 4 and 5 disorders were collapsed into one category (i.e., 4 or more disorders) for statistical purposes. The range for the final cumulative DSM disorder variable was 0 to 4.

Table 8: Lifetime Prevalence of Estimated DSM-IV Disorder Types/Subtypes (% , SE)	
Fear Disorders (26.1%, 1.0)	
	Specific phobia (19.9%, 1.0)
	Agoraphobia (with or without panic disorder) (2.6%, .04)
	Social phobia (8.5%, 0.6)
	Panic disorder (with or without agoraphobia) (2.4%, .02)
Distress Disorders (25.4%, 0.9)	
	Separation anxiety disorder (7.6%, 0.5)
	Post-traumatic stress disorder (4.7%, 0.4)
	Major depressive episode/dysthymia (18.6%, 1.1)
	Generalized anxiety disorder (2.2%, 0.4)
Behavior Disorders (22.7%, 1.3)	
	Attention deficit hyperactivity disorder (ADHD) (8.1%, 0.6)
	Oppositional defiant disorder (12.6%, 0.9)
	Conduct disorder (6.8%, 0.9)
	Eating disorders (5.1%, 0.4) (anorexia nervosa, bulimia nervosa and binge-eating disorder)
Other Disorders (6.2%, 0.4)	
	Bipolar disorder (bipolar I, II and subthreshold) (6.2%, 0.4)
Substance Disorders (11.4%, 0.9)	
	Alcohol abuse with or without dependency (6.1%, 0.5)
	Drug abuse with or without dependency (8.9%, 0.8)

Using a significance level of .05, confounding variables found to be significantly related to one or more of the three outcome variables of interest (i.e., behavior disorders, distress disorders, and suicidality) were controlled for in the final analyses.

Data Analysis Plan

Sampling Weights

To address the dual-framed, clustered sampling methodology used to select participants in the study, the NCS-A investigators generated sample weights to account for the complex nature of the dataset (Kessler et al., 2009a). This study used the sample weight generated for the full adolescent sample (i.e., sample of adolescents from both the NCS-R household sample and the student sample). The full sample weight was generated from the student sample weight and the household sample weight which were generated using 2000 census data and select indicators to adjust each sample to be more representative of the general population. A final full sample weight (FINAL_UNBLENDED) was generated by combining the student and household weights and adjusting for discrepancies between the final student and household sample weights. Finally, to adjust for clustering effects, the investigators generated a stratum variable (STR) and cluster variable (SECU) that will also be used in the analyses (Kessler et al., 2009a).

Missing Data and Data Assumption

Missing data for each independent and dependent variable were assessed at the initiation of the analyses. It was determined that less than 5% of the data were missing, and therefore it was assumed missing data were “missing at random” (MAR) (i.e., when

missing observations on a variable X differ from the observed scores on that variable only by chance) or “missing completely at random” (MCAR) (i.e., when the presence versus absence of data on X is unrelated to any other variable in the data set) (Kline, 2010). Multicollinearity (Tolerance: $R^2_{\text{snc}} < .10$ and Variance Inflation Factor: $1/1-R^2_{\text{snc}} > 10$) was examined prior to initiation of the analyses (Kline, 2010). Age and grade level were found to be highly correlated with high tolerance and variance inflation factor scores. Given these results, grade level was removed from the analyses.

Scale Reliability, Descriptive and Bivariate Analyses

The complex sample module of the Statistical Package for the Social Sciences (SPSS) 22.0 was used for descriptive and bivariate analyses. Prior to initiation of the analyses, all social integration scaled items were examined using principal components analysis (i.e., direct oblimin) and scale reliability. Next, bivariate associations were analyzed to determine if variables identified as potential confounders should be controlled for in the multivariate analyses, and to determine if the main predictors of interest were associated with suicidal ideation. Pearson’s correlations coefficients and Chi-square were used to assess associations of continuous and categorical variables. Statistical significance was assessed at the $p \leq 0.05$ level.

Multivariate Logistic Regression and Path Analysis

For paper #1, the complex sample module of the Statistical Package for the Social Sciences (SPSS) version 24 was used for the analyses (“IBM Release notes - IBM SPSS Statistics 24.0 - United States,” 2016). Several logistic regression models, controlling for covariates, were conducted to assess the relationship of exposure to adversity during

childhood and the dependent variable “suicidal ideation.” Univariate analyses were conducted to obtain adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for each of the twenty adversity items to determine if there was a significant relationship to the dependent variable. Next, two full regression models were conducted first with the 9-item ACE assessment and then the 20-item ACE assessment. Model fit and R^2 statistics were examined to determine if including all 20 adversity items was a better predictor of risk for suicidal thoughts when compared to the model with the 9-item ACE assessment. Finally, logistic modeling was used to examine the graded cumulative effect of the 20-item ACEs assessment on risk for suicidal ideation. Model results include mean and prevalence estimates, model statistics, overall classification, R^2 estimates, and odds ratios with 95% confidence intervals.

For paper #2, Mplus version 7.4 was used to test the hypothesis using multi-group path analyses (Muthén & Muthén, 2018). The full sample was retained for this analysis and full information maximum likelihood (FIML) method was used to handle missing data. Weighted least squares (WLSMV) was used to estimate the path coefficients given the complex sampling methodology and the inclusion of both continuous and categorical variables. As recommended by Hu and Bentler (1999), data to model fit was examining using comparative fit index ($CFI > .95$) and the root mean square error of approximation ($RMSEA < .06$) indices (Hu & Bentler, 1999). Parameter estimates were examined and statistically significant path coefficients and R-square values for each multi-group analysis are reported (Kline, 2010).

Power Analysis

The online power calculator “Free Statistics Calculators version 4.0 – Calculator: A-Priori Sample Size for Structural Equation Models” (<http://www.danielsoper.com/statcalc/calculator.aspx?id=89>) by Daniel Sopel was used to estimate the necessary sample size for the proposed analyses. Required information for the estimated sample size includes the 1) anticipated effect size, 2) desired statistical power level, 3) number of latent variables, 4) number of observed variables, and 5) the probability level. Estimates were provided for the minimum sample size to detect the desired effect size, the minimum sample size for the model structure, and the recommended minimum sample size for the analyses.

To determine the largest sample size necessary for the proposed analyses, sample size estimates were calculated for the hypothesis (hypothesis 2b) with the largest number of observed variables (i.e., adversity = 21, family integration = 13, school integration = 16, peer integration = 7, religious/spiritual integration = 4, internal and external locus of control = 10, behavioral and distress disorders = 7, suicidality = 1, and socioeconomic status (i.e., family income) = 1) and largest number of latent variables (10). Estimates were calculated for small, medium and large effect sizes (see Table 9). A sample size of 703 is recommended to detect a small, medium and large effect size with a statistical power level of .80 and probability level of .05. If potential control variables (i.e., age, education, gender, maternal education, paternal education, urbanicity, and two additional disorders) are included in the calculation the estimated sample size increases to a recommended minimum sample size of 1,012 (see Table 10).

	Small	Medium	Large
Anticipated effect size	0.1	0.3	0.5
Desired statistical power level	0.80	0.80	0.80
Number of latent variables	10	10	10
Number of observed variables	80	80	80
Probability level	0.05	0.05	0.05
Minimum sample to detect effect	703	67	18
Minimum sample size for model structure	700	700	700
Recommended minimum sample size	703	700	700

	Small	Medium	Large
Anticipated effect size	0.1	0.3	0.5
Desired statistical power level	0.80	0.80	0.80
Number of latent variables	10	10	10
Number of observed variables	88	88	88
Probability level	0.05	0.05	0.05
Minimum sample to detect effect	703	67	18
Minimum sample size for model structure	1,012	1,012	1,012
Recommended minimum sample size	1,012	1,012	1,012

Human Subjects Concerns

This dissertation is a secondary data analysis of the National Comorbidity Survey Replication Adolescent Supplement study (NCS-A) (Kessler, 2013). The NCS-A is maintained by the Inter-university Consortium for Political and Social Research (ICPSR) at the University of Michigan, Institute for Social Research (Kessler, 2013). To limit the risk of participant disclosure, data maintained by ICPSR undergo a confidentiality review and are altered when necessary. Prior to conducting this study approval was obtained from the ICPSR Institutional Review Board and from the University of Maryland, College Park Institutional Review Board (IRB).

Appendix B: Principal Components Analysis Results

This study theorized that adolescent social integration included a number of social factors that could potentially provide the support and connection deemed necessary for healthy child development. These five factors of adolescent social integration were family integration, school integration, religious/spiritual integration, teacher integration, and peer integration. While the NCS-A questionnaire did not include instruments designed to assess adolescent social integration in these five areas of interest, several items within the NCS-A were used as proxy measures to construct the five scaled integration variables.

The following tables and summaries are the final results of a principal components analysis (PCA) conducted for each of the five integration variables. Direct oblimin rotation was used for these analyses. A summary of each PCA, Kaiser-Meyer-Olkin (KMO) statistics (i.e., measure of sampling adequacy), Bartlett's Test of Sphericity (i.e., test of the null hypothesis that the scale variables are uncorrelated), and the component and/or rotated component matrix are presented (when applicable). The Cronbach's Alpha for each scaled integration item is also presented.

Religious Integration Scale Results

Four items were identified as representing religious/spiritual integration. The Kaiser-Meyer-Olkin measure of sampling adequacy was .811 and the Bartlett's Test of Sphericity was statistically significant ($X^2 = 19368.90$, $df = 6$, $p < .001$). The total variance explained was 71.70% and all of the items loaded on one component.

Cronbach's Alpha = .882

Component Matrix	
Items	Component 1
During difficult times, seek comfort in religion	.895
Important of religion in daily life	.885
Decision making guided by religious beliefs	.891
Freq. attend religious services	.699

Peer Integration Scale Results

Three items were identified as representing peer integration. The Kaiser-Meyer-Olkin measure of sampling adequacy was .606 and the Bartlett's Test of Sphericity was statistically significant ($X^2 = 8761.40$, $df = 3$, $p < .001$). The total variance explained was 66.01% and all of the items loaded on one component.

Cronbach's Alpha = .632

Component Matrix	
Items	Component 1
How much can rely on friends when have serious problem	.866
How much can you open up to friends/talk about worries	.891
How often call/hang out/get together socially with friends	.661

School Integration Scale Results

Twelve items were identified as representing family integration. The Kaiser-Meyer-Olkin measure of sampling adequacy was .884 and the Bartlett's Test of Sphericity was statistically significant ($X^2 = 62893.21$, $df = 21$, $p < .001$). The total variance explained was 68.02% and all of the items loaded on one component factors. Cronbach's Alpha = .748

Rotated Component Matrix	
Items	Component 1
Grade in last or current year at school	.551
I like school	.915
Getting good grades is important to me	.926
Homework is a waste of time	.766
I try hard at school	.943
I feel as if I do not belong at school	.760
Most of the things I learn in school are unimportant	.842

Teacher Integration Scale Results

Three items were identified as representing teacher integration. The Kaiser-Meyer-Olkin measure of sampling adequacy was .771 and the Bartlett's Test of Sphericity was statistically significant ($X^2 = 29247.07$, $df = 3$, $p < .001$). The total variance explained was 90.31% and all of the items loaded on one component. Cronbach's Alpha = .665

Component Matrix	
Items	Component 1
I like my teachers	.955
Most of my teachers treat me fairly	.942
I care a lot about what my teachers think about me	.953

Family Integration Scale Results

Twelve items were identified as representing family integration. The Kaiser-Meyer-Olkin measure of sampling adequacy was .958 and the Bartlett's Test of Sphericity was statistically significant ($X^2 = 77832.10$, $df = 66$, $p < .001$). The total variance explained was 57.71% and all of the items loaded on one component.

Cronbach's Alpha = .855

Component Matrix	
Items	Component 1
How is relationship with parents/guardian	.623
How often family members felt close to each other	.803
How often family members did things together	.849
How often family members avoided each other at home	.780
How often family members willing did what family decided	.816
How often family members shared interests and hobbies	.857
How often family members easily expressed opinions	.841
How often family members each had input on major decisions	.741
How often family members compromised	.699
How often family members talked about feelings	.810
How often family members talk when sad/worried	.822
How often family members kept feelings to themselves	.671

Appendix C: Institutional Review Board Approval Letters



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TEL 301.405.4212
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irb@umd.edu
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INSTITUTIONAL REVIEW BOARD

DATE: June 2, 2017

TO: Kathleen Washington

FROM: University of Maryland College Park
(UMCP) IRB

PROJECT TITLE: [909882-2] Exploring the Effects of Poverty, Social Integration, and Locus of Control on Childhood Adversity and Other Stress Inducing Events

REFERENCE #:

SUBMISSION TYPE: Continuing Review/Progress Report

ACTION:

APPROVE

D APPROVAL DATE: June 2,
2017

EXPIRATION DATE: June 22, 2018

REVIEW TYPE: Expedited Review

REVIEW CATEGORY: Expedited review category # 5

Thank you for your submission of Continuing Review/Progress Report materials for this project. The University of Maryland College Park (UMCP) IRB has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

Prior to submission to the IRB Office, this project received scientific review from the departmental IRB Liaison.

This submission has received Expedited Review based on the applicable federal regulations.

This project has been determined to be a Minimal Risk project. Based on the risks, this project requires continuing review by this committee on an annual basis. Please use the appropriate forms for this procedure. Your documentation for continuing review must be received with sufficient time for review and continued approval before the expiration date of June 22, 2018.

Please remember that informed consent is a process beginning with a description of the project and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the project via a dialogue between the researcher and research participant. Unless a consent waiver or alteration has been approved, Federal regulations require that each participant receives a copy of the consent document.

Please note that any revision to previously approved materials must be approved by this committee prior to initiation. Please use the appropriate revision forms for this procedure.

All UNANTICIPATED PROBLEMS involving risks to subjects or others (UPIRSOs) and SERIOUS and UNEXPECTED adverse events must be reported promptly to this office. Please use the appropriate reporting forms for this procedure. All FDA and sponsor reporting requirements should also be followed.

All NON-COMPLIANCE issues or COMPLAINTS regarding this project must be reported promptly to this office.

Please note that all research records must be retained for a minimum of seven years after the completion of the project.

If you have any questions, please contact the IRB Office at 301-405-4212 or irb@umd.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within University of Maryland College Park (UMCP) IRB's records.

[ICPSR Access Request:26816] Exploring the Effects of Poverty, Social Integration, and Locus of Control on Childhood Adversity and Other Stress Inducing Events Modifications Approved
2 messages

petrinko@umich.edu <petrinko@umich.edu>
11, 2017 at 4:26 PM To: desmond@umd.edu

Fri, Aug

Cc: shakira@nationalcrittenton.org,

petrinko@umich.edu Dear Sharon

M. Desmond;

Your data access request for Exploring the Effects of Poverty, Social Integration, and Locus of Control on Childhood Adversity and Other Stress Inducing Events has been approved, as modified. If you requested additional datasets as part of this modification, we will contact you shortly with instructions for accessing these data.

Please contact Shelly Petrinko (petrinko@umich.edu) if you have any

difficulty with this process. Thank you,

Shelly Petrinko

Inter-university Consortium for
Political and Social Research
University of Michigan

P.O. Box 1248

Ann Arbor, MI 48106

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