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The Cumulative Effects of Victimization, Community Violence, and Household
Dysfunction on Depression and Suicide Ideation in a Cohort of Adolescent Females

by

Katherine Best

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
Department of Community and Family Health
College of Public Health
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Dedicated to my children

Jason, Anna, Paul,

and the memory of my little brother,

Joe

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THE CUMULATIVE EFFECTS OF VICTIMIZATION, COMMUNITY VIOLENCE,
AND HOUSEHOLD DYSFUNCTION ON DEPRESSION AND SUICIDE IDEATION
IN A COHORT OF ADOLESCENT FEMALES

Katherine Best

ABSTRACT

Recent scholarly efforts have sought to examine the cumulative impact of deleterious adverse childhood exposures on various mental health outcomes. Lifetime prevalence rates for depressive disorders are approximately 20% among adolescents. Depression is ranked as the leading cause for disability and fourth leading contributor to the global burden of disease in the world.

The purpose of this study was to determine the cumulative impact of adolescent adverse experiences on outcomes of depression, suicide ideation, and overall mental distress in a cohort of 125 adolescent girls receiving public assistance. The adverse exposures studied were personal victimization, household dysfunction, and community violence exposures.

Across the three categories of exposures, adolescents reported that community exposures were the highest 92.8%, followed by household dysfunction 89.6 %, and lastly, personal victimization 80%. Over 40% reported experiencing more than seven adverse exposures. There was a doubling in the incidence of depression by the fourth year, and an almost ten percent increase in mental distress by the fourth year. Evidence of a significant

direct association was found for those experiencing victimization with depression and suicide ideation. The total Adolescent Adverse Exposures (AAE) score was positively correlated with the CES-D scores in the last three years of the study, however not with suicide ideation. The cumulative impact or ‘dose-response’ relationship of such exposures on depression, suicide ideation, or change over time was not found.

In contradiction with general beliefs and existing literature, a significant negative association was found with depression and having a parent incarcerated or experiencing the divorce of parents. This finding suggests given the homogeneity of this population, experiencing both poverty and high levels of exposure to victimization, that having an incarcerated parent or parental divorce may be potentially protective mitigating the stressful experiences of continued victimization.

The results of this study offer evidence of high prevalence rates of adversity occurring in the lives of these already at risk adolescents. A call for efforts to reduce community violence and personal victimization in the context of poverty are needed to prevent the growing rates of depression and suicide ideation for these fragile families and adolescence.

CHAPTER ONE

INTRODUCTION AND STATEMENT OF THE PROBLEM

“Kids are ‘malleable’ rather than ‘resilient’, in the sense that each threat costs them something.” Bruce Perry, M.D.

Growing up with economic disadvantage is significantly associated with poorer health outcomes (Boothroyd & Olufokunbi, 2001; Boushey & Gundersen, 2001; Irwin, Burg, & Cart, 2002; Lichter & Crowley, 2000). Negative impacts include depressive symptoms (Aneshensel & Sucoff, 1996; Wight, Sepulveda & Aneshensel, 2004), dropping out of school (Haveman & Wolfe, 1995), teenage pregnancy (Kirby, 1997), and substance involvement (Frojd, Marttunen, Pelkonen, Pahlen & Kaltiala-Heino, 2006; Kirby & Fraser, 1997). The presence and persistence of depressive symptoms (Dekovic, Buist, & Reitz, 2004) disproportionately affects those with low socioeconomic positions, as evidenced in the growing literature on high rates of depression (Belle, 1990; Muntaner, Eaton, Miech, & O’Campo, 2004; Ritchey, Gory, Fitzpatrick, & Mullis, 1990; Wight et al., 2004). The gravity of this disparity is that depression is ranked as the first and foremost leading cause for disability and fourth leading contributor to the global burden of disease in the world (World Health Organization [WHO], 2001). The economic impact exceeds \$63 billion per year in the United States, making it a significant public health problem (U.S. Department of Health and Human Services [USDHHS], 1999).

This problem is even more pervasive and insidious when considering the contribution of depression as a risk factor for morbidity and mortality. Evidence documents a relationship between mental disorder and all of the first seven leading health indicators (e.g. physical activity, overweight and obesity, tobacco use, substance abuse, high risk sexual behaviors, poor mental health, injury and violence) (National Institutes of Health [NIH], 2000).

Adolescents' lifetime prevalence rates for any depressive disorder is approximately 20%, influencing nearly 6 million young people (USDHHS, 1999; Friedman, Best, Armstrong, Duchnowski, Evans, Hernandez et al., 2004; Tsuang & Tohen, 2002). Further investigation of the causes and the function of time and age on female adolescent depression is justified in light of the potential consequences of untreated depression (Dekovic et al., 2004): a 12-fold risk factor for suicide in females, co-occurring disorders (USDHHS, 1999), substantial impairment in functioning across domains, high risk sexual behaviors, circumscribed lifetime opportunities and lower rates of employment due to depressive symptoms (Friedman et al., 2004; Kalil, Born, Knuz, & Cuadill, 2001).

Since 1966, federal efforts to address suicide have been championed by the National Institute of Mental Health (NIMH). The approach was that of identifying risk factors associated with suicide (USDHHS, 2001). By 1983, the Centers for Disease Control and Prevention (CDC) sought to bring to public attention the problem of teen suicides. In 1996, the World Health Organization established guidelines for national strategies for the prevention of suicide (USDHHS, 2001).

More recently, the Surgeon General's Report on mental health and the objectives of Healthy People 2010 call for specific strategies to evaluate suicide as a national agenda. Ranked among the top leading causes of death since 1975, suicides accounted for 307,973 deaths in the U.S. between 1989-1998 (USDHHS, 2003).

The economic burden of suicide in 1995 was estimated at \$111.3 billion, which does not take into account disability from attempted suicides, and the lack of data on cases of death that are uncertain (USDHHS, 2001). A child dies from suicide every two hours (American Foundation for Suicide Prevention, 2003). Suicide rates for children 10-14 years old increased by 100 percent from 1980-1996 (USDHHS, 2001).

For adolescents aged 15-24, suicide is the 3rd leading cause of death (the overall suicide rate for this age group is approximately 11 deaths per 100,000); while males *complete* suicide at a greater rate, females *attempt* suicide three times more often (Institute of Medicine [IOM], 2002). A national school based study conducted by Kann and colleagues (1998) found a one-year prevalence rate for suicidal ideation of 20.5 percent (as cited in IOM, 2002, p. 40).

The literature demonstrates that adults exposed to severe sexual or physical abuse in childhood are more suicidal than those not exposed are (Bryant & Range, 2001; Dube, Anda, Whitfield, Brown, Felitti, Dong, Giles et al., 2005). This study also suggests that severity and frequency of the sexual and physical abuse also contributes to suicidality as victims report fewer reasons for living and fewer social concerns for committing suicide (Bryant & Range, 2001).

Additional risk factors for suicidality as cited in the literature include; mental illness, substance abuse, conduct disorder, economic insecurity, and hopelessness due to

interpersonal losses, as well as other contextual social factors (DHHS, 2001; Group for the Advancement of Psychiatry [GAP], 1996; IOM, 2002). Familial antecedents for depression include: maternal depression, victimization, criminality, and absentee fathers (IOM, 2002).

Need for the Study

In order to successfully face major public health challenges the IOM (2003) has suggested that the field embrace a model of understanding based upon the theoretical perspective of social ecology. Specifically, research with the goal of designing interventions has to be derived or mapped onto the perceived model of explanation or determinants. The ecological model embraces a broad spectrum of linkages and causal pathways (Bronfenbrenner, 1989) that take into consideration the complexities of the human condition and the dynamic, rather than static, nature of life and health (IOM, 2003). The need to study outcomes utilizing the social ecological model has been emphasized by researchers in the field for decades. For example, epidemiologist John Cassel (1964) who noted that ‘rapid rates of change in any one of four linked open systems... the physiological, psychological, social, or cultural produced potential strains and possible breakdown’.

One of the overarching goals of Healthy People 2010 is the elimination of health disparities. Socioeconomic status (SES) is widely recognized as a fundamental causative factor in creating health disparities (Goodman, Adler, Kawachi, Frazier, Huang & Colditz, 2001). The economic insecurities and relative deprivation created by disadvantaged status contribute to a wide range of social conditions that have been identified as key causes of illness (Link & Phelan, 1995).

Current research on health disparities in the lives of infants, children and adults continues to focus on risk and protective factors that identify a broad range of inequalities within their social and environmental contexts (Aneshensel & Sucoff, 1996; Frojd, et al., 2006; Goodman et al., 2001). However, in adolescent populations the graded relationship of SES and health is less clear (Goodman et al., 2001). Social disparities are typically operationalized through a variety of indicators such as income, education, occupation, social class or position, and perceived deprivation (Aneshensel & Sucoff, 1996; Cohen, 2002; Elstad, 1998; Frojd, et al., 2006). Despite the recognition that social structures impact mental health (Aneshensel & Sucoff, 1996; Frojd, et al., 2006; GAP, 1996) further understanding the relationship of social determinants and the underlying mechanisms that contribute to mental disorder is needed (Cohen, 2002; Elstad, 1998; Irwin, et al., 2002). This is especially critical when considering the sensitive developmental period of adolescence and the impact of depression and suicide on this age group (IOM, 2002).

It has been proposed that the link between psychological effects and social inequalities is increased exposures to stress resulting in both health (Elstad, 1998) and mental health disparities (Aneshensel, Rutter, & Lachenbruch, 1991; Turner & Loyd, 1995). Systems of stratification based upon structural arrangements, economic class, race, or gender contribute to stressful life conditions through increased disparities in resources, opportunities, personal regard, and self-esteem (Link & Phelan, 1995; Pearlin, Lieberman, Meneghan, & Mullan, 1981; Pearlin, 1989).

The literature suggests that structural arrangements seem to be mediated through perceptions of social status or position (Goodman et al., 2001). A persistent marginalized status in society, enduring conditions of loss, and inadequate resources or opportunities

result in numerous forms of psychological distress, withdrawal, substance abuse, depression, anxiety, hopelessness and decreased productivity (Aneshensel, et al., 1991; Cohen, 2002; Goodman, et al., 2001; Taylor & Turner, 2002; Turner & Loyd, 1995).

In an effort to further understand the indirect psychosocial pathways of disease and disorder, recent scholarly efforts have sought to bridge community and individual level data into an ecodynamic analysis that examines the cumulative impact of deleterious stress exposures on overall well being (Cohen, 2002; Felitti et al., 1998; Gilman, Kawachi, Fitzmaurice, & Buka, 2003; Taylor & Turner, 2002). Pearlin argues ‘that stressful experiences arise not in a vacuum but may be traced to surrounding social structures and a person’s location within such structures’ (Pearlin, 1989). The implication that overall health outcomes are the embodied expressions of the cumulative impact of stress exposures resulting from socioeconomic position and the perception of status in early life warrants further investigation (Aneshensel et al., 1991; Elstad, 1998; Gilman et al., 2003; Goodman et al., 2001; Krieger, 2001; Taylor & Turner, 2002). Nevertheless, much of the current research has sought causal linkages through ‘innate or individual characteristics versus imposed or societal constraints’ (Aneshensel et al., 1991; Elstad, 1998; Gilman et al., 2003; Goodman et al., 2001; Krieger, 2001; Taylor & Turner, 2002).

The role of cumulative adverse exposures in the context of structural arrangements, and the perceptions of those stressors, is meaningful to explore in light of an increasing literature on social determinants of overall health and well being (Aneshensel et al., 1991; Aneshensel & Sucoff, 1996; Elstad, 1998; Gilman et al., 2003; Goodman, 2001; Turner & Lloyd, 1995).

Dong, Anda, Felitti, Dube, Williamson, Thompson, and colleagues (2004) found that adults reporting any single adverse experience were likely to have been exposed to a multitude of adverse events in childhood suggesting the importance of understanding co-occurring traumas and the cumulative impact of stressful experiences. Wrongly assuming that one single type of exposure or trauma is implicated in the development of overall psychological distress may lead to misdiagnoses, under assessment of distressing events, mistreatment of exposures, or mis-timed interventions (Chapman, Whitfield, Felitti, Dube, Edwards, & Anda, 2004; Felitti, et al., 1998; Turner, Finkelhor & Ormrod, 2006; Whitfield, 1998).

Further gaps and methodological deficiencies noted within the existing literature base for depression and suicidality are the lack of longitudinal studies and predictive models (IOM, 2002). Moreover, even in cases where the research suggests that there are a number of direct causal linkages, the confounding ecological factors offer further justification for context-oriented approaches as well as the investigation of processes that may be more effective in changing outcomes (Link & Phelan, 1995).

A meta-analysis of socioeconomic inequality and depression by Lorant, Deliege, Eaton, Robert, Philippot, and Anseau (2003) found compelling evidence for a causal relationship, but call for greater understanding of the course of development of depression. Furthermore, a review of the literature disclosed limited studies examining the association of social position with depression among women (Chapman et al., 2004; Muntaner, Eaton, Miech, & O'Campo, 2004), despite evidence that females experience depression at twice the rate of males.

In addition, there is limited empirical research seeking to understand the nature of these gender differences (Hazler & Mellin, 2004). A current argument in the literature is that female adolescents are generally more exposed to multiple stressful events and that they are more distressed and reactive to environmental stressors than males (Ge, Lorenz, Conger, Elder & Simons, 1994).

The Institute of Medicine calls for “specific data from well-defined and characterized populations whose community level social descriptives are well-known,” in order to clarify the complex pathways from childhood experiences to mental illness and/or suicidality. Clarification of the etiological processes by assessing change longitudinally through identification of time of onset and the preceding temporal events, rather than simply specifying risk factors, also guides future development of interventions that are optimally timed and able to address multiple causal pathways (IOM, 2002; Kraemer, Stice, Kazdin, Offord, & Kupfer, 2001).

An additional suggestion by the IOM (2002) is that, given that suicide is a relatively infrequent event, alternate endpoints, such as suicidal ideation, are required to add to the existing knowledge base. Further understanding of various factors situated within the developmental transition of adolescence and how these factors work in concert to either prevent or evoke suicidal behavior is needed (IOM, 2002). A number of scholars suggest a need for more research identifying not only specific acute stressors but also the context of such events in continuing problems that produce chronic strain (Chapman et al., 2004; Felitti et al., 1998; Pearlin, 1989; Thoits, 1995; Turner et al., 2006).

Thus, the conceptual underpinnings for this study draw upon the classic stress process model developed by Pearlin and colleagues. This perspective approaches outcomes through a socio-ecologic theoretical perspective-utilizing individual, familial, and environmental levels of mediating and moderating resources and stressors (Bronfenbrenner, 1989; Pearlin et al., 1981).

The propositions of social stress theory suggest that: multiple adverse exposures of perceived stressors arising from a constellation of contextual stressors, chronic strain, and acute stressors contribute to poor mental health outcomes (Kirby & Fraser, 1997; Krieger & Smith, 2004; Turner & Lloyd, 1995; Turner & Lloyd, 1999; Pearlin et al., 1981; Pearlin, 1989; Rudolph, Hammen, Burge, Lindberg, Herzberg, & Daley, 2000; Rutter, 2005; Thompson, Mazza, Herting, Randell, & Eggert, 2005). Brooks-Gunn's (1991) longitudinal study presented evidence of increased depression in adolescents exposed to the stressors of numerous life events; it was not the novelty or type of events but the number of events that were significant.

Building upon the broad framework of the stress process theory (Pearlin, 1981) this study sought to replicate as closely as possible the analytic strategies utilized by Felitti and colleagues' (1998) study of Adverse Childhood Experiences (ACE) conducted by the Kaiser Permanente Medical Group and the Centers for Disease Control and Prevention.

To date the ACE study is a decade long ongoing collaboration assessing the impact of numerous interrelated ACEs on a wide variety of health and behavioral outcomes in adults through a cross-sectional lens (Chapman et al., 2004; Dong, Anda, Felitti, Williamson, Dube, Brown et al., 2005; Dube, Anda, Felitti, Chapman,

Williamson, Giles, 2001; Felitti et al., 1998). Specifically, these researchers have been assessing the relationship of childhood abuse and household dysfunction on adult morbidity and mortality.

This study sought to add to the literature by validating the ACE study approach of investigating the cumulative effect of adverse childhood/adolescent exposures on outcomes of depression and suicide ideation in female adolescents utilizing data from a cohort of adolescent females being raised on public assistance.

Implications for Public Health

In 1845, Friedrich Engels observed, “the sufferings of childhood are indelibly stamped on the adults” (Engels, 1845/1958; Krieger & Smith, 2004). This insight underpins current epidemiological studies that address the inequities accompanying a life of poverty and later health consequences (Link & Phelan, 1995; Lorant et al., 2003; Muntaner et al., 2004). The cumulative impact of chronic strain from both socioeconomic status and exposures to violence and victimization contribute to poor mental health outcomes found in populations in poverty (Chapman et al., 2004; Felitti et al., 1998; Pearlin, 1989; Thoits, 1995; Turner et al., 2006).

A growing number of researchers have examined the increased prevalence rates of disorder in children and adolescents over the past decade and the association with reported increased frequencies of childhood adversities in the form of victimization and household dysfunction (Chapman et al., 2004; Foege, 1998; Spat Widom, 1999; Turner et al., 2006). There is a call to more clearly determine etiology of mental disorder and to further understand the direct and indirect influences of adversity and trauma on such outcomes (Thompson et al., 2005).

The public health significance of this study includes efforts to contribute to the knowledge base by: (1) increasing the understanding of the cumulative impact or “dose response” relationship of adverse childhood/adolescent exposures on depression, suicide ideation, and overall mental distress in adolescents; (2) understanding the impact of cumulative stressors across multiple domains within the context of poverty, utilizing a longitudinal lens; (3) providing valuable information regarding malleable stressors and resources for the purpose of developing specific interventions for female adolescents being raised in the context of poverty. For example, if specific adverse exposures in adolescence demonstrate a significant contribution to a trajectory of depression over time, then establishing meticulous screening efforts at the beginning of a school year or during primary care visits would help to inform interventions.

It is hoped that this research will contribute both conceptually and empirically to our understanding of the pathways and the critical processes and interactions between individual, family, and contextual stressors affecting the developmental period of female adolescence. Moreover, it is hoped that the results of this study will help to provide even a brief glimpse of the exposure to adversities that this population has experienced in order to guide future efforts towards interventions to alleviate the burden of depression, suicide ideation, and overall mental distress for adolescent females.

Overview of Study Methods

This study examined secondary data from the Welfare Reform: Adolescent Girls in Transition Study (WRAGT) (Boothroyd, Armstrong, Gómez, Haynes, & Ort, 2003; Boothroyd, Armstrong, Gómez, Haynes, Ort, & Best, 2005). This study was a multi-

phase mixed methods longitudinal cohort study, which examined the impact of welfare reform on the future hopes and aspirations of female adolescents (Boothroyd et al., 2003). Ultimately, the project's aim was to determine what factors differentiate adolescent girls whose lives follow a positive trajectory from those girls experiencing difficulties that are more serious.

Participants in this study were part of a larger project funded by the Florida Agency for Health Care Administration (Contract #M0107) assessing the impact of welfare reform on the well-being and future aspirations of adolescent girls. To be eligible for study participation, mothers had to be receiving Temporary Assistance for Needy Families Program (TANF) and have a daughter between the ages of 13 and 17 living at home at the start of the study. During the course of the study, there was no further requirement for daughters to remain at home or for a mother to be receiving TANF. In addition, at the start of the study the families had to reside in a five county area in west central Florida. A sample of 125 mothers receiving TANF (at the time of enrollment into the study) and their adolescent daughters were identified from the 2000-2001 Florida Medicaid eligibility, data using the family identifier and other matching variables (such as gender, address, and last name). Recruitment letters were mailed to 873 potential participants whereby 125 eligible daughter/mother pairs were ultimately recruited for participation. Enrollment was stratified by race/ethnicity (i.e., white, black, Hispanic) and geographic location (i.e., urban versus rural).

Each year of the study involved face-to-face interviews using various standardized measures with the 125 mothers and their daughters. These procedures were initially conducted in 2002, and then repeated in the three subsequent years, providing

four waves of data. Data for this study were drawn from all four waves collected from both the mothers and daughters.

Justifications for utilizing a data set where participants are situated in poverty are based upon a number of suggestions. Kraemer and colleagues (2001) call for disaggregating socioeconomic status to examine causal chains and the impact of the sequencing of events on mental health outcomes. As noted before the IOM (2002) calls for “well-defined and characterized populations whose community level social descriptives are well-known.” Within this study the term “welfare” is not used as a vernacular term in reference to recipients of public assistance, but in reference to those involved with the federal welfare reform laws receiving Temporary Assistance for Needy Families (TANF). This is discussed more in depth in Chapter 2.

The perceptions of poverty and the accompanying explanatory frameworks invariably assign blame or impute “ownership” of the problem, with the “burden of change” often discussed at the micro or individual level. The context of poverty coupled with the stigmatizing labels associated with welfare in reference to social position is an emerging area of research as investigators begin to take into account the role of depression on coping mechanisms or planning alternative futures (Kalil et al., 2001; Wadsworth, Raviv, Compas, & Connor-Smith, 2005).

The overarching assumptions for the study are based upon the theoretical lens of stress process theory, which predicts that “large qualitative classes of events, that meet the criteria of being undesirable or unscheduled may contribute to stress and future depression” (Elstad, 1998; Pearlin et al., 1981). Pearlin and colleagues (1981) note that this is a “reasonable approach when the goal is to evaluate the total contribution of

classes of eventful experiences on stress” and the resulting poor outcome. A small range of classes of stressful events have been selected for simplicity and manageability. *Acute stressors* refer to adolescent victimization or abuse; *chronic stressors* refer to household dysfunction; and *contextual strain* refers to community exposures of violence and perceived fear of the neighborhood context.

While using the theoretical underpinnings of Pearlin’s concepts this study closely replicated the analytic methods of the ACE studies (Felitti et al., 1998) utilizing similar or identical items for the operationalization of adverse exposures and thus guided the selection of the independent variables. It expands upon the ACE study model by capturing a wider range of adverse exposures experienced during childhood/adolescence. In particular, community exposures to violence and perceived fear of the neighborhood context have been added as a representation of contextual strain.

The outcome variables of interest were depression, suicide ideation, overall mental distress, and a change over time in all three variables. A score for each was assessed at 4 points in time and a change score computed by subtracting the score in year 1 from the score in year 4. The presence of symptoms of depression were measured by the CES-D and the presence of suicide ideation were measured by thoughts of suicide reported by a single scaled item.

Definitions

The following is a description of the constructs to be used for the composite predictor variables. Each of the constructs have been operationalized and were developed by using categories of questions included under each class of events or exposures experienced by the adolescents. A description of each specific item follows in Chapter 3.

Adolescent Victimization

The victimization of an adolescent was operationalized as a composite variable utilizing the following categories: (1) reports of being bullied, beaten up, sexually assaulted, robbed, stabbed, shot at, shot; (2) positive responses to questions on physical, psychological, and sexual abuse; and (3) reports of being sexually assaulted in the previous year.

Household Dysfunction

This construct was operationalized as a composite variable utilizing the following categories of events: (1) family substance abuse; (2) maternal mental illness; (3) maternal victimization; (4) parental criminality; (5) parental separation/divorce; and (6) residential instability.

In an effort to capture the contextual factors in the lives of these adolescents, a measure of community violence has been added to the overall model to further expand the work of the ACE study and to assess the influence of such experiences on direct experiences of victimization or household dysfunction. Additional justification for this is found in recent concern that the prominence given to child sexual abuse may be misplaced as ‘carrying the weight of causality’ (Mullen, Martin, Anderson, Romans, & Herbison, 1996) and that such factors may function as a marker for coexisting adversities impacting overall outcomes (Turner et al., 2006).

Community Violence

Community exposures to violence were operationalized as a composite variable based on reports of: (1) seeing someone sexually assaulted, robbed, stabbed, shot at, shot, killed; (2) feeling afraid with adults, in neighborhood, or school; (3) knowledge of

weapons: knowing people who own a gun, bring a knife to school, bring a gun to school, or other weapons to school; (4) having heard gunshots in the neighborhood.

The purpose of this study was to determine the cumulative impact or “dose response” of adverse experiences on depression, suicide ideation, and mental distress over time in a cohort of 125 adolescent girls raised on Welfare. The domains of adverse experiences investigated were adolescent victimization, household dysfunction, and exposure to community violence.

Research Hypotheses

1. Exposure to adolescent victimization will have a positive association with the presence of depression, suicide ideation, and overall mental distress.
2. Household dysfunction will have a positive association with the presence of depression, suicide ideation, and overall mental distress.
3. Exposure to community violence will have a positive association with the presence of depression, suicide ideation, overall mental distress.
4. The number of adverse exposures will have a cumulative impact or “dose response” relationship with the level of depression, suicide ideation, and mental distress.
5. The Adverse Adolescent Exposure Score will be significantly related to change in depression, suicide ideation, and mental distress over time.

Delimitations

Delimitations offer a description of the population to which results may be generalized (Locke, Wyrlic, Spirduso, & Silverman, 2000). The results from this dissertation may be generalized to the following populations:

1. Results are generalizable to female adolescents living with their Medicaid eligible mothers in 2002 within the five county area of southwest Florida. Beyond that region of Florida, generalization to the remainder of the state is unclear.
2. Results are only generalizable to the population of female adolescents living with their Medicaid eligible mothers in 2002 within the five county area of west Florida who were not suffering from severe mental disorder.

Limitations

The limitations or restrictive weaknesses in the study design are as follows:

1. The small sample size (n=125) is a limitation, restricting the number of variables that can be utilized in multivariate analyses.
2. The CES-D scale (Radloff, 1977) is limited to measurement of depressive symptomatology, not for meeting criteria for clinical depression.
3. The development of the composite variables for the AAE score were based on similar composites developed by Felitti and colleagues (1998) utilizing select questions from various scales not originally intended for these purposes.
4. Data were based on retrospective recall and may result in underreporting, given the evidence from other longitudinal studies have demonstrated that retrospective self-reports of adverse exposures are likely to underestimate actual occurrence (Della, Yeager, & Lewis, 1990).
5. There may be mediators or moderators of the relationship between adverse exposures and depression other than the factors examined.
6. Age variations in the adolescent girls (13-17) in the first year of the study may have contributed to differences in perceptions and reports of adverse experiences.

CHAPTER TWO

REVIEW OF THE LITERATURE

The purpose of this literature review is to introduce the reader to the concept of adverse adolescent exposures and to explore the relationship between adverse exposures, depression, suicide ideation, and overall distress. Specifically, this review will present empirical evidence supporting the conceptual framework guiding this study. In particular, a review of literature utilizing a cumulative or “dose response” approach of to the study of factors related to victimization, household dysfunction, community violence, and their association with depression, suicide ideation, or mental distress in adolescents will be presented. The global areas of risk discussed are as follows: socioeconomic position, victimization, household dysfunction, and exposures to community violence. The review will also emphasize the need for further research investigating the impact of such exposures and the complexities of adolescent experiences of stressors and strains during transition to young adulthood.

Risk Factors

Broadly defined, risk factors refer to antecedent events that range from biological to environmental conditions that predispose, enable, or reinforce an onset, digression, or maintenance of a problematic outcome (Kazdin, Kraemer, Kessler, Kupfer, & Offord, 1997; Kirby & Fraser, 1997). Specifically, risk is defined as the probability that a

particular outcome is associated with exposures to a certain characteristic, event, or environment over the base rate of the general population (Kazdin et al., 1997).

Kazdin and colleagues (1997) propose that exposure to one risk factor does not necessarily lead to a poor outcome, but with the presence of four or more risk factors, there is a 10-fold increase in psychological distress or disorder. In this regard, a review of the literature on specificity, (i.e., that a particular risk factor is uniquely associated with a particular outcome) has found evidence to the contrary, there are many different avenues to psychopathological outcomes, and similar conditions lead to multiple outcomes (McMahon, Grant, Compas, Thurm, & Ey, 2003).

The most common models for looking at risk factors are Additive (cumulative) Models, Interactive Models, or the Challenge Model (Kirby & Fraser, 1997; Luthar & Zigler, 1991). Additive Models posit that risk and protective factors are polar opposites and lie along a continuum; increases in risk factors causes decreases in competence or coping (Kirby & Fraser, 1997). Interactive Models posit that protective factors exert an effect in the presence of risk factors. This is conceptualized as protective factors offering a buffering effect, an interruption of the risk chain, or that protective factors may prevent the initial occurrence of a risk factor (Kirby & Fraser, 1997). The third model, the Challenge Model posits that a curvilinear relationship exists so that stressors actually lead to an enhanced competence (Luthar & Zigler, 1991). Utilizing the over-arching socio-ecological perspective that allows for multi-systemic interactions enables a theoretical approach to assess and understand the relationship of risk factors on poor outcomes across life domains (Kirby & Fraser, 1997). The justification for this approach is that neither the additive, nor the challenge, nor the interactive models of risk and protective

factors have been completely supported; however, research suggests that a balance of models may be helpful in assessing the presence of effects across systems (Kirby & Fraser, 1997).

Effects of Cumulative Risk Factors

The co-occurrence of multiple risk factors in the form of childhood abuse and household dysfunction has been labeled more recently as Adverse Childhood Experiences (ACE) (Felitti et al., 1998). Negative cumulative influences of multiple categories of ACEs on both physical and mental well being have been found to be deleterious in numerous studies (Dong et al., 2004). Dong and colleagues found that adults reporting single adverse experiences were likely to have been exposed to a multitude of adverse exposures in childhood, suggesting the importance of understanding co-occurring traumas and the cumulative impact of stressful experiences.

Summary

In summary, a host of factors have been implicated in research studies investigating predisposing risk factors for the onset of depression, with varying levels of empirical support. Research that examines cumulative adverse exposures contributing to poor mental health outcomes utilizes broad categories of adverse experiences across dimensions that include poverty, perceived deprivation, family disorganization or household dysfunction, victimization, and exposures to community violence (Cohen, 2002; Dong et al., 2005; Felitti, 1998; Gilman et al., 2003; Taylor & Turner, 2002).

Stress Process Model

Introduction

The classic stress process model developed by Pearlin and colleagues approaches outcomes through a socio-ecologic theoretical perspective utilizing individual, familial, and environmental levels of mediating and moderating stressors and resources (Pearlin et al., 1981). Pearlin (1989) argues, “that stressful experiences arise not in a vacuum but may be traced to surrounding social structures and a person’s location within such structures”. Systems of stratification based upon social and economic class, race, or gender, contribute to stressful life conditions through increased disparities in areas such as resources, opportunities, personal regard, and self-esteem (Brooks-Gunn, 1991; Gilman et al., 2003; Goodman et al., 2001; Link & Phelan, 1995; Pearlin et al., 1981; Pearlin, 1989; Rutter, 2005).

Such structural arrangements exert a force of threatening or stigmatizing experiences creating stressors and strains relative to perceptions of status within structural arrangements. Pearlin (1989) defines stress as: “an exigency that people confront that is perceived as threatening or burdensome” (p.241). The events give rise to stress creating a stressor that has historically been divided into a life event, a recurring problem or chronic strain. The propositions of social stress theory suggest that perceived stressors arise from a constellation of contextual stressors, chronic strain, and acute stressors (Pearlin et al., 1981; Pearlin, 1989). The following section will discuss current literature in each of the domains of the stress process model.

Status Strain

The relationship between socioeconomic status (SES) and mental disorder is well established (Rutter, 2005), however, there is a lack of understanding of the underlying mechanisms between SES and overall outcomes (Goodman et al., 2001). Frequently, when utilizing SES as a risk factor, researchers will utilize a proxy variable such as maternal education, welfare status, and receipt of reduced lunch, income level, or parental occupation as indicators of SES. A consistent finding in the literature is based on the status-attainment model; parents' levels of education or occupation are associated with children's educational as well as occupational attainment (Jodl, Michel, Malanchuk, Eccles, & Sameroff, 2001). However, the authors note a primary limitation of the model, that is, "SES begets SES", and fails to offer any further explanation. Recently, there has been a shift in the empirical focus on SES by further elaborating the process of socialization by parents.

Variables Relative to Socioeconomic Position. Numerous scholars concerned with the social causation of disorder emphasize the need to differentiate between the objective nature of social position, and the subjective perception of placement in the social hierarchy (Goodman et al., 2001). Empirical evidence demonstrates that depression is associated with social class or relative position, but is not consistently linked to SES (i.e., education or occupational prestige) (Muntaner et al., 2004).

An additional consideration is that adolescence is a critical developmental period often influenced by social desirability. An adolescent's emerging self-concept during this sensitive transitional time includes the crystallization of perceived social status (Goodman et al., 2001). An illustration of status strain at the individual level for an

adolescent may be seen in a youths' desire to increase social status relative to their parents, "creating forms of adulthood that are different from those of their parents" (Thomson & Holland, 2002).

Zaslow and colleagues' (2001) review of various welfare reform initiatives implemented in numerous states, including Florida, found a variety of negative adolescent outcomes. A growing body of evidence from both cross-sectional and longitudinal studies have demonstrated evidence that low SES (Gilman et al., 2003), as well as discrimination, is associated with elevated lifetime risk of depression (Dooley & Prause, 2002; Schlulz, Gravlee, Williams, Israel, Mentz, & Rowe, 2006; Taylor & Turner, 2002).

The impact of the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA, P.L. 104-193) passed by Congress in August 1996, not only dramatically altered welfare programs but also the lives of the children of recipients. The primary goal of the TANF Program was to assist people in becoming economically self-sufficient. While being raised on welfare increases the likelihood of future enrollment in welfare 80% of the daughters of welfare mothers, do not become dependent on welfare themselves. However, they are more likely to receive welfare (approximately 20%) compared to daughters of non-welfare mothers (about 3%) (Furstenberg, 1992). Gottschalk, McLanahan, and Sandefur (1994) attribute this differential to the powerful effects of poverty and single parenthood. Taylor (2000) suggests that the powerful effects of poverty are not so easily teased apart, yet they seem to be more devastating for girls than boys. Research suggests that gender differences may be related to changes in reactivity to environmental stressors as well as the frequency of stressful occurrences

endured by girls (Ge et al., 1994). Such findings have resulted in investigators stressing the need for early interventions to assist girls in “breaking the cycle” of poverty (Brooks & Buckner, 1996).

In summary, while there is evidence that depression is associated with both social class and relative position, there is little knowledge about distress in welfare samples. There is also little evidence on the role of chronic or acute stressors and the relationship between SES and depression or suicide ideation, or what may mitigate the distress (Kalil et al., 2001).

Chronic Stressors of Household Dysfunction

One of the propositions of social stress theory suggests that chronic stress contributes to a wide range of poor outcomes (Pearlin et al., 1981; Pearlin, 1989). The explanations for the net effects of multiple complex childhood exposures ranges from shared and overlapping risk factors, co-morbid patterns, and one factor creating an elevated risk for another (Dong et al., 2004; Kessler, Davis, & Kendler, 1997). Building upon this assumption, the broad concept of household dysfunction is conceptualized in the literature as family disorganization, including a number of frequently co-occurring individual risk factors. Conditions such as parental psychopathology, depression, suicidality, substance abuse, criminal behaviors, child hood abuse and neglect, maternal victimization, maternal depression, parental separation and divorce, and residential instability have been shown to place children at risk for poor outcomes (Dong et al., 2004; Kirby & Fraser, 1997). Studying simply one or two for these exposures limits our understanding of the cumulative effect of such co-occurring stressful experiences.

Nevertheless, previous studies of these risk factors have independently predicted an increased lifetime risk for depression. Research has addressed parental separation and divorce in childhood (Gilman et al., 2003; McMahon et al., 2003) parental substance abuse, aggressive parenting styles, and maternal victimization (Barnett, Miller-Perrin & Perrin, 1997; Stein, Leslie & Nyamathi, 2002) with greater frequency and duration of exposure to abuse (Favorini, 1995; Nurco, Blatchley, Hanlon, O'Grady, 1999); In addition, research has demonstrated that there is a greater risk for poor outcomes in adolescents exposed to parental psychopathology (Barnett et al., 1997; Hammen, Henry, & Daley, 2000). The mechanisms hypothesized to explain the link between parental psychopathology and child outcomes range from genetic transmission, parental modeling, poor parenting, parental incarceration, and overall family dysfunction (Dougherty, Klein, & Davila, 2004; Hammen et al., 2000; Kirby & Fraser, 1997).

Until recently, researchers have neglected to fully separate areas of household dysfunction from violence exposures, and have focused simply on demonstrating the co-occurrence of these two variables. However, Felitti and colleagues (1998) began a series of studies with the Kaiser Permanente Health Plan that distinguished between the constructs of adverse childhood exposures and various health and mental health outcomes. As noted in Chapter 1, the Adverse Childhood Experiences (ACE) study provides important direction for the research proposed here.

Felitti and associates operationally define the construct of household dysfunction using the following variables: 1) parental separation or divorce, 2) a household member with substance abuse, 3) mental illness, 4) incarceration, and 5) maternal victimization. Residential mobility was added to expand the model for household dysfunction in 2005

(Dong et al., 2005). The justification for including relocation, generally assumed to be a major life event, comes from empirical evidence supporting the relationship between high residential instability and the onset of depression in cohort studies (Dong et al., 2005; Gilman et al., 2003). Approximately 8% of the general population moves in a six-month period. Residential mobility in families leaving TANF is 42% within a six-month period (Sard, 2002). Best and colleagues (2006) found a significant relationship between the number of moves an adolescent experienced and level of depression in a TANF sample. The interpretation of the increased depression is that multiple moves may interrupt work schedules, jeopardizing employment for older adolescents, adversely affect a youth's educational progress, and lead to the loss of social connections because of changes in peer groups (Gilman et al., 2003; Magdol, 2002).

In summary, despite the differences in defining household dysfunction, the cumulative effects of multiple complex childhood exposures range from factors that frequently co-occur; (Dong et al., 2004) may remain persistent, or increase the risk of another traumatic exposure (Pearlin et al., 1981; Pearlin, 1989; Turner & Lloyd, 1999). Moreover, there is evidence that adverse childhood exposures in the form of household dysfunction (i.e., maternal depression, family member incarceration, family discord) predispose an adolescent female to be more likely to experience depression when exposed to acute stressors than those not exposed to household dysfunction (Brooks-Gunn, 1991; Hammen et al., 2000).

Contextual Strain: Exposures to Community Violence

One of the propositions of social stress theory is that perceived stressors arise from a constellation of contextual stressors, chronic strain, and acute stressors (Pearlin et

al., 1981; Pearlin, 1989). Cicchetti and Rogosch (2002) called for a “developmental analysis of distal influences and the relationships to more proximal causes for psychopathology in youth”. Specifically, these authors noted that contextual factors such as community violence can exert significant effects on youth and that a developmental analysis would enable understanding of both the progression of experience and the trajectories followed.

Over the past twenty-five years, the problem of community violence within the urban areas of our nation has become a growing concern. Prevalence estimates for youth exposures to community violence range from 75% overall (National Center for Children Exposed to Violence [NCCEV], 2006) to 88% of inner city youth (Mazza & Reynolds, 1999).

Evidence of outcomes to exposures to community violence range from increased risk of homicide (Centers for Disease Control and Prevention [CDC], 2002), altering the developmental trajectories of youth, exacerbating distress reactions, strengthening perceptions of danger and hopelessness (Duckworth, Hale, Clair, & Adams, 2000; Gerard & Buehler, 2004; Howard, Feigelman, Li, Cross, & Rachuba, 2002; Luthar & Goldstein, 2004; White, Bruce, Farrell, & Kliewer, 1998), and increased suicide risk (Mazza & Reynolds, 1999; Vermeiren, Ruchkin, Leckman, Deboutte, & Schwab-Stone, 2002).

Duckworth and colleagues (2000) tested the utility of a *proximity model* versus the *chronic threat model* with three forms of community exposure. The goal was to explain the separate and additive contributions of various forms of community violence exposures on psychological distress in adolescents. The investigators defined community violence using three dimensions: direct victimization, witnessing violence, and

community chaos (i.e., criminal activity, drug dealing, and the sound of gunfire near home or school). Multiple linear regression analysis found significant support for both the *proximal model* and the *chronic threat model*. Moreover, these researchers found that community chaos mediates the relationship between direct victimization and stress reactions.

Perceptions of community safety, witnessing, and hearing of violence, and direct exposures are associated with various forms of psychological distress in both cross-sectional and longitudinal studies (Duckworth et al., 2000; Gutman & Sameroff, 2004; Howard et al., 2002; O'Donnell, Schwab-Stone, & Muyeed, 2002; Scarpa, Heruley, Sumate, & Haden, 2006; White, Bruce, Farrell, & Kliewer, 1998). In the Philadelphia Family Management Study, Gutman and colleagues (2004) investigated the processes in successful adolescent development by assessing pathways from neighborhoods to families and the developmental course of adolescents. Evidence for a relationship between social environment and depression in longitudinal studies was demonstrated. Neighborhood problems (e.g. assaults, muggings, drug use and dealing, and vandalism) were significantly associated with later adolescent depression but did not demonstrate an impact in early adolescence. These findings suggested that young adult females may be more vulnerable to contextual surroundings as they enter childbearing roles than their younger peers.

In summary, findings in the literature support the hypothesis that the chronic stress of contextual exposures to chaos and community violence contribute to psychological distress in youth over time. These exposures range from hearing about violence near one's home or school (Scarpa et al., 2006) to witnessing or experiencing

personal victimization (Howard et al., 2002). Evidence of a graded relationship of cumulative exposures to community violence and psychological distress over time has been demonstrated (Gerard et al., 2004), yet discrepancies in the literature remain on desensitization to violence exposures over time, (especially in males) and on buffering effects for psychological distress (White et al., 1998). Additional concerns stem from a lack of consistency in definition; many researchers include direct victimization with the ambient exposures of chaos, witnessing and hearing of the violence (White et al., 1998). These researchers suggest that direct victimization should be analyzed independently of community violence.

Acute Stressors: Victimization

Acute stressors are part of the constellation of stressors proposed by social stress theory (Pearlin et al., 1981; Pearlin, 1989). The determination that a stressor is acute is based on the level of threat, the quality of the event according to desirability and the level of disruption. Recently, there has been an increased interest in the impact of exposure to violent victimization during the developmental stages of childhood and adolescence in terms of morbidity and mortality across the life span (Felitti et al., 1998). Approximately 22% of children with learning disabilities acquired their disability as a result of severe child maltreatment (Karr-Morse & Wiley, 1997).

Exposure to trauma occurring during a critical developmental period as in the example of intrauterine trauma or toxic substance exposure often interrupts the development of the brain resulting in neurological deficits (Perry, 2001). The implications of trauma and maltreatment on children during sensitive developmental stages are often damaging due to active development of the cortex, which may result in

emotional, behavioral, and cognitive delays and impairment (Perry, 2001). Nevertheless, exposures to maltreatment during the developmental stage of adolescence should not be minimized, as it is still considered a developmentally sensitive time. It is further proposed by Perry (2001) that chronic stimulation of the stress response systems as in chronic maltreatment cases; (i.e., hypothalamic-pituitary-adrenal, central nervous system, noradrenergic-dopaminergic systems) may result in alteration in functioning across emotional, behavioral, and cognitive domains. The developmental literature points to the pivotal tasks and vulnerabilities of brain formation and regulation processes that if exposed to severe or chronic disruption during neurobiological maturation may be permanently altered (Perry, 2001; Rudolph et al., 2000). One example of such alteration after sexual abuse is the hastening or premature onset of puberty (Finkelhor & Hashima, 2001).

A large number of health/mental health outcomes have been associated with victimization, including: depression, anxiety, post traumatic stress disorder, suicidality, substance abuse, violence, teen pregnancy and risky sexual behaviors (Dube, et al., 2005; Finkelhor & Hashima, 2001; Howard et al., 2002; Jong, Mulham, & Kam, 2000; Kendall-Tackett et al., 1993; Spat Widom, 1999; Stevens, Murphy, & McKnight, 2003; Turner et al., 2006).

In 2001, the national prevalence estimates of violent victimization for youth ages 16-19 was 5.6 percent or 1 out of 18 experiencing victimization (Child Trends, 2003). The ratio for sexual assault and rape for adolescents age 12-17 is 1.5 times greater than adults (Finkelhor & Hashima, 2001). These authors proposed that the reason for higher levels of victimization in youth is due to their dependency status. The distribution of

maltreatment of all youth range from 54% for confirmed cases of neglect, 22% for physical abuse, 8% for sexual abuse, 4% for emotional maltreatment, and 12% for other forms of maltreatment (National Committee to Prevent Child Abuse, 1998).

In a national representative sample of 2,030 youth, cumulative exposures to multiple forms of victimization exposures remained a significant predictor of adverse mental health outcomes (Turner et al., 2006). In a cross-sectional study of 2,603 youth with a mean age of 13 years, investigators found that sexual abuse was both independently and directly associated with suicide attempts (Bergen, Martin, Richardson, Allison, & Roeger, 2003). Utilizing sequential logistic regression modeling these researchers found depression both mediated suicide risk and directly impacted suicide attempts.

In summary, the impact of victimization during the sensitive period of adolescence has an independent impact on multiple health and mental health outcomes but is mediated and moderated by the type of event, injury, and relationship to the perpetrator. Cumulative measures of victimization appear to mediate antecedent stressors and strains.

Conclusions

While it is hardly novel to suggest that traumatic or adverse experiences have a significant impact on mental health outcomes, there is a concern that misattributing the potency of one risk factor (i.e., child sexual abuse) as an antecedent event that may predispose or maintain a problematic outcome across the life course may risk giving that event undue prominence while ignoring other factors (Felitti et al., 1998; Menard, Bandeen-Roche, & Chilcoat, 2004; Turner & Lloyd, 1995).

Even within the body of child maltreatment literature there is a focus on a number of overlapping risk factors that frequently co-occur, suggesting the multifinality of stressors (i.e., similar stressors associated with different outcomes) and equifinality (i.e., different stressors are associated with the same outcome in different people) (Menard et al., 2004). Social stress theory suggests that perceived threats arise from a constellation of various stressors and strains (Pearlin et al., 1981; Pearlin, 1989). It has been argued that adolescents are at greater risk in regards to social structures, expectations, community environments, and family experiences due to developmental sensitivities. An adolescent's emerging self-concept during this transitional time includes the crystallization of multiple systems, but also the simultaneous challenge of multiple adaptive experiences (Ge et al., 1994).

When considering the cumulative impact, or in the rubric of epidemiology, dose response relationship, of exposures to household dysfunction, community violence, or personal victimization (Menard et al., 2004), a magnitude of mental health problems in adolescents, including depression, anxiety, post traumatic stress disorder, suicidality, substance abuse, violence, teen pregnancy and risky sexual behaviors, have been identified in the literature (Felitti, 1998; Ge, 1994; Kessler et al., 1997; Turner & Lloyd, 1995).

The Cumulative Effects of Adverse Exposures

More recently, a conflict in the field exists regarding whether it is more valuable to pursue specificity of risk factors, or cumulative risk models that mirror the real world of social organization. Researchers embracing cumulative approaches to risk posit that a primary danger in pursuing individual risk constructs is that it may perpetuate stereotypes

about a persistently marginalized group in our society (as in the sexually abused) (Felitti, 1998; Kessler et al., 1997; Molnar, Buka & Kessler, 2001; Schneider & Ingram, 1993; Turner & Lloyd, 1995). Thus, there is a risk of increasing personal burdens while limiting future opportunities in this population.

While some researchers argue that because the field is still developing, a lack of evidence of specificity within adolescent literature exploring particular risk factors and the relationship to unique mental health outcomes (a perspective of the socio-medical model or more precisely here developmental psychopathology) can be expected (McMahon et al., 2003). Other researchers embrace the sociological paradigm that supports a broader category of psychological or emotional distress so as not to exclude mental health consequences (Aneshensel et al., 1991).

A basic premise of social stress theory is that the effects of stress are non-specific, as evidenced by the empirical data of an array of disorders that occur after an exposure to a stressor. The danger of this approach as argued by Aneshensel and colleagues (1991) lies in the misclassification of persons who are seemingly non-disordered due to specific categorization and thereby missing other manifestations of stress exposures.

Nevertheless, studies vary in how outcomes of psychological or emotional distress are defined. Some include symptoms of emotional distress that impact daily functioning such as in school performance for youth, symptomatology as evidenced by various symptom check lists that include measures of depression, anxiety, post traumatic stress disorder, or suicide ideation (Howard et al., 2002; Turner & Lloyd, 1995) and/or diagnostic evidence of psychiatric disorder. Symptoms associated with depression during

adolescence include: interpersonal and academic dysfunction, helplessness, anger, eating disorders, sexual promiscuity, running away, and substance abuse.

During the past two decades a substantial amount of evidence on the association of chronic adversities and single events of adverse exposures and poor mental health functioning in adolescents has emerged (Bergen et al., 2003; Finkelhor & Hashima, 2001; Garnezy & Masten, 1994; Howard et al., 2002; Johnson, Kotch, Catellier, Winsor, Dufort, Hunter, Amaya-Jackson, 2002; Jong et al., 2000; Kendall-Tackett et al., 1993; McMahon et al., 2003; Spat Widom, 1999; Stevens et al., 2003; Turner & Lloyd, 1999; Turner et al., 2006). It is argued that higher rates for female mental disorder may be due to the relationship between chronic stress and the role of care giving (the high cost of care giving hypothesis) and that substance abuse and anti-social behavior in males are typically not included in epidemiological surveys (Aneshensel et al., 1991).

Nevertheless, it remains that the third leading cause of death for adolescents between 15-24 years of age is suicide (Hazler & Mellin, 2004). Specific symptoms associated with suicide ideation are increased anxiety, depression, stress, hopelessness, and loss of self-esteem (Hazler & Mellin, 2004).

Multiple Stressors Across Domains

Literature on multiple stressors across three or more domains is extremely limited. The majority of studies utilizing cumulative approaches have looked at one or two domains, primarily in the areas of victimization or community violence, and have been cross-sectional in design. The following is the state of the literature that supports findings with respect to cumulative impact of adversities across more than two domains.

The Dunedin Women's Study conducted in New Zealand investigated the long-term impact of child physical, emotional, and sexual abuse across the life span in a randomly selected community sample of 497 women (Mullen et al., 1996). Results found that abuse was not randomly distributed but was more prevalent in disturbed and disrupted homes, with excessive moves contributing to poor outcomes. The researchers report that combined abuse variables explain a modest proportion (1-5%) of overall distress within the context of other stressors.

The National Comorbidity Survey (Kessler et al., 1997) included twenty-six adversities that encompassed loss events, parental factors, and personal adversities. Multivariate analyses revealed additive effects on probability of disorder, where the cumulative effect of two or more adversities had a greater impact than the effect of one. It was noted that after the sixth adversity was added into the equation the researchers were unable to detect an effect. Moreover, these authors caution against interpreting results of a single-adversity as a causal indicator of a single disorder based upon the clustering of adversities in their results.

A retrospective cohort study with 18,175 members began a series of studies targeting the interplay between multiple stressors (Chapman et al., 2004; Dube et al., 2001; Dong et al., 2005; Felitti et al., 1998). The relationship of adverse childhood experiences and various health and mental health outcomes were investigated utilizing multivariate logistic regression. A dose response relationship was found with ACE's in any category increasing the risk of attempted suicide 2-5 fold ($p < .001$).

A recent longitudinal study with 2-waves of data collection by Menard and colleagues (2004) with 1,715 participants found evidence that multiple stressors tend to

occur in clusters and that there is a co-occurring pattern of adversities. The domains studied were socio-demographic characteristics, including welfare status, 3 categories of child abuse (sexual, physical and emotional), parental warmth, parent's mental illness, suicidal behavior, household member substance abuse and incarceration, and non-nuclear family structure. These investigators utilized both multiple regression analysis and latent variable modeling, adding to the existing literature with a focus on person-centered variables.

A longitudinal study from 1975 to 1993 with a community sample of 659 families found that maladaptive parenting and childhood maltreatment were associated with elevated risk for suicide attempts and interpersonal difficulties during middle adolescence (Johnson, Cohen, Gould, Kasen, Brown & Brook, 2002). Domains of adversities included poverty, critical life events, household dysfunction, and childhood abuse.

A commonality of all of these studies is that adversities tend to occur in clusters, and that identifying one event as causal of poor mental health outcomes could result in misspecification. Evidence for the cumulative effect of two or more adversities having a greater impact than the effect of one demonstrates a dose response relationship with poor outcomes.

Limitations of Current Literature

The following section is an overview of the major gaps and limitations noted within the literature. Broadly, the gaps include: (1) a lack of theoretical testing; (2) a lack of longitudinal research; (3) a lack of examination of the association between various contextual factors and social position with depression among female adolescents; (4) a need for the study of suicidal ideation (IOM, 2002) (i.e., given that suicide is a relatively

infrequent event); (5) and finally, the need for the exploration of mediating and moderating influences on the impact of depression.

The first significant limitation is the paucity of longitudinal studies on adolescents investigating depression and suicide ideation utilizing a theoretical framework (i.e., social stress theory that proposes that stressors arise from a constellation of contextual stressors, chronic strain, and acute stressors (Pearlin et al., 1981; Pearlin, 1989). Although noteworthy, the Kaiser Permanente studies have investigated distinct adverse exposures on mental health outcomes, yet these studies are still restrictive in terms of elucidating clear mechanisms of influence. Data are often truncated into a single variable and therefore analysis neglects to consider the longitudinal nature, namely, chronicity on the developmental trajectory of mental health outcomes.

A meta-analysis of socioeconomic inequality and depression by Lorant and colleagues (2003) found compelling evidence for a causal relationship, but call for greater understanding of the course of development of depression. Furthermore, a review of the literature disclosed that there were no known studies examining the association of social position with depression among female adolescents (Mutaner et al., 2004).

The Institute of Medicine (2002) calls for “specific data from well-defined and characterized populations whose community level social descriptives are well known”, in order to clarify the complex pathways from childhood experiences to mental illness and/or suicidality. An additional suggestion by the IOM (2002) is that given that suicide is a relatively infrequent event, alternate endpoints, such as suicidal ideation, are required to add to the existing knowledge base.

There is a need for clarification of etiological processes by assessing change longitudinally through identification of time of onset and the preceding temporal events in order to further understand the sequencing of events on mental health outcomes and to further the examine a causal chain (Thoits, 1995). Such information would guide future development of interventions that are optimally timed and able to address multiple causal pathways (IOM, 2002; Kraemer et al., 2001).

Methodological limitations include the wide variation in sample populations, variation in operationalization of constructs, and the exclusion of various contextual factors. Study designs employed with adolescents are typically cross sectional assessments, although longitudinal designs are preferable given the desire to establish causality. The studies noted above included a long interval of time between initial exposures and recall of experiences and outcomes. One last limitation of current research is the relatively little exploration of mediating and moderating influences on depression and the potential for a unique combination of factors that place female adolescents at greater risk for suicide ideation (Hazler & Mellin, 2004).

Mechanisms of Influence

As stated above, there is a need for future research to test the impact of mediating and moderating factors in adolescents on depression and suicide ideation. Such evidence would help to inform prevention efforts and to further understand how these factors work in concert to evoke poor outcomes.

Pathways to Risk Amplification: Enabling and Reinforcing Factors

Intermediate factors along the causality continuum are considered to either further enable or buffer the impact of negative influences; thereby contributing to risk

amplification, or mitigating against poor outcomes. An illustration of this are factors that contribute to poorer outcomes for child sexual abuse such as: age of abuse, the duration or frequency of abuse, type of sexual activity, child/perpetrator relationship, number of perpetrators, victim gender, force or physical injury, multiple forms of abuse, and perceptions of abuse (Barnett et al., 1997). The risk factors associated with sexual abuse are female gender, prepubescent age, passivity, divorced home, mother's employment, or disability, stepfather or boyfriends presence in the home, and maternal history of sexual abuse.

Across all dimensions of maltreatment and stressful life events, the literature notes that gender, age, and socioeconomic disadvantage are primary risk factors (Ge at al., 1994; Barnett et al., 1997). Detailed analyses have shown that distal risk factors of poverty, while increasing the likelihood of proximal family dysfunction and contextual exposures to violence, have an indirect effect on depression yet remain part of the causal chain of direct effects through proximal factors (Rutter, 2005).

As this study uses an all female sample with socioeconomic disadvantage, age will be further discussed and explored as a mechanism of influence on outcomes. The literature discusses two prominent age ranges for victimization through child abuse. These groups fall between 0 to 5 year olds (51%) to the adolescent group of 12 to 17 year olds representing (35%) of those reported (Barnett et al., 1997). Investigations on the experience of stressful life events have found that females between the ages of 13 and 15 report a dramatic increase in stressful exposures followed by a slight decline in negative events after 15 (Ge at al., 1994).

Further illustration of mechanisms of influence contributing to child victimization is found in the study of household dysfunction parental substance abuse (Miller, Smyth, and Mudar, 1999; Murphy, Jellinek, Quinn, Smith, Poitras, & Goshko, 1991). In another study, mechanisms of influence (the presence of both injury and close relationship to the perpetrator) were significant to the dose relationship between victimization and suicidality. The contribution of injury and relationship of perpetrator was (6.6%) in non-ideators, and (58.9%) in those with suicidal behaviors (Simon et al., 2002).

Conclusions

This study aimed to contribute to the existing knowledge base in three ways: first, by investigating the prevalence of stressors across multiple domains in the lives of female adolescents raised in the context of welfare. Secondly, to capitalize on longitudinal data to clarify the cumulative impact of exposures to adverse events and the change of depression, suicide ideation, and mental distress over time; and lastly, to explore the mechanisms of cumulative exposures of adverse exposures on depression, suicide ideation, and overall mental distress. The conceptual framework for testing the independent effect of the constructs of personal victimization, household dysfunction, and exposure to community violence as well as the additive impact of these cumulative measures of adverse exposures on depression, suicide ideation, mental distress and the change in these outcomes is presented in Figure 1. The empirical evidence presented above provides justification for each of these pathways. A more detailed conceptual model with each category developed by dimensions is presented in chapter three.

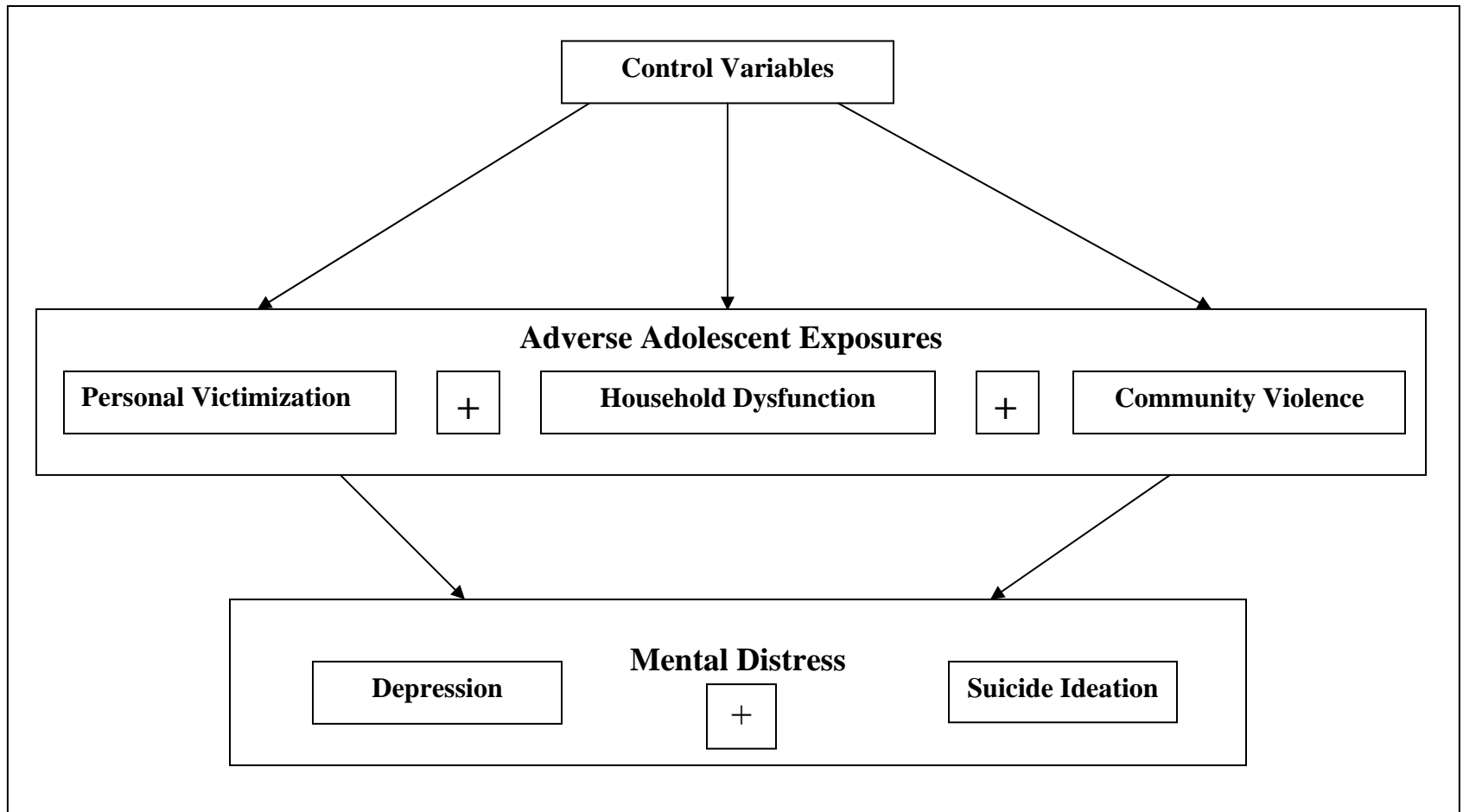


Figure 1. Conceptual Model for Testing Cumulative Impact of Adverse Exposures on Adolescent Mental Health Outcomes

CHAPTER THREE

METHOD

This chapter describes the methods used to conduct this study. It is divided into the following sections: (1) study purpose; (2) research hypotheses; (3) overview of study design; (4) description of the Welfare Reform: Adolescent Girls in Transition data set; (5) study sample; (6) original data collection methods and instrumentation; (7) study variable selection; (8) data analysis; and (9) design strengths and limitations.

Study Purpose

The purpose of this study was to determine the cumulative impact or “dose response” effect of adverse experiences on depression, suicide ideation, and overall mental distress over time in a cohort of 125 adolescent girls raised on public assistance. The adverse experiences studied were personal victimization, household dysfunction, and community violence exposures. The development and change in depression, suicide ideation, and mental distress over the four points of time during the study period served as the outcome variables.

Research Hypotheses

1. Exposure to adolescent victimization will have a positive association with the presence of depression, suicide ideation, and overall mental distress.
2. Household dysfunction will have a positive association with the presence of depression, suicide ideation, and overall mental distress.

3. Exposure to community violence will have a positive association with the presence of depression, suicide ideation, and overall mental distress.
4. The number of adverse exposures will have a cumulative impact or “dose response” relationship with the level of depression, suicide ideation, and overall mental distress.
5. The Adverse Adolescent Exposure Score will be significantly related to change in depression, suicide ideation, and mental distress over time.

Overview of Study Design

This study was based upon secondary analysis of data from the Welfare Reform: Adolescent Girls in Transition (WRAGT) (Boothroyd et al., 2003; Boothroyd et al., 2005), a mixed method longitudinal study examining the impact of welfare reform on the future hopes and aspirations of female adolescents. Participants in the original study were part of a larger project funded by the Florida Agency for Health Care Administration (Contract #M0107).

Data for the current study were drawn from all four waves of interviews conducted with the mothers and their daughters. Both univariate and bivariate analyses were performed to assess completeness of data and associations between individual predictors, composite variables, and outcome variables. A combination of multivariate analyses were used including ordinary least square (OLS) regression and logistic regression models developed to explore the impact of adverse experiences on depression, suicide ideation, overall mental distress and change over time.

Description of Welfare Reform: Adolescent Girls in Transition Data Set

The Sampling Frame and Process

Mothers receiving TANF (at the time of enrollment into the study) and their adolescent daughters were identified from the 2000-2001 Florida Medicaid eligibility data using the family identifier and other matching variables (such as gender, address, and last name). To be eligible for study participation, mothers had to be receiving TANF and have a daughter between the ages of 13 and 18 living at home. Additionally, the families had to reside in a five county area in west central Florida. Recruitment letters were mailed to 873 potential participants, whereby 125 eligible daughter/mother pairs were recruited for participation. Enrollment was stratified on race/ethnicity (i.e., white, black, Hispanic) and geographic location (i.e., urban versus rural).

Attrition Rates. Given that subject attrition presents significant methodological challenges in longitudinal studies, attrition rates were assessed in planning the current study. Retention rates for both mothers and daughters at each of the follow-up interviews are summarized in Table 1. In order to describe those who left the study, additional information regarding barriers to participation were gathered. Barriers for participants who were not re-interviewed included, unresponsiveness, failure to keep multiple interview appointments, maternal involvement in a drug rehabilitation program, incarceration, maternal death, disavowal of previous participation in the study, outstanding warrants for arrest, and placement in foster care where permission could not be obtained for an interview (Boothroyd et al., 2005).

Table 1

Follow-up Retention Rates

<i>Year</i>	<i>Phase 1</i>			
	<i>Mothers</i>		<i>Daughters</i>	
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>
2002	125	100%	125	100%
2003	113	90.4%	116	92.8%
2004	107	85.6%	111	88.8%
2005	113 ¹	90.4%	115 ²	92.0%

*Note.** Reprint from Source: (Boothroyd et al., 2005). Welfare reform: Adolescents girls in transition – A three-year follow-up study.

¹ Three mothers were deceased.

² One daughter was deceased.

Strengths and Limitations of Study Sample.

1. A primary strength of this cohort sample is that this is a homogeneous sample in regards to exposure to welfare status, a proxy for poverty.
2. The sample was selected using random sampling procedures from an enrolled population then stratified on race/ethnicity and geographic location (i.e., urban versus rural).
3. Another general strength of a cohort study sample is that there is stronger evidence for exposure-disease associations given the homogeneity of the groups experiences. Cohort studies allow for greater determination of risk of exposures over other sampling strategies (Friis & Sellers, 1999).
4. An additional strength of the study sample is that trained interviewers conducted face-to-face interviews in participant's homes.

5. A common limitation of longitudinal cohort studies is loss of data due to attrition. However, as noted above, there were high rates of retention for the entire length of the study, thus creating a minimal limitation for this sample.
6. A final limitation is the constraint of a small sample size to support the complex analyses.
7. Age variations in the girls (13-17) in the first year of the study may have contributed to differences in perceptions and reports of adverse experiences.

Original Data Collection Methods

Each year of the study, face-to-face interviews were conducted by trained interviewers in the homes of participants using various standardized measures with 125 mothers who were receiving TANF. These procedures were initially conducted in 2002, and repeated in each of the three following years providing four waves of data. All procedures and protocols were reviewed and approved by the University's Institutional Review Board prior to the initiation of the study.

Instrumentation

The WRAGT was a comprehensive study utilizing 35 psychometrically tested measures including respondent self-report health, mental health and substance abuse status measures (See Appendix A & B for a full list of measures). In addition, information on respondent demographics, family characteristics, and living situations were included in both the mother and daughter protocols. The original study assessed demographic data using the Standards for Mental Health Decision Support Systems developed by Leginski and colleagues (National Institute of Mental Health [NIMH], 1989). The instrumentation and questions pertinent to this study are reviewed below,

organized by constructs within the conceptual framework for testing the effect of stressors and strains on depression and suicide ideation.

Data Integrity

Preliminary data analyses were performed on the original WRAGT 2002 to 2005 data set to ascertain the feasibility of conducting the current study. Specifically, to determine whether the data set provided appropriate variables to test the current study's proposed objectives of replicating the ACE study with adolescence.

Study Variable Selection

The proposed theoretical framework required that variables address adverse adolescent experiences that ranged from personal victimization, household dysfunction, and community violence exposures as well as the outcomes of interest: the development or change in depression and suicide ideation over time. Evidence from the preliminary review of the data demonstrated sufficient data to construct the categories of interest and sufficient variability within the sample making the study feasible.

To narrow the focus of this study, only variables closely aligned with the approach utilized by Felitti and colleagues' ACE (1998) study were included. The exceptions are adolescent behavioral variables selected as control variables and variables relative to the operationalization of community violence. Justification for these additions to the ACE model were based on the need for accommodating adolescent female behaviors that impact the transition into adulthood (e.g. pregnancy and school status) and to include contextual exposures of community violence to further understand the influence these exposures may exert upon outcomes.

Missing Data Strategies

Strategies for handling missing data range from ignoring the missingness to imputing data with predictive models (Buhi, Goodson, & Neilands, 2008; McKnight, McKnight, Sidani & Figueredo, 2007). The following section discusses the classification of missingness as one of three probable mechanisms, and further defines and examines strategies to approach the current data set.

The first classification of missingness is missing at random (MAR), or data that is missing not as a function of the item but as a function of some other observed variable (Buhi et al., 2008; McKnight, 2007). An example of where this may occur in this study would be variables regarding teen pregnancy. The section of the protocol regarding sexual experiences may have been skipped if the interviewer was told that the adolescent had not yet had a sexual encounter. This could be attributed to the adolescent's age and could be considered MAR, and therefore, ignorable missingness. Missing completely at random (MCAR), or missingness not resulting or related to an observed variable or incomplete data is also considered ignorable. MCAR's may result from cases where a participant is lost to follow up due to death or illness (Buhi et al., 2008). Not missing at random (NMAR) data, or missingness due to systematic influences, such as incriminating questions or missing due to unobserved data is considered to be non-ignorable as it produces biases in the results that require interpretation.

Given that there is complete baseline data for all cases across demographic questions, indices of adverse exposures, and outcome variables, those cases that were lost to follow up were assumed to be MCAR, thus the data for subsequent years were considered as ignorable and not in need of imputation, deletion, or direct estimation

(White, Carpenter, Evans, & Schroter, 2004). Nevertheless, justification for not deleting cases from the baseline year was due to the small size of the sample, and as correlation, and prevalence rates were available on traumatic exposures and outcome scores in the first year of the study each of the cases were retained in order to preserve sample size.

Missing data for the outcome variables of depression and suicide ideation are presented below. In the first year of the study, 125 adolescents completed the CES-D. In at least one of the four years of the study there were 13 cases overall (10.4%) missing CES-D scores in one of the four years. There were nine cases (7.2%) missing CES-D scores during two year of the four years. There was only one case with complete baseline data that was lost to follow up in the three subsequent years of the study. The results are presented in Table 2.

Table 2

Number of Cases Missing Depression Scores and Suicide Ideation Item

	<i>Frequency</i>	<i>Percent</i>
Complete Data	102	81.6
Missing 1 Year	13	10.4
Missing 2 Years	9	7.2
Missing 3 Years	1	.8
Total	125	100.0

To insure data integrity a review of each item of the CES-D was conducted at each point in time during the study. This analysis revealed one or less items missing per year on three cases. An imputation technique presented in the literature for the CES-D

has been used to retain those cases. Specifically, that a missing item be assigned the mean value of the completed items (Garrison, Addy, Jackson, McKeown, & Waller, 1991).

An analysis of the correlation between observed items of the CES-D and the imputed items data set resulted in a perfect (1) correlation at ($p = .01$). For missing cases found during the follow up years, a regression analysis was performed to develop a predictive equation based upon previous year(s) depression score. These scores were then individually reviewed and then imputed into the final variable in order to retain the cases and preserve power for further analyses.

Each of the predictor variables is a composite index. Due to the small sample size, deletion techniques were not used in this study. It is important to note that the central assertion of the entire study is that each of the predictor indices (i.e., victimization, household dysfunction, and community violence) are measuring the cumulative effects of each of the relevant dimensions comprising the overall variable. Therefore, the same strategies utilized in the ACE studies for missing information on an exposure to trauma for an adolescent were utilized. Specifically, those items not endorsed within a category of adverse exposure and counted as missing were dummy coded as “0”; thus assuming that the adolescent did not have that experience.

While the results may underestimate exposures; misclassifying youth as unexposed and creating a bias towards the null, this is a minimal concern for this study given the preliminary analysis of the three adverse exposure composite variables revealed prevalence rates ranging from (80% - 92.8%). As this is not a study of severity or chronicity but of exposure, there seems to be sufficient data for the purposes of this study.

Further rationale for this approach is in the distinction between data and information. Specifically, *data* on one exposure to parental divorce, criminality, or personal sexual assault provides sufficient *information* to be included and counted as an exposure to a phenomenon (McKnight et al., 2007). Thus, a score of “1” in the dimension of a criminal household member (a data point) which at any point during the 4 years still counts as a score of “1” whether a participant reported exposure in the other three years, or did not complete the question in the other three years.

As this is not a study of severity or chronicity but of exposure that data point provides us with information on the exposure to such an occurrence. This approach eliminates exhaustive efforts of dealing with a missing data point on a single item during the entire course of the study given the infrequency of missing items.

Behavioral and Demographic Control Variables

Demographic and behavioral data were selected to statistically control for potential confounding influences. Control variables selected include daughters’ age, ethnicity, teen pregnancy, and school status. The specific items asked during the interviews along with response options are listed in Table 3.

The descriptive statistics for the above control variables, as well as selected demographic characteristics for the sample at the time of enrollment in the *WRAGT* study are presented in Table 4.

Table 3

Behavioral and Demographic Control Variables

<i>Variable</i>	<i>Item (s)</i>	<i>Response Option</i>
Daughters Age	What is your date of birth?	Continuous
Daughters Race /Ethnicity	How would you describe your race/ethnicity?	1=White 2= Black/African American 3= Hispanic 4=Other
Teen Pregnancy	Have you ever been pregnant?	0=No 1=Yes
School status	Are you still in school?	0=No
Demographic Questions	Have you had any college, business or technical school? Reason not in school?	1=Yes Qualitative

Table 4

Characteristics of the Mothers and Daughters

<i>Characteristics</i>	<i>Mothers 2002 (n = 125)</i>	<i>Daughters 2002 (n = 125)</i>
<i>Age:</i>		
Mean	38.4	15.5
SD	4.99	.99
Range	30 - 53	13 - 17
<i>Race/Ethnicity:</i>		
White	40.7%	33.6%
Black/African American	38.2%	40.8%
Hispanic	21.1%	25.6%
<i>Marital status:</i>		
Married or living as married	12.8%	0%
Divorced, Separated, or Widowed	54.4%	0%
Never married	32.8%	100%
<i>Education:</i>		
Dropped out of school	50.4%	20.8%
Completed high school	49.6%	NA
<i>Teen Pregnancy:</i>		
Ever pregnant		15%
<i>Length of time on TANF:</i>		
Less than 6 months	15.4%	None
Six months to 1 year	18.7%	
1 to 2 years	23.6%	
Over 2 years	42.3%	
Not on TANF	0%	

Predictor Variables

This section presents variables selected from the larger data set based upon a demonstrated linkage in one or more previous studies as contributing to depression or suicide ideation. Furthermore, the variables were selected to closely replicate the ACE studies (Felitti et al., 1998) with the addition of exposures of community violence.

The contextual exposures were added to further assess the contribution of community violence on depression and suicide ideation as well as the potential interaction with household dysfunction and adolescent victimization. Previous research suggests that exposures to neighborhood violence augment the effects of maternal depression on child outcomes, exerting a sort of double jeopardy through this interaction (Silverstein, Augustyn, Cabral, & Zudkermean, 2006). It further suggests a need to assess the role of maternal victimization, suggesting such trauma may explain a mother's lack of responsiveness to her child's exposure to violence (Simon, Anderson, Thompson, Crosby & Sacks, 2002).

For the purposes of this study, each category of exposure was a composite variable constructed with each of the indicators of adverse exposures. Justification offered by previous research indicates that defining abuse or traumatic experiences by any adverse event during childhood is wrought with difficulties as we try to delineate from undesirable mundane exposures to events that are more critical.

The current literature suggests that giving weight to one form of traumatic exposure minimizes the powerful additive effects of multiple exposures and even the multiplicative effect or ripple effect overtime of such exposures.

There is a greater consensus in the literature that abuse and victimization is not randomly distributed but is instead found predominantly in disrupted and dysfunctional families with economic and social disadvantage (Mullen et al., 1996).

The specific items selected for each category of this study mimic the constructs of the ACE study and as closely as possible replicate, the line of questioning in regards to exposures to physical and sexual trauma and household dysfunction. It is important to note that one of the underlying reasons for the differences in the line of questioning regarding constructs of abuse is that the ACE was completed by adults participating in a health care plan through a mailed survey with an average age of 56.

In contrast, the WRAGT was administered face to face with youth of an average age of 15. The potential ethical dilemmas for the research team of the original WRAGT study and the implications for youth reporting abuse by a parent or adult household member would have made approval by the Institutional Review Board (IRB) virtually impossible as well as limiting parental consent for participation in the study in general. Thus, there were no questions within the WRAGT in regards to emotional abuse by a parent figure. There are questions regarding physical and sexual assault. The questions from the ACE study regarding exposure to abuse are presented in Table 5. For ease of comparison, the items selected from the WRAGT on exposure to victimization are presented in Table 6.

Table 5

Items from ACE Study on Abuse

<i>Abuse by Category</i>	<i>Item</i>
Emotional	Did a parent or other adult in the household... a. Often or very often, swear at you, insult you, or put you down? b. Often or very often, act in a way that made you afraid that you might be physically hurt?
Physical	Did a parent or other adult in the household... a. Sometimes, often or very often push, grab, slap, or throw something at you? b. Ever hit you so hard that you had marks or were injured?
Sexual	Did an adult person at least 5 years older ever... a. Touch or fondle you in a sexual way? b. Have you touched their body in a sexual way? c. Attempt oral, anal, or vaginal intercourse with you? d. Actually have oral, anal, or vaginal intercourse with you?"

Table 6

Items for Measurement of Exposure to Victimization

<i>Variable</i>	<i>Item</i>	<i>Response Options</i>
Adolescent Victimization	Have you ever been...(or in the past year) a. bullied/pushed around? b. beaten up? c. sexually assaulted? d. robbed? e. stabbed? f. shot at? g. shot?	0=No 1=Yes
Abused	Have you ever been abused by anyone, verbally, physically, sexually or psychologically?	0=No 1=Yes
Sexually assaulted	In the past year have you experienced being sexually assaulted?	0=No 1=Yes

The literature suggests that there is a limitation in the non-specific or general question of sexual assault; typically, results produce a significantly lower rate of response than questions that are specific, thus the resulting data is likely to be a conservative estimate of potential exposures to sexual abuse (Mullen et al., 1996). Once again, it is important to note that a strength of the methods utilized in data collection by the WRAGT study team are that the questions were asked in face to face interviews with trained interviewers in contrast to the ACE studies which utilized only mailed surveys to gather data.

Adolescent Victimization

This composite variable was operationalized as: (1) first year reports of ever being bullied, beaten up, sexually assaulted, robbed, stabbed, shot at, shot; (in subsequent years this question reads “in the past year have you been bullied, etc.) (2) positive responses to questions on physical, psychological, and sexual abuse; (3) report of being sexually assaulted in the past year. Justification for including this question again is due to documented underreporting of sexual assaults. This particular question is found in a different location of the protocol embedded in the Life Events Inventory (Monaghan, Robinson, & Dodge, 1979).

A second comparison category from the ACE study is from the category of household dysfunction regarding mental illness: (1) “*Was a household member depressed or mentally ill?* (2) *Did a household member attempt suicide?*” In contrast, the items in this study for the same category of parental mental illness are: (1) “*In the past year have you experienced your parent having emotional/psychiatric problems?*; (2) (Mother) *In the past month how often have you felt like hurting or killing yourself?*” As in the ACE

study (Felitti et al., 1998) respondents in this study are defined as exposed to a category if they responded “yes” to 1 or more of the questions within the category.

Household Dysfunction

This composite variable was operationalized as: (1) family substance abuse; (2) maternal mental illness; (3) maternal victimization; (4) parental criminality; (5) parental separation/divorce; (6) residential instability. The questions and response options are presented in Table 7.

Community Violence

This composite was operationalized as a variable based on reports of: (1) seeing someone sexually assaulted, robbed, stabbed, shot at, shot, killed; (2) feeling afraid with adults, in the neighborhood, or at school; (3) knowledge of weapons: people who own a gun, bring a knife to school, bring a gun to school, or other weapons to school; (4) the hearing of gunshots in the neighborhood. The questions and response options for this category are presented in Table 8.

Table 7

Items for Measurement of Household Dysfunction

<i>Variable</i>	<i>Item</i>	<i>Response Options</i>
Family Substance Abuse	(Mother) Have you ever had a drinking or other drug problem? Have any of your family members ever had a drinking or other drug problem?	0= No 1=Yes
Maternal Mental Illness	In the past year you have experienced your parent having emotional/psychiatric problems? <i>In the past month</i> how often, have you felt like hurting or killing yourself?	0=No 1=Yes 1=At least every day 2=Several times a week 3=Several times during month 4=Once during month 5=Not at all
Maternal Victimization	Have you ever been abused by anyone either verbally, physically, sexually or psychologically?	0=No 1=Yes
Parental Criminality	In the past year you have experienced..... a. your parent going to jail/prison for a year or more? b. your parent going to jail/prison for 30 days or less?	0=No 1=Yes
Parental Separation/ Divorce	In the past year you have experienced: a. separation of your parents? b. divorce of your parents?	0=No 1=Yes
Residential Instability	How many places have you lived in the past year? [include current residence]	Continuous

Table 8

Items for Measurement of Exposure to Community Violence

<i>Variable</i>	<i>Item</i>	<i>Response Options</i>
Exposure to violence	Have you ever seen someone....	0=No
	a. sexually assaulted?	1=Yes
	b. robbed?	
	c. stabbed?	
	d. shot at?	
	e. shot?	
	f. killed?	
Feeling Afraid	Do you feel afraid ...	1=Very
	a. with adults?	2=Somewhat
	b. outside in neighborhood?	3=Not very
	c. at school?	
Presence of weapons	Do you know kids who...	0=No
	a. own a gun?	1=Yes
	b. bring a knife to school?	
	c. bring a gun to school?	
	d. bring other weapons to school?	
Presence of gun shots in the neighborhood	How often, if ever, do you hear gunshots in your neighborhood?	1=Almost every day/night
		2=Once or twice a week
		3=Once or twice a month
		4=Once or twice a year
		5=Have never heard
		gunshots

Outcome Variables

Depression

Depression was measured utilizing the Center for Epidemiology Studies Depression Scale (CES-D) (Radloff, 1977), a self-report 20-item measure of depression. The CES-D is designed to measure depressive symptomatology in the general population for both adolescents and adults. With adolescents, the CES-D has demonstrated positive predictive value in measuring major depression, dysthymia, and psychiatric disorder (Garrison et al., 1991). The line of questioning instructs respondents to indicate the frequency they have experienced a feeling during the past week on a 4-point scale.

Response options include 1= Rarely or none of the time (less than 1 day); 2 = Some or a little of the time (1-2 days); 3 = Occasionally or a little of the time (3-4 days); 4 = Most or all of the time (5-7 days). In order to score the CES-D the four positively worded items are reverse coded in order to fit the direction of responses for all items. Each item is then recoded on a 4-point scale to provide a range of zero to three; 0 for “Rarely or none of the time” to a score of 3 for “Most or all of the time”. The scores are computed by summing the recoded items. The sum of the 20 items provides a range from zero to 60 with scores greater than or equal to established cut-offs indicating potential depression. The items for the CES-D are presented in Table 9.

Table 9

Items Comprising the CES-D Scale

Please tell me which answer best describes how often you felt or behaved this way in the past week....

- a. I was bothered by things that usually don't bother me.
 - b. I did not feel like eating; my appetite was poor.
 - c. I felt that I could not shake off the blues even with help from my family or friends.
 - d. I felt that I was just as good as other people.
 - e. I had trouble keeping my mind on what I was doing.
 - f. I felt depressed.
 - g. I felt that everything I did was an effort.
 - h. I felt hopeful about the future.
 - i. I thought my life had been a failure.
 - j. I felt fearful.
 - k. My sleep was restless.
 - l. I was happy.
 - m. I talked less than usual.
 - n. I felt lonely.
 - o. People were unfriendly.
 - p. I enjoyed life.
 - q. I had crying spells.
 - r. I felt sad.
 - s. I felt that people disliked me.
 - t. I could not get "going".
-

The CES-D scale is deemed highly reliable for both adult and adolescent populations with internal reliability ranging from .82 (Taylor & Turner, 2002) to .85 (Radloff, 1977). There is evidence of reliability for using the CES-D for adolescents ranging in age from 12 to 18, the alpha values obtained for groups of both male and females ranged from 0.87 (Garrison et al., 1991) to .91 (Reifman & Windle, 1995). The commonly accepted cut-off score for “clinical caseness” in adults is a score of 16 or above (Kalil et al., 2001). For adolescents, Garrison and colleagues (1991) determined that the optimal screening cut points are 22 or above for females and 12 or above in male adolescents (12-15 years old) or grades 7th and 8th.

For older adolescents (16 to 18 years old) or grades 9th through 12th these authors recommend a cut off score of 24 or above for females and 22 in males (Garrison et al., 1991). In this study, given the ages range from 13 to 18 at the start of the study both cut point scores for the two different groups of young adolescents and older adolescents have been implemented. Specifically, from 12 up to 15 years of age have a cut off score of 22 and 16 to 18 years of age cut off score of 24. In the last two years of the study, those ranging from 18 years old and above are scored at the cut-off score for “clinical caseness” in adults a score of 16 or above (Kalil et al., 2001). In the first year of the study, the internal reliability for the CES-D obtained an alpha of 0.83.

In this study depression scores were used both as continuous and nominal variables. As a continuous variable, the depression score was used in the preliminary analyses in establishing correlations across each of the four years of the study. As a dichotomized variable, scored as (1 = the presence of depression) and (0 = absence of depression), it was used in selected logistic regression models to distinguish between

groups. In order to assess change in depression from Year 1 to Year 4 of the study a change score was developed from the CES-D continuous score using the following equation: $(CESD_{Year\ 4} - CESD_{Year\ 1} = \square CESD)$.

Suicide Ideation

Suicide ideation is measured using one item taken from the Pediatric Symptom Index (Jellinek, Murphy & Burns, 1986). Respondents were asked during the past month (How often have you felt like hurting or killing yourself?). Response options were (1= often); (2 = sometimes); or (3 = never). For scoring the entire instrument, these responses were reversed scored to (2 = often); (1= sometimes); (0 = never). As a continuous variable, it was used in the preliminary analysis to establish correlations.

As dichotomized, this variable was collapsed and recoded to “0” = (Never) and “1” (Any Suicide Ideation). In order to assess change in suicide ideation from Year 1 to Year 4, a change score was developed for the suicide ideation (continuous) variable utilizing the following equation: $(SUICIDE_{Year\ 4} - SUICIDE_{Year\ 1} = \Delta SUICIDE IDEATION)$.

Mental Distress

Due to small sample size a final outcome variable was also constructed by combining those scoring above the cut off score on the CESD in each year with those with suicide ideation in the same year. These scores were developed in each year as continuous variables and then dichotomized and recoded into a final variable that was scored as “0” = (Never) and “1” (Any Mental Distress) for ever having experienced mental distress during the entire study.

Data Analysis

A logistic regression analysis was employed to adjust for the potential confounding effects of age, race, educational attainment, and teen pregnancy on the relationship between the number of adverse exposures and depression and suicide ideation. To test for the dose response relationship of adolescent adverse exposures the number of exposures by category were entered as a cumulative dichotomous variable (0, 1, 2, 3, 4 ...) for each dependent variable.

The measure of exposure was simply the sum of exposures across domains; the number of exposures ranged from “0” (unexposed) to “12” (exposed to all categories). A description for the univariate, bivariate, and multivariate analyses follows.

Level One Analyses

To prepare the data for analysis, frequency distributions were generated to test for variability, to assess the degree of missing data, and to assess prevalence for each of the variables. Where indicated response options may have been collapsed based on distributions. For continuous variables, means, standard deviations, skewness, and kurtosis were generated.

Behavioral and Demographic Control Variables

Demographic and behavioral variables used to control for confounding effects included: (1) daughters age, (2) daughter race/ethnicity, (3) educational status, and (4) teen pregnancy. The educational status variable was constructed utilizing items from across all four years of the study that specifically asked about enrollment in school, reason for not being enrolled, whether a high school diploma or GED was attained and

whether or not the respondent had participated in any post secondary studies. Once again, due to limited sample size, two of the demographic variables were recoded.

The race/ethnicity variable was recoded (0 = white and, 1 = non-white) for logistic models and age was recoded into (0 = \leq 15 years old and, 1 = \geq to 16 years old) reflecting the two different cut off scores for the CES-D of 12 to 15 years of age and 16 to 18 years of age suggested in the literature (Garrison et al., 1991; Kalil et al., 2001).

Predictor Variables

Data representing any of the adverse adolescent experiences within each category of exposure were re-coded as dichotomous responses of “0” (no event) or “1” (yes, an occurrence of the event). The four exceptions requiring that items be re-coded are as follows:

(1) *(Mother) In the past month how often have you felt like hurting or killing yourself?* (1=At least every day, 2 =Several times a week, 3=Several times during the month, 4=Once during the month, 5=Not at all). This item was recoded to (0= Not at all, 1= Any positive response in options 1-4).

(2) *How often, if ever, do you hear gunshots in your neighborhood?* Responses have been recoded into a categorical variable: (0=Never, 1= one or more times in past year).

(3) *Do you feel afraid ...a.) with adults; b.) outside in neighborhood; c.) at school?* (1=Very, 2= Somewhat, 3= Not Very). The item has been recoded into (0= Not Very and /somewhat, / 1= Very).

(4) *How many places have you lived in the past year?* This was originally a continuous variable. The response option was recoded such that any response of

more than one move during the four year study has been recoded into a (0 = no / 1 = moved).

Composite Variables. Respondents were defined as exposed to a category of event if they responded “yes” to one or more of the questions within the category. These variables were constructed based on data across the four observations. First, a variable was computed to determine the number of times an event was reported across the four points of time.

The resulting variable could range from zero if an adolescent reported no exposure during any of the interviews to four if they reported exposure during each interview. Next, each of these continuous exposure variables, for every event category, were recoded into different dichotomous variables of 0 = not exposed to 1 = exposed. Specifically, a zero was given to adolescents who reported no exposure across the four points of time or a one if they reported any exposure at any point during the study. If a participant reported an event at one point in time, the event was counted as occurring. If they reported the adverse exposure at two or more times, they still only received a score of “1”. This approach offers an index of exposure but not the level of severity or chronicity of an exposure.

Outcome Variables

The dependent variables (CES-D scores, suicide ideation, and mental distress) were assessed across all four points of time. Continuous outcome variables for each year were preserved for correlations and linear regressions and then dichotomized for purposes of logistic models as well as the development of an overall mental distress outcome variable.

Level Two Analyses

The second level of analysis tested bivariate associations for each of the control, predictor, and outcome variables. Just as with the univariate analysis, separate analyses were conducted for each level of variable. In order to establish correlation coefficients, Pearson correlation matrices were computed for each of the individual items used to construct the cumulative scores for each category of adverse exposure. Measures of association examined the relationships between each socio-demographic variable (i.e., age, race/ethnicity, and education), individual predictor items, and outcome variables.

As this study seeks to replicate previous adverse childhood exposures studies, as in the ACE studies, the same methods were employed for the overall construction of the cumulative indices within each of the categories of adverse adolescent exposures: (1) adolescent victimization; (2) household dysfunction; and (3) community violence.

A cumulative variable for each of the observed experiences has been constructed based on dichotomous variables described in the previous section. The use of an overall cumulative measure of traumatic events or “adverse adolescent exposures” has been recommended to provide a more accurate indicator of stress leading to poor outcomes (Smith, Leve, & Chamberlain, 2006). A model for testing the cumulative effect of adverse events on depression and suicide ideation is depicted in Figure 2.

The three major constructs of concern (e.g. victimization, household dysfunction, and community violence) were operationalized by the items included in the developed composite scores. A sum of each of these three scores created the overall or total cumulative score of adolescent adverse exposures experienced. A respondent was defined as exposed to an event if they respond “yes” to one or more of the questions within a

specific category. For each respondent, the number of adverse adolescent exposures (AAE) was summed to create an AAE score, which ranged from “0” (unexposed) to “12” (exposed to all categories).

The final AAE score was an interval variable used as a summary measure for the cumulative effect of multiple exposures to: (1) adolescent victimization; (2) household dysfunction; and (3) community violence.

In summary, the construction of the predictor variables was a three-step process:

Step One – A case count for each item in 12 dimensions reported across four points in time: (0 = No Exposure) (4 = Exposure Each Year).

Step Two – Each continuous *adverse exposure* was recoded in to a dichotomized variable: (0 = No Exposure) (1= Exposed).

Step Three – Computed AAE Score: A sum of exposures across 12 dimensions (range 0 to 12).

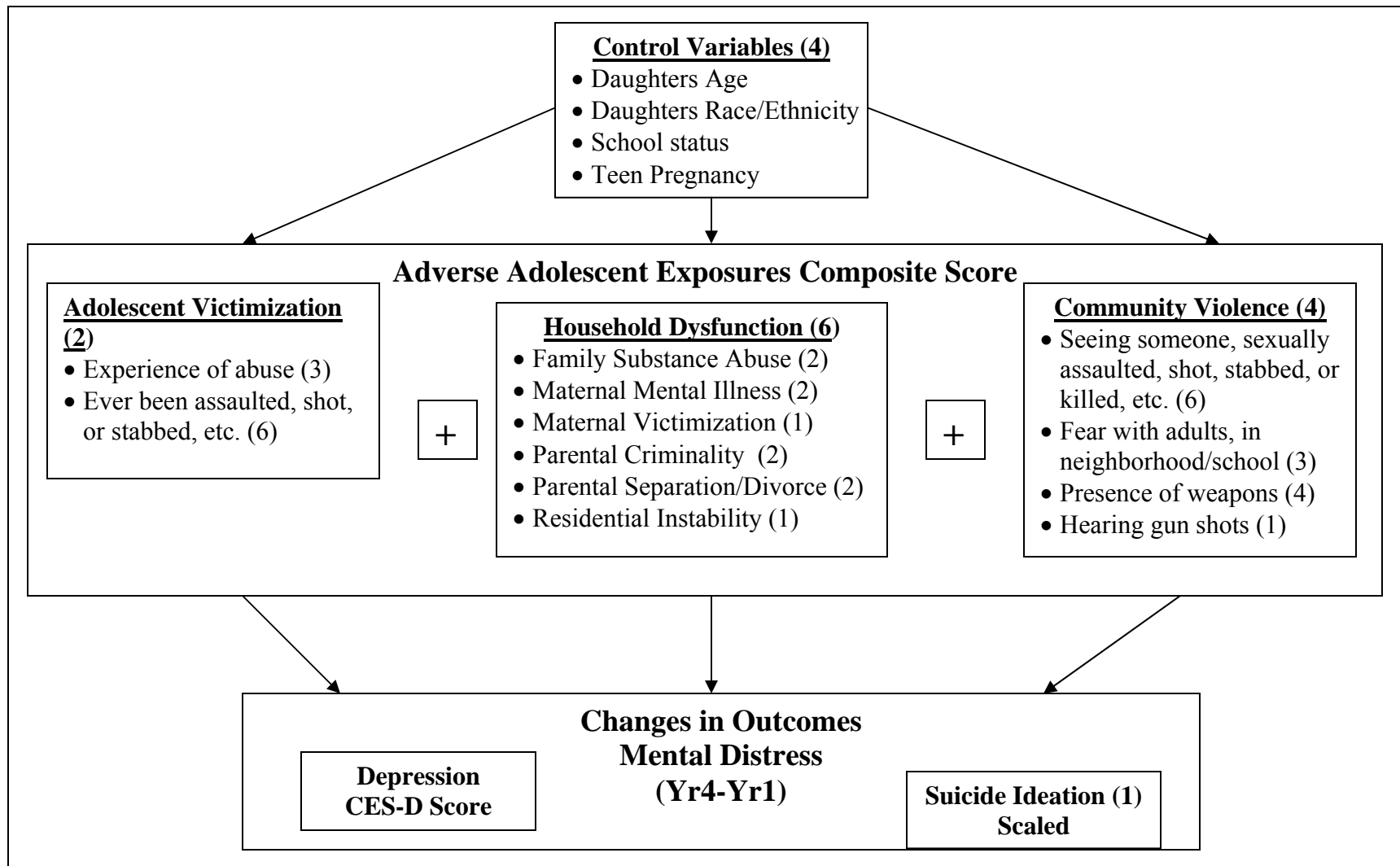


Figure 2. Operational Model for Testing the Cumulative Effects of Adverse Exposures on Depression and Suicide Ideation

Level Three Analyses

To test the first three hypotheses, the individual impact of exposures per category, the adjusted odds ratios (ORs) and 95% confidence intervals (CIs) from logistic regression models were used. In order to adjust for confounders, socio-demographic variables of age, race, educational status, and teen pregnancy were entered into each of the models first to isolate the relationships of adverse exposures on the presence of depression, suicide ideation, and overall mental distress.

To test hypotheses four and five, the impact of cumulative adverse exposures to the level of depression, suicide ideation, and overall mental distress the number of exposures were entered as a single ordinal variable (0, 1, 2, 3, 4 ...) variable into multivariate regression models with continuous outcome variables of depression, suicide ideation, mental distress, and computed change scores. Due to small sample size this procedure was repeated with a grouped AAE score. The first cut off score of four adverse exposures was based upon the general consensus within the risk factor literature, which states that having 4 or more risk factors increases poor outcomes. Specifically, Kazdin and colleagues (1997) found that exposure to one risk factor did not necessarily lead to a poor outcome, but that the presence of four or more risk factors, resulted in a 10-fold increase in psychological distress. This was validated by researchers investigating the enduring impact of adverse exposures across the lifespan in children resulting in both mental and physical distress whereby persons with greater than or equal to 4 exposures were at greater risk of poor outcomes (Anda, Felitti, Bremner, Walker, Whitfield, Perry, Dube, & Giles, 2006).

The decision to establish another cut off score at seven or more was based upon a previous study conducted by Dube and colleagues (2001) where these researchers found that having a score of at least seven adverse exposures increased suicide attempts by over 50 fold in adolescents and 30 fold in adults. Kessler and colleagues (1997) included twenty-six adversities that encompassed loss events, parental factors, and personal adversities. A multivariate analyses revealed additive effects on the probability of disorder, however, it was noted in their study that after the sixth adversity was added into the equation the researchers were unable to detect an effect.

Design Strengths and Limitations

A primary strength of the study is that this is a cohort sample, which by design provides stronger evidence for exposure-disease associations than in other sampling strategies as it permits direct determination of risk (Friis & Sellers, 1999). An additional strength of the study is that interviews were conducted face to face with trained interviewers.

In regards to study sample limitations, the most common limitation of longitudinal cohort studies is loss of data due to attrition. However, there were high rates of retention for the entire length of the study as noted previously, thus creating a minimal limitation for this sample. The data for this study were originally collected to monitor the risk and protective processes across developmental, familial, and environmental domains on the general well being or resiliency of a cohort of adolescent girls growing up in families receiving assistance. Although this study proposed to look at similar risk and protective processes, the outcomes under investigation were depression and suicidality.

Another constraint within this data set is that there were no specific instruments incorporated in the protocols screening for suicidal thoughts or behavior.

Another important issue in secondary data analysis is access to documentation and coding. A strength of this study is that though I was not part of the original conceptualization of the study, I have worked closely with the quantitative data and have permission from the principal investigator, Dr. Roger Boothroyd to use the data.

Another strong point is that I have access to the research team to address questions that may arise regarding the database and the original codebook and transcripts.

The limitations or restrictive weaknesses in the study design are as follows:

1. The small sample size (n=125) is a limitation, restricting the number of variables that can be utilized in analytic models.
2. Assessment of depression using the CES-D scale (Radloff, 1977) is limited to measurement of depressive symptomatology, not for meeting criteria for clinical depression.
3. The development of the composite variables for the AAE score is based on similar composites developed by Felitti and colleagues (1998 utilizing select questions from various scales not originally intended for these purposes.
4. Data are based on retrospective recall and may result in biases toward the null, given the evidence for longitudinal studies that have demonstrated that retrospective self-reports of adverse exposures are likely to underestimate actual occurrence (Della et al., 1990).
5. There may be mediators or moderators of the relationship between adverse exposures and depression other than the factors examined.

6. Age variations in the adolescent girls (13-17) in the first year of the study may have contributed to differences in perceptions and reports of adverse experiences.

Conclusion

Although growing up in poverty is associated with increased likelihood of teenage pregnancy, academic failure, substance abuse, and suicidality (Martin, Andersen, Lynch & Kupper, 1999), this presents an incomplete picture of all the mechanisms at play when considering the accompanying stressors that may not befall an adolescent with a more advantaged background (Musick, 1993). The independent relationship of welfare and depression has been established in cross-sectional studies (Dooley & Prause, 2002). There is also literature demonstrating a strong, graded relationship between adverse exposures and depression as well as suicide attempts in adult women. However, little attention has been devoted to the role of adverse exposures as antecedents for depression or as a factor that may influence suicide ideation over time in a well-defined adolescent population.

In summary, this study adds to the literature by broadening the spectrum of adverse exposures often studied for adolescents. The indicators included were: personal victimization, living with a household member that had been incarcerated, mentally ill, victimized, or using substances, knowing or witnessing the victimization of another, reporting fear of going out in the neighborhood, and the presence of weapons or gunfire. The paucity of literature addressing the cumulative effect of multiple stressors and multiple agents influencing adolescents transitioning into adulthood in the context of poverty highlights the need for further investigation to assess the potential ripple effect of such exposures on depression and suicide ideation.

CHAPTER FOUR

RESULTS

The results are reported by level of analyses. Level one provides the descriptive statistics of both the predictor and outcome variables. Level two provides the results of analyses exploring associations and significance levels for the predictor and the outcome variables. The final section, level three, presents the results of the logistic and multiple regression analyses used to examine each hypothesis.

Level One Analyses

Frequency distributions have been used to assess the variability, the degree of missing data, and the prevalence for each of the variables. Where indicated response options have been recoded based on distributions or for specific analytic procedures.

Control Variables

Demographic and behavioral variables used to control for confounding effects were: (1) daughters' age, (2) daughters' race/ethnicity, (3) educational status, and (4) teen pregnancy. The mean age at the start of the study was 16 (range: 14 to 18 years of age, SD=1.055). The racial distribution of the adolescents was 32% white, 41.6% black, 23.2% Hispanic, and 3.2% other. In regards to educational status, by the end of the entire study 27.2% of the daughters had dropped out of school, 16% were still enrolled in high school, 11.2% had a high school diploma or GED, and 45.6% had some post secondary

education (e.g. college, technical, or business school). By the end of the study, 48.8% (61) of the girls had experienced at least one pregnancy.

Predictor Variables

Definitions and prevalence of each of the 33 items used to construct the predictor composite variables across four points in time are presented in Table 10. As stated above these percentages are based upon the report of one adverse exposure per item across twelve dimensions during the four years of the study. The results at each step of the development for the predictor variables follow the same procedure. In step one, the predictor items reported across four points in time ranged from 0 = No Exposure to 4 = Exposure Each Year.

In step two, each continuous *adverse exposure* was recoded into a dichotomized variable: 0 = No Exposure to 1 = Exposed. The prevalence rates presented are based on the report of at least one exposure for any item across the four years.

Prevalence estimates for individual items across the four years ranged from 1.6% (2) adolescents being shot to 63.2% (79) of the adolescents knowing kids who owned a gun. The next highest rate of exposure was in residential mobility where reports of having moved more than one time 61.6% (77) during the four years ranged from 0 to 13 moves. Within the category of victimization, 49.6% (62) reported abuse with 75.2% (94) experiencing direct victimization of being bullied, beaten up, robbed, stabbed, shot at, or shot. Within the category of household dysfunction, overall exposure was reported at 89.6% (112). Over 61% reported high levels of residential mobility, followed by familial substance abuse (52.8%), and maternal abuse (43.2%). Within the category of community

violence 92.8% reported exposures. The highest category of exposure was knowledge of weapons among peers; 72.8% (91). Witnessing the victimization of another during their lifetime followed this dimension. The highest rate reported within witnessing the victimization of another were adolescents having seen someone being robbed (42.4%). Both categories of feeling afraid and hearing gunshots in the neighborhood were reported at the same rate across the four years (36%). Overall, across the three categories of adverse exposures, adolescents reported that community exposures were the highest 92.8% or (116), followed by household dysfunction 89.6 % (112), and lastly, personal victimization 80% (100).

The final step in the development of the AAE score and the results are presented below. Specifically, the level of positive responses for 12 dimensions within the three categories of victimization, household dysfunction, and community violence were summed providing exposures ranging from: 0 to 12.

The results of adolescents reporting exposures, presented in Table 11, found that no adolescent reported exposure to all 12 of the categories. Two of the adolescents reported zero exposures and two adolescents reported the highest score of 11 exposures. A total of 5.6% or (7) adolescents reported experiencing more than ten adverse exposures. The mean number of adverse adolescent exposures was 5.86 events (SD=2.493). There was a bi-modal distribution of exposures for those receiving a score of 5 and 6 exposures.

Table 10

Definition and Prevalence of each Item by Category for Adverse Exposures

<i>Category of Adolescent Adverse Exposures (12)</i>	<i>Percent</i>	<i>N=125</i>
<i>Victimization: (2)</i>	80.0%	(100)
1) Abuse/Maltreatment	49.6 %	(62)
Have you been verbally, physically, sexually or psychologically abused?	44.8 %	(56)
Have you ever been sexually assaulted?	30.0%	(38)
In the past year have you experienced being sexually assaulted?	11.2%	(14)
2) Have you ever been... (in the past year have you been)	75.2%	(94)
a. bullied/pushed around	54.9%	(68)
b. beaten up	26.4%	(33)
d. robbed	35.2%	(44)
e. stabbed	6.4%	(8)
f. shot at	9.6%	(12)
g. shot	1.6%	(2)
<i>Household Dysfunction: (6)</i>	89.6%	(112)
1) Family Substance Abuse (Mother)	52.8%	(66)
Have you ever had a drinking or other drug problem?	23.2%	(29)
Have any of your family members ever had a drinking/drug problem?	48.0%	(60)
2) Maternal Mental Illness	36.0%	(45)
Have you experienced parent having emotional/psychiatric problems?	34.4%	(43)
<i>In past month</i> how often have you felt like hurting or killing yourself?	3.2%	(4)
3) Maternal Abuse: Any physical, sexual or psychological abuse	43.2%	(54)
4) Parental Criminality: Any parental incarceration during study.	28.8%	(36)
5) Parental Separation/Divorce: In the past year.	25.6%	(32)
6) Residential Mobility: More than one move during entire study.	61.6%	(77)
<i>Community Violence : (4)</i>	92.8%	(116)
1) Have you ever seen someone being...	68.8%	(86)
a. sexually assaulted	20.0%	(25)
b. robbed	42.4%	(53)
c. stabbed	27.2%	(34)
d. shot at	40.8%	(51)
e. shot	31.2%	(39)
f. killed	20.8%	(26)

<i>Category of Adolescent Adverse Exposures (12)</i>	<i>Percent</i>	<i>N=125</i>
2) Do you feel afraid ...	36.0%	(45)
a. with adults	4.0%	(5)
b. outside in neighborhood	15.2%	(19)
c. at school	20.8%	(26)
3) Presence of Weapons: Do you know kids who...	72.8%	(91)
a. own a gun	63.2%	(79)
b. bring a knife to school	37.2%	(47)
c. bring a gun to school	10.4%	(13)
d. bring other weapons to school	16.0%	(20)
4) Do you hear gunshots in your neighborhood?	36.0%	(45)

Table 11

<i>Number of Adverse Adolescent Experiences (AAE Score)</i>		
<i>(AAE SCORE)</i>	<i>Frequency (N=125)</i>	<i>Percent</i>
0	2	1.6
1	3	2.4
2	9	7.2
3	10	8.0
4	11	8.8
5	19	15.2
6	19	15.2
7	17	13.6
8	14	11.2
9	14	11.2
10	5	4.0
11	2	1.6

Outcome Variables

The dependent variables were assessed across all four points of time. For adolescents ranging in age from 12 to 15 years of age were a cut-off score for depression was computed at 22 based on the literature (Garrison et al., 1991). Those adolescents ranging in age from 16 to 18 received a cut-off score of 24. In the last two years of the

study those ranging from 18 years old and above were scored at the cut-off score for “clinical caseness” for adults as done in previous studies with a score of 16 or above (Kalil et al., 2001).

The overall prevalence rates for the outcome variables are presented in Table 12. This includes depression scores above the criterion cut-off as computed using the above ages and scores at each point in time, the prevalence of suicide ideation at each point in time, and a combined variable constructed for overall mental distress due to small cell sizes. Those cases meeting both criteria for CESD depression score and reporting suicide ideation were only given a score of “1” for overall mental distress, the remainder of the cases were independent of each other. The overall distribution of suicide ideation scores remained remarkably consistent for the four-year period. Where there was a doubling in the incidence of depression by the fourth year, and an almost ten percent increase in mental distress by the fourth year.

Table 12

Prevalence of Outcome Variables across Four Years

	<i>Year 1</i>		<i>Year 2</i>		<i>Year 3</i>		<i>Year 4</i>	
	<i>%</i>	<i>(n)</i>	<i>%</i>	<i>(n)</i>	<i>%</i>	<i>(n)</i>	<i>%</i>	<i>(n)</i>
Depression Above Criterion*	14.4%	(18)	20.0%	(25)	20.0%	(25)	29.6%	(37)
Suicide Ideation	5.6%	(7)	5.6%	(7)	4.8 %	(6)	5.6%	(7)
Any Mental Distress	22.6%	(17)	24.0%	(30)	22.4 %	(28)	31.2%	(39)

Note. Cut-off Score adjusted for adolescents’ age.

Level Two Analyses

Bivariate techniques demonstrating the associations found between individual items comprising the composite variables developed for each of the categories and the AAE score, socio-demographics and outcomes follow in this section. Correlations among the individual items used to develop the three composite predictor variables as well as the dichotimized outcome variables were examined and are presented in Table 13.

Relationship Among Predictor Variables

Amongst the individual item predictors the strongest correlations were found between childhood exposure to physical, psychological, or sexual abuse and exposure to other forms of personal victimization ($r = .347$), parental mental illness ($r = .423$), maternal experience of abuse ($r = .233$), witnessing victimization ($r = .323$), and knowledge of weapons ($r = .319$). All of these items were positively correlated at a significance level at less than the $p < .01$.

Moderate correlations at less than $p < .05$ were found between the adolescent's experience of abuse and having an incarcerated parent ($r = .182$), parental divorce or separation ($r = .188$), and both the primary outcome variables of depression ($r = .204$) and suicide ideation ($r = .152$). Exposure to personal victimization was significantly associated at $p < .01$ level with parental mental illness ($r = .272$), maternal experience of abuse ($r = .239$), knowledge of weapons ($r = .232$), and the outcome of depression ($r = .246$). The relationship between personal victimization and witnessing community violence were significant at the level of $p < .05$ ($r = .173$).

Family substance abuse is significantly correlated at $p < .01$ levels with maternal experience of abuse ($r = .275$), having a parent incarcerated ($r = .354$), and residential

moves ($r = .308$). Items significantly correlated with parental mental illness below the .01 level are maternal abuse ($r = .288$), incarcerated parent ($r = .259$), and knowledge of weapons ($r = .309$). Witnessing violence ($r = .181$) and the outcome of suicide ideation ($r = .193$) were significant at less than .05 levels. Maternal exposure to abuse is correlated at the $p < .01$ level with knowledge of weapons ($r = .243$), and the outcome of suicide ideation ($r = .246$). Other correlates positively associated with family substance abuse at $p < .05$ are incarcerated parent ($r = .194$) and witnessing community violence ($r = .169$). Additional significant relationships with an incarcerated parent included parental separation or divorce ($r = .153, p < .05$).

At the ($p < .01$) level residential moves ($r = .248$), witnessing violence ($r = .276$), and the outcome variable of depression were found to have a negative correlation ($r = -.212$). Parental separation and divorce also was negatively correlated with depression ($r = -.224$). This finding suggests that these adolescents may have experienced some protective mechanisms with the separation of a family member.

As would be expected witnessing violence and knowledge of weapon carrying in the community were significantly related at ($p < .01$) ($r = .325$). Being afraid was associated with the outcome variables of suicide ideation ($r = .240, p < .01$) and depression ($r = .159, p < .05$). Knowledge of weapons demonstrated an association with suicide ideation at ($r = .159, p < .05$).

Relationship Among Socio-Demographics and Predictor Variables

The socio-demographic characteristics by the number of adverse exposures reported are presented in Table 14. While not statistically significant, those reporting the majority of adverse exposures tended to be 16 years or old at the time of the first

interview. Yet, 50% of those 15 and 18 years old at the time of the first interview reported experiencing greater than or equal to seven or more adverse exposures. The race variable was significant for differences in experience of exposures $\chi^2 = (6, N=125) = 14.129, p = .028$. When recoded into a dichotomized categorical variable of white/non-white, non-whites were significantly more likely to have an experience of any adverse exposure $\chi^2 (2, N=125) = 7.052, p = .03$. However, those with a score of seven or more adverse exposures were more likely to be white adolescents.

Neither educational status nor pregnancies were significant in regards to adverse exposures. However, interestingly, those who have experienced over seven adverse exposures had dropped out of high school at some point during the study or to the contrary had been enrolled in post high school education. This finding is in alignment with two theories of risk. Specifically, that greater adversity is either indicative of poor outcomes (Kazdin et al., 1997) or that stressors actually lead to an enhanced competence (Luthar & Zigler, 1991) through a compensatory effect, which increases striving.

Relationship Among Socio-Demographics and Outcome Variables

The prevalence of outcomes for suicide ideation and depression by socio-demographic characteristics are presented in Table 15. Within the bivariate analysis of associations between socio-demographic variables and outcome variables, only age ($r = .180, p .04$) and pregnancy ($r = .231, p = .01$) demonstrated a positive association that was significant with depression. Specifically, for 14 year olds 3 out of 10 reported suicide ideation, while of the 18 year olds 7 out of 10 scored above criterion score for depression. This finding is consistent with the literature in that female adolescent's depressed feelings begin to increase from about age 13 upward until they stabilize; the explanations remain

unclear, but vary from hormonal influence, economic insecurity, to greater sensitivity to peer disruption as during frequent moves (Ge et al., 1994).

Adolescents reporting ever being pregnant were 2.6 times more likely to experience an elevated depression score (95% CI 1.3 – 5.3) ($p = .01$). As expected, the remainder of the socio-demographic variables were not significantly associated with either of the outcome variables. There was a notable visual difference in the proportion of Hispanic youth reporting suicide ideation versus whites and blacks, however not significantly different. Nevertheless, a separate analysis was run with only those reporting Spanish origin with suicide ideation to assess difference; no significant relationship was found $\chi^2 = (1, N=125) = .840, p = .359$. A possible explanation for the increased suicide ideation found with time on TANF, may be found in the stress-vulnerability model proposed by Rich and Bonner in 1987 (as cited in the GAP Report No. 140, 1996).

Specifically, if one assumes that there is a combination of factors that may contribute to the stress and vulnerability of an adolescent female, such as limited resources and high levels of residential mobility, combined with exposure to victimization, then a possibility of increased risk for suicide ideation seems plausible. The findings of a decrease in depression with time on TANF are in line with previous findings of studies of female adolescent's perceptions of parental economic stress and depression (Frojd et al., 2006). An adolescents' positive adjustment to the economic circumstances of their mothers receiving public assistance may be a function of their

increasing age and ability to develop personal resources and behavioral options (Yagub, 2002).

Odds Ratios of Individual Items and Outcome Variables

The odds of individual items predicting suicide ideation (Table 16) or depression (Table 17) confirm the Pearson correlations found. The predictors increasing the odds of reporting suicide ideation were abuse OR 3.4 (95% CI 1.2 – 10.1) ($p = .023$), parental mental illness OR 2.9 (95% CI 1.1 -7.9) ($p = .031$), maternal abuse OR 3.4 (95% CI 1.2 – 9.8) ($p = .020$), and fear of the outside OR 3.7 (95% CI 1.4 – 10.5) ($p = .007$). Knowledge of weapons in the hands of peers approached significance with the odds of developing suicide ideation at 3.7 (95% CI 0.8 - 16.9) ($p = .076$). The odds of adolescents having been victimized and scoring above the cut off score for depression are OR 3.5 (95% CI 1.4 – 8.4) ($p = .005$).

Table 13

Correlation Matrix of Individual Item Predictor Variables and Outcomes

	1	2	3	4	5	6	7	8	9	10	11	12
1. Abuse	—											
2. Victim	.347**	—										
3. Family Substance Abuse	-.024	-.061	—									
4. Parental Mental Illness	.423**	.276**	.008	—								
5. Maternal Abuse	.233**	.239**	.275**	.288**	—							
6. Parental Incarceration	.182*	.079	.354**	.259**	.194*	—						
7. Parental Sep/Divorce	.188*	.125	-.143	.095	.118	.153*	—					
8. Residential Moves	-.006	.080	.308**	.112	.058	.248**	-.065	—				
9. Witnessed Violence	.323**	.173*	.124	.181*	.169*	.276**	.078	.143	—			
10. Afraid Outside	.056	.083	.008	.028	.086	-.109	-.134	-.025	.001	—		
11. Knowledge of Weapons	.319**	.232**	-.002	.309**	.243**	.111	.111	.035	.326**	-.028	—	
12. Heard Gun Shots	-.044	.122	.075	.028	-.048	-.072	.057	.078	.145	.097	.009	—
Any Suicide Ideation	.204*	.140	-.046	.193*	.216**	-.122	-.095	-.124	.093	.240**	.159*	-.132
Any Depression	.152*	.246**	-.037	.025	.114	-.212**	-.224**	.120	.118	.159*	.074	.092

Note. **Correlation is significant at the 0.01 level.

*Correlation is significant at the 0.05 level.

Table 14

Socio-Demographic Characteristics by Outcomes

	<i>Number of Adverse Adolescent Exposures (N=125)</i>			
	<i>0 – 4 AAE</i>	<i>5 – 6 AAE</i>	<i>7 – 11 AAE</i>	<i>Total in Class</i>
<i>Age at first Interview</i>				
14	40.0%	10.0%	50.0%	8.0%
15	20.8%	29.2%	50.0%	19.2%
16	30.4%	26.1%	43.5%	36.8%
17	28.6%	42.9%	28.6%	28.0%
18	20.0%	30.0%	50.0%	8.0%
<i>Race</i>				
White	12.5%	37.5%	50.0%	32.0%
Black	40.4%	26.9%	32.7%	41.6%
Hispanic	31.0%	20.7%	48.3%	23.2%
Other	0.0%	75.0%	25.0%	3.2%
<i>Education</i>				
Dropped Out	20.0%	32.4%	47.1%	27.2%
In high school	30.0%	30.0%	40.0%	16.0%
High School or GED	50.0%	35.7%	14.3%	11.2%
Post High School	26.3%	28.1%	45.6%	45.6%
<i>Ever Pregnant</i>	26.2%	32.8%	41.0%	48.8%
<i>Length of Time on TANF:</i>				
Less than 6 Months	14.3%	57.1%	28.6%	23.3%
Six Months to 1 Year	0.0%	50.0%	50.0%	20.0%
Over 1 Year	17.6%	29.4%	52.9%	56.7%
All Participants	28.0%	30.0%	42.0%	100.0%

Note. Rows within factors sum to 100.

Table 15

Socio-Demographic Characteristics by Outcomes

<i>Characteristic</i>	<i>Any Suicide Ideation</i>		<i>Any Depression</i>	
	<i>No</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>
<i>Age at first Interview</i>				
14	70.0%	30.0%	90.0%	10.0%
15	95.8%	4.2 %	50.0%	50.0%
16	82.6%	17.4%	52.2%	47.8%
17	85.7%	14.3%	51.4%	48.6%
18	80.0%	20.0 %	30.0%	70.0%
<i>Race</i>				
White	85.0%	15.0%	55.0%	45.0%
Black	86.5%	13.5%	51.9%	48.1%
Hispanic	79.3%	20.7%	51.7%	48.3%
Other	100.0%	0.0%	50.0%	50.0%
<i>Education</i>				
Dropped Out	76.5%	23.5%	44.1%	55.9%
In High School	95.0%	5.0%	65.0%	35.0%
High School or GED	85.7%	14.3%	50.0%	50.0%
Post High School	86.0%	14.0%	54.4 %	45.6%
<i>Ever Pregnant</i>	85.2%	14.8%	41.0%	59.0%
<i>Time on TANF</i>				
Less Than 6 Months	100.0%	0.0%	42.9%	57.1%
Six Months to 1 Year	83.3%	6.7%	50.0%	50.0%
Over 1 Year	76.5%	23.5%	64.7%	35.3%

Note. Rows within factors sum to 100%

Table 16

Individual Factors Influence on Any Suicide Ideation

<i>AAE Category</i>	<i>%</i>	<i>Any Suicide Ideation During Study</i>		<i>P value</i>
		<i>Odds Ratio</i>	<i>95% Confidence Interval</i>	
1. Abuse	22.6	3.4	(1.2 -10.0)	.023*
2. Victim	18.1	3.2	(.70 - 14.7)	.118
3. Family Substance Abuse	13.6	.77	(.29 - 2.1)	.607
4. Parental Mental Illness	24.4	2.9	(1.1 -7.9)	.031*
5. Maternal Abuse	24.1	3.4	(1.2 - 9.8)	.020*
6. Parental Incarceration	8.3	.42	(.12- .52)	.185
7. Parental Sep/Divorce	9.4	.50	(.14 - 1.8)	.295
8. Residential Moves	11.7	.50	(.19 - 1.4)	.171
9. Witnessed Violence	17.4	1.9	(.57 - 5.9)	.300
10. Afraid Outside	26.7	3.8	(1.4 -10.5)	.007**
11. Knowledge of Weapon:	18.7	3.7	(.80 - 16.9)	.076
12. Heard Gun Shots	8.9	.42	(.13 - 1.4)	.140

Note. **Correlation is significant at the 0.01 level (One-tailed).

*Correlation is significant at the 0.05 level (One-tailed).

Table 17

Individual Factors Influence on Any Depression

<i>AAE Category</i>	<i>%</i>	<i>Any Depression During Study</i>		<i>P value</i>
		<i>Odds Ratio</i>	<i>95% Confidence Interval</i>	
1. Abuse	54.8	1.9	(.91 - 3.8)	.091
2. Victim	54.3	3.4	(1.4 - 8.4)	.005**
3. Family Substance Abuse	45.5	.86	(.43 - 1.7)	.679
4. Parental Mental Illness	48.9	1.1	(.54 - 2.3)	.779
5. Maternal Abuse	53.7	1.6	(.78 - 3.2)	.205
6. Parental Incarceration	30.6	.38	(.17 - .86)	.016*
7. Parental Sep/Divorce	28.1	.34	(.14 - .80)	.011*
8. Residential Moves	51.9	1.7	(.79 - 3.4)	.179
9. Witnessed Violence	51.2	1.8	(.78 - 3.6)	.189
10. Afraid Outside	57.8	2.0	(.93 - 4.1)	.077
11. Knowledge of Weapons	49.5	1.4	(.63 - 3.1)	.411
12. Heard Gun Shots	53.3	1.5	(.71 - 3.1)	.304

Note. **Correlation is significant at the 0.01 level (One-tailed).

*Correlation is significant at the 0.05 level (One-tailed).

Conversely, there was a negative association with depression for those adolescents not reporting having a parent incarcerated OR .38 (95% CI 0.2 – 0.9) ($p = .016$), nor experiencing a parental separation or divorce OR .34 (95% CI .14 - .80) ($p = .011$).

Relationships of Socio-Demographics and Cumulative Score with Outcome Variables

The bivariate relationships between the control variables, the predictor categories and the cumulative AAE score with each outcome variable are presented in Table 18. The CES-D scores at each year, as well as the outcome variables of suicide ideation, mental distress, and change scores permit the exploration of the impact of exposures across time. Age recoded as (0 = below 16, 1 = 16 or over) is significantly associated with change in suicide ideation over time ($r = .155, p < .05$) and change in overall mental distress ($r = .217, p < .01$). The race variable was not significant with any of the outcome variables at this level of analysis. Education recoded as (0 = enrolled or graduated, 1 = dropped out of high school) is significantly associated with suicide ideation ($r = .182, p < .05$) and any mental distress ($r = .151, p < .05$) during the study. Having experienced any pregnancy was significantly associated with CES-D scores in year 4 ($r = .156, p < .05$), change in CES-D score ($r = .152, p < .05$), and any mental distress during the study ($r = .161, p < .05$).

Further bivariate analyses were conducted to examine both the cumulative AAE score, and the sum of scores from the categories of victimization, household dysfunction, and community violence. Victimization was positively associated with CES-D scores.

In Year 1 ($r = .156, p < .08$), Year 2 ($r = .312, p < .001$), Year 3 ($r = .358, p < .001$), and Year 4 ($r = .233, p = .009$), any suicide ideation across study ($r = .215, p =$

.016), and any mental distress ($r = .273, p = .002$). While the other correlations were not significant in this category, the results across the four years demonstrate an increase in strength of association for victimization and depression.

Household dysfunction was not associated as a category with any of the outcome variables. Community violence exposures, however, demonstrated a strong significant relationship for all four years of depression scores in Year 1 ($r = .238, p = .008$), Year 2 ($r = .305, p = .001$), Year 3 ($r = .244, p = .006$), Year 4 ($r = .282, p = .001$), and overall mental distress ($r = .225, p = .012$). There was no significant relationship with suicide ideation or change in outcomes.

The total AAE score was significantly associated with CES-D scores at Year 2 ($r = .241, p = .007$), Year 3 ($r = .247, p = .005$), Year 4 ($r = .183, p = .041$). However, there was no significant relationship found between the total AAE score and mental distress or suicide ideation or with any of the change scores.

Table 18

Bivariate Associations of AAE Scores with Outcomes across Time

	<i>CESD Year 1</i>	<i>CESD Year 2</i>	<i>CESD Year 3</i>	<i>CESD Year 4</i>	<i>Change in CESD</i>	<i>Any Suicide Ideation</i>	<i>Change in Suicide</i>	<i>Any Mental Distress</i>	<i>Change Mental Distress</i>
<i>Control</i>									
Age	.019	-.102	-.048	-.056	-.079	.007	.155*	.134	.217**
Race	.103	.074	.100	.103	.009	.004	.102	.024	.030
Education	.101	.123	.002	.133	.042	.182*	-.059	.151*	-.005
Any Pregnancy	.016	.123	.147	.156*	.152*	-.012	-.102	.161*	.125
<i>Predictors</i>									
Victimization	.156*	.312**	.358**	.233**	.095	.215*	.092	.273**	.048
Household	.005	.019	.013	-.074	.095	.009	-.010	-.035	-.091
Community	.238**	.305**	.244**	.282**	.108	.140	.056	.225*	-.030
Total AAE SCORE	.166	.241**	.247**	.183*	.017	.166	.032	.162	-.067

Note. **Correlation is significant at the 0.01 level (One-tailed).

*Correlation is significant at the 0.05 level (One-tailed).

Level Three Analyses

Contribution of Each Predictor on Outcomes

Separate, individual regression models were examined to test the contribution of each category of adverse exposure on the outcomes of depression, suicide ideation, and any mental distress at any point during the study. Odds ratios were calculated using separate logistic models both controlling for and not controlling for socio-demographics. When all 12 adverse exposures were entered into the model, 29.8% of the variance in experiencing any mental distress during the course of the study was explained. In seeking the best-fit model for the data, a forward maximum likelihood ratio model was determined. The final forward logistic regression model presented in Table 19, explained 24% of the variance by retaining four variables: abuse OR 2.5 (CI, 1.07 - 6.01) ($p = .036$); parental incarceration, OR .28 (CI .113 - .71) ($p = .007$); parental separation and divorce, OR .30 (CI .12 - .78) ($p = .013$); and personal victimization, OR 3.4. (1.3 - 9.2) ($p = .014$).

The first three hypotheses called for an examination of the relative contribution of the composite categories of exposures to victimization, household dysfunction, and community violence to depression and suicide ideation. For each hypothesis, a series of logistic regression models were analyzed at first without controlling for socio-demographics, the results are presented in Table 20. Specifically, those experiencing personal victimization were over three times more likely to experience mental distress than those adolescents not who had not been victimized.

However, while the results infer that personal victimization is the critical exposure in predicting overall mental distress in these adolescents, it is important to note that across the three categories of adverse exposures there is very little variance suggesting that community exposures were virtually a constant and household dysfunction exposures were almost at 90%. Specifically, these adolescents reported that community exposures were the highest 92.8% or (116), followed by household dysfunction 89.6 % (112), and lastly, personal victimization 80% (100). The lack of variance in familial and contextual exposures is the most plausible explanation for the lack of evidence supporting the respective hypotheses.

Those experiencing exposure to victimization were 2.35 times more likely to report suicide ideation, while those experiencing community violence exposures were only 1.469 times more likely to report suicide ideation. Household dysfunction did not play a significant role in the report of suicide ideation. Only the category of victimization was significant in predicting depression OR 4.7 (CI .63 –13.5) ($p = .004$). Those exposed to household dysfunction were over two times more likely to develop depression while those exposed to the category of community violence were 1.87 times more likely to develop depression. Those exposed to direct victimization were over four times more likely to experience mental distress OR 4.2 (CI 95% 1.55 – 11.41) ($p = .005$).

The results of the full logistic regression models for suicide ideation (Table 21) and any depression (Table 22) by each cumulative category of adverse exposure indicate only slight attenuations in odds ratios.

Table 19

Summary of Regression Analysis with Adverse Exposures on Any Mental Distress

	<i>Nagelkerke R²</i>	<i>B</i>	<i>SE</i>	<i>P value</i>	<i>Odds Ratio</i>	<i>95% Confidence Interval</i>
Step 1	.080					
Victim		1.194	.447	.008	3.3	(1.4 - 7.9)
Step 2	.153					
Incarcerated Parent		-1.154	.432	.007	0.3	(.14 - .74)
Victim		1.353	.464	.004	3.9	(1.6 - 9.6)
Step 3	.200					
Incarcerated Parent		-1.071	.442	.015	0.3	(.14 - .82)
Parental Sep/Divorce		-1.013	.460	.028	0.4	(.15 - .89)
Victim		1.516	.479	.002	4.6	(1.8 - 11)
Step 4	.241					
Abuse		.928	.442	.036	2.5	(1.1 - 6.0)
Incarcerated Parent		-1.266	.468	.007	0.3	(.11 - .71)
Parental Sep/Divorce		-1.209	.487	.013	0.3	(.12 - .78)
Victim		-1.236	.502	.014	3.4	(1.3 - 9.2)

Table 20

Influence of Adverse Exposure Categories on Outcomes

<i>AAE Category</i>	<i>Any Suicide Ideation During Study (n= 19)</i>			<i>P-value</i>
	<i>Percent (n)</i>	<i>Odds Ratio</i>	<i>95% Confidence Interval</i>	
Victimization	89.5% (17)	2.4	(0.5 - 10.9)	.224
Household Dysfunction	89.5% (17)	1.0	(0.2 - 4.8)	.984
Community Violence	94.7% (18)	1.5	(0.3 - 18.1)	.723
	<i>Any Depression During Study (n = 59)</i>			
Victimization	91.5% (54)	4.7	(0.6 - 13.5)	.004*
Household Dysfunction	93.2 % (55)	2.2	(0.6 - 7.5)	.218
Community Violence	94.9% (56)	1.9	(0.5 - 7.8)	.387
	<i>Any Mental Distress During Study (n = 63)</i>			
Victimization	90.5 % (57)	4.2	(1.6 – 11.4)	.005*
Household Dysfunction	92.1% (58)	1.7	(0.5 -5.6)	.367
Community Violence	93.7 % (59)	1.3	(0.3 -5.1)	.717

Note. *Correlation is significant at the 0.05 level.

After adjusting for age, race, education, and pregnancy for each of the categorical exposures only those experiencing victimization were over two times more likely to report suicide ideation OR 2.3 (CI 95% .45 – 11.5) ($p = .371$). The findings demonstrate that being pregnant is protective in regards to suicide ideation, but not for depression as seen in Table 22.

Adolescents who had dropped out of school had greater odds of reporting suicide ideation OR 2.6 (CI 95% .86 – 7.9) ($p = .092$). Adolescents who were 16 years of age or

older at the start of the study were more likely to report suicide ideation than their younger peers OR 1.7 (CI 95% .49 – 6.0) ($p = .398$). Significant odds ratios for depression were found for those experiencing a pregnancy OR 2.3 (CI 95% 1.03 - 5.2) ($p = .043$); and for those reporting exposure to victimization, they were almost five times more likely to score above the cut-off scores for depression OR 4.99 (CI 95% 1.6 - 15.5) ($p = .005$).

Contribution of Cumulative Predictors on All Outcomes

To test the fourth hypothesis, the odds ratios associated with increasing levels of exposure to adverse experiences on the presence of depression, suicide ideation, and any mental distress were examined. These are summarized in Table 23. The results do not support the presence of a ‘dose response’ relationship as hypothesized would exist in relationship to increasing levels of adverse exposures to the risk of developing depression given none of the odds ratios were significant. In terms of suicide ideation, again there was no evidence found to support a dose response relationship.

Table 21

Summary of Logistic Regressions for Suicide Ideation Controlling for Socio-Demographics

	<i>B</i>	<i>SE</i>	<i>P - value</i>	<i>Odds Ratio</i>	<i>95% Confidence Interval</i>
<i>Controls</i>					
Age	.539	.638	.398	1.7	(0.5 - 5.9)
Race	.193	.566	.733	1.2	(0.4 - 3.7)
Education	.954	.567	.092	2.6	(0.9 - 7.9)
Any Pregnancy	-.476	.568	.402	0.6	(0.2 - 1.9)
<i>Predictors¹</i>					
Victimization	.821	.827	.321	2.3	(0.5 - 11.5)
Household Dysfunction	-.333	.891	.709	0.7	(.13 - 4.1)
Community Violence	.421	1.157	.716	1.5	(0.2 - 14.7)

Note. ¹All control variables entered into each Logistic Regression with each predictor category.

Table 22

Summary of Logistic Regression Models for Depression Controlling for Socio-Demographics

	<i>B</i>	<i>SE</i>	<i>P - value</i>	<i>Odds Ratio</i>	<i>95% Confidence Interval</i>
Age	.289	.452	.523	1.3	(0.6 - 3.2)
Race	.444	.426	.297	1.6	(0.7 - 3.6)
Education	.166	.444	.712	1.2	(0.5 - 2.8)
Any Pregnancy	.835	.410	.043*	2.3	(1.03 - 5.2)
<i>Predictors¹</i>					
Victimization	1.608	.557	.005*	4.9	(1.6 - 15.5)
Household Dysfunction	.278	.725	.701	1.3	(.32 - 5.5)
Community Violence	.293	.844	.728	1.3	(0.3 - 7.01)

Note. ¹Control variables entered into each Logistic Regression with predictor categories.

* Correlations significant at the 0.05 level.

However, significant odds ratios were found associated with more than five adverse exposures and more than six adverse exposures to adverse events. Adolescents with more than 5 exposures were 4.94 times ($p < .05$) more likely to report suicide ideation compared to adolescents exposed to 5 or less adverse events. None of the odds ratios associated with the risk of mental distress were significant.

Interestingly, though statistically not significant, any exposure greater than one demonstrated over three times OR 3.74 (CI 95% .41-34.47) the likely hood of experiencing depression. However, as adverse exposures increased in number the likely hood for reporting depressive symptoms did not, suggesting that other mechanisms may be at play. This result is counterintuitive, that more risk may inoculate one towards depression. What is unknown is whether other adverse outcomes developed other than depression, such as anxiety or substance abuse.

The cumulative AAE scores showed an increase in the risk for developing suicide ideation when an adolescent had scored over three exposures. Little to no evidence was found to support the relationship between the AAE score and mental distress.

To test hypothesis five, linear regression models were examined controlling for socio-demographic variables. These are presented in Table 24. Likewise, little evidence was found to support hypothesis five. When controlling for socio-demographics the direct effects of the cumulative impact of the AAE score disappeared for change scores across all outcomes. The results do not support the presence of a 'dose response' relationship as hypothesized would exist in relationship to increasing levels of adverse exposures to the change in developing depression given none of the odds ratios were significant.

Table 23

The Relationship of the AAE Score to Depression, Suicide Ideation, and Mental Distress

AAE SCORE	N	Depression		Suicide Ideation		Mental Distress	
		%	OR (CI _{95%})	%	OR (CI _{95%})	%	OR (CI _{95%})
> 0	(123)	50.4	1.02 (.06-16.62)	14.6	.17 (.010 -2.866)	50.4	1.02 (.06 –16.62)
> 1	(120)	48.3	3.74 (.41-34.47)	14.2	.25 (.038 -1.59)	50.8	1.55 (.25 -9.62)
> 2	(111)	50.5	3.73 (.99-14.11)	15.3	1.08 (.22 -5.29)	53.2	2.84 (.84 – 9.59)
> 3	(101)	51.5	2.58 (.98-6.75)	16.8	2.23 (.48 – 10.37)	54.5	2.39 (.94 – 6.09)
> 4	(90)	52.2	2.10 (.93-4.72)	18.9	3.84 (.84 – 17.60)	55.6	2.12 (.95 – 4.72)
> 5	(71)	50.7	1.39 (.68-2.83)	22.5	4.94 (1.36 –17.98)*	54.9	1.53 (.745 – 3.10)
> 6	(52)	51.9	1.38 (.68-2.83)	23.1	2.83 (1.03 – 7.78)*	55.8	1.45 (.71 – 2.96)
> 7	(35)	51.4	1.26 (.58-2.77)	20.0	1.63 (.582 - 4.54)	54.3	1.24 (.57 – 2.72)
> 8	(21)	47.6	1.02 (.40-2.61)	23.8	2.01 (.635 – 6.35)	52.4	1.10(.43 – 2.81)
> 9	(7)	28.6	.43 (.08-2.30)	14.3	.93 (.105 – 8.16)	28.6	.374 (.07 – 2.00)
> 10	(2)	0.0	NA	50.0	5.83 (.349 – 97.527)	50.0	.98 (.06 – 16.09)

Note. *p < 0.05 level.

Table 24

<i>Linear Regression Models for Total AAE SCORE and Change Scores</i>			
<i>SE</i>	<i>F^a</i>	<i>R²</i>	<i>P -value</i>
<i>Change in Depression During Study</i>			
8.904	1.107	.044	.361
<i>Change in Suicide Ideation</i>			
.386	1.736	.068	.132
<i>Change in Mental Distress</i>			
.604	1.440	.057	.215

Note. ¹Model adjusted for age, race, education, and pregnancy: df=5.

Summary of Findings

Although the data did not support all of the hypotheses in this study, there were a number of significant findings. While community exposures to violence were the most reported, exposure to personal victimization was the largest contributor to outcomes of depression, suicide ideation, and overall distress.

Evidence of a direct association was found for those experiencing victimization with suicide ideation, mental distress, and CES-D depression scores at all four points in time. However, victimization did not predict change in any of the outcomes. The relationship of the total AAE score was positively correlated with the CES-D scores across time as well as with any mental distress experienced during the study. Summaries of all of the bivariate associations are presented in Table 25, Table 26, and Table 27.

Multivariate analyses exploring the relative contribution of the cumulative impact of exposures found that there was a significant relationship for the presence of suicide ideation after five exposures. However, there was no evidence supporting that having an elevated AAE score increased the risk for developing depression or mental distress.

Only school dropout remained a significant predictor for suicide ideation. In the models for depression and mental distress only age remained after controlling for socio-demographics, any significant contribution of cumulative exposures to adversity disappear. A final summary table of support for all of the study hypotheses follows in Table 28.

Table 25

Summary of Bivariate Associations between Socio-demographics, Individual Predictors and Outcomes

<i>Predictors</i>	<i>Significance</i>	<i>Level</i>	<i>Interpretation</i>
<i>Socio-Demographics</i>			
Age	S	$P < .01$	Adolescents age 16 and over report significantly more days of suicide ideation and depressive symptoms.
Race	NS		While non-whites reported more symptoms of mental distress, whites were more likely to experience over 7 adverse experiences.
Education	S	$P < .05$	Dropping out of high school has a positive significant association with suicide ideation and greater mental distress.
Pregnancy	S	$P < .05$	Experiencing an adolescent pregnancy has a positive significant association with depression and greater mental distress.
<i>Adverse Exposures</i>			
<i>Victimization</i>			
Abuse	S	$P = .02$	Experiencing abuse has a positive significant association with household dysfunction, community violence, and outcomes of suicide ideation and greater mental distress.
Victim	S	$P = .005$	Experiencing victimization has a positive significant association with household dysfunction, community violence, and with outcomes of depression and greater mental distress.

Table 26

Summary of Bivariate Associations Between Familial Predictors and Outcomes

<i>Predictors</i>	<i>Significance</i>	<i>Level</i>	<i>Interpretation</i>
<i>Household Dysfunction</i>	NS		The category of household dysfunction was not associated with distress.
Family Substance	S	$P < .01$	Family substance abuse has a positive significant association with other dimensions of household dysfunction.
Parental Mental Illness	S	$P < .01$	Parental mental illness has a positive significant association with other dimensions of household dysfunction, community violence, and suicide ideation.
Maternal Abuse	S	$P = .02$	Maternal abuse has a positive significant association with other dimensions of household dysfunction, community violence, and suicide ideation.
Parental Incarceration	S	$P < .01$	Having a parent incarcerated has a positive significant association with other dimensions of household dysfunction, community violence, and has a negative significant association with the outcome of depression.
Parental Sep/Divorce	S	$P < .01$	Parental separation or divorce has a positive significant association with abuse, an incarcerated parent, and has a negative significant association with the outcome of depression.
Residential Moves	S	$P < .01$	Residential moves have a positive significant association with family substance abuse and having a parent incarcerated.

Table 27

Summary of Bivariate Associations Between Community Predictors and Outcomes

<i>Predictors</i>	<i>Significance</i>	<i>Level</i>	<i>Interpretation</i>
<i>Community Violence</i>	S	$P < .01$	The category of exposure to community violence has a positive significant association with the outcome of depression at all points in time and overall mental distress.
Witnessed Violence	S	$P < .01$	Witnessing violence is has a positive association with various forms of household dysfunction and knowledge of weapons in the community.
Afraid Outside	S	$P = .007$	Being afraid out in the community has a positive significant association with the outcome of depression and with suicide ideation.
Knowledge of Weapons	S	$P < .01$	Knowledge of weapons amongst peers has a positive significant association with the outcome victimization, maternal abuse, parental mental illness, witnessing violence.
Heard Gun Shots	NS		Hearing gunshots in the community was not associated with other exposures or mental distress.

Table 28

Summary of Significance for Hypothesis

<i>Level</i>	<i>Hypothesis</i>	<i>Support</i>
Category of Exposure	1. Exposure to adolescent victimization will have a positive association with depression, suicide ideation, and mental distress.	Yes
	2. Household dysfunction will have a positive association with depression, suicide ideation, and mental distress.	No
	3. Exposure to community violence will have a positive association with depression, suicide ideation, and mental distress.	Partial
Cumulative Exposures	4. The number of adverse exposures will have a cumulative impact or “dose response” relationship with the level of depression, suicide ideation, and overall mental distress.	No
	5. The Adverse Adolescent Exposure Score will be significantly related to change in depression, suicide ideation, and mental distress over time.	No

CHAPTER FIVE

DISCUSSION OF FINDINGS

This investigation represents a departure from previous studies examining single forms of risk in relationship to adverse mental health outcomes, to assessing the cumulative impact of community, family, and personal exposures to adversity. The results bring evidence of extreme levels of contextual risk that in one population would create even more dire results, yet in this group unseen mechanisms of resilience and protective factors were present. The results imply that caution must be taken in examining generally assumed risk factors, such as family characteristics of divorce or incarceration, as in this population these factors were protective. The important implication is that social and family characteristics of assumed risk appears to be relative to the population and their contextual experiences of exposures to adversity and violence.

The purpose of this study was to determine the cumulative impact of adverse experiences on depression and suicide ideation over time in female adolescents. In addition, this study expanded upon the ACE study model by capturing a wider range of adverse exposures from the community. The contextual variables included exposures ranging from witnessing violence, being afraid in the community, knowledge of the presence of weapons, to hearing gunshots. In as much as this study attempted to replicate the analytic strategies of the ACE studies, the results for this study did not demonstrate a

cumulative impact, even though the exposure rates for adversity were three times national rates.

Prevalences

Within this cohort of adolescent females raised on public assistance, 92.8% had been exposed to community violence. This level of contextual adversity was greater than those reporting being raised in families with household dysfunction (89.6 %), and personal victimization (80%). Yet, while the overall category of community exposures to violence were the most highly reported, results from exposure to personal victimization made the greatest contribution to outcomes of depression and suicide ideation.

Consistent with other studies, the rates of exposure in this population were widespread, however, slightly higher than those reported in studies of urban youth exposures in the general population which ranged from 85% for community exposures to 70% for interpersonal victimization (Duckworth et al., 2000). One of the most disturbing findings was that over 72% of the adolescents had experienced five or more adverse exposures and 89% experienced over three adverse events, almost triple the exposures reported by Kessler and colleagues (1997) in the National Co-Morbidity Study.

Prevalence estimates for individual items across the four years ranged from 1.6% of adolescents being shot, to 63.2% of the adolescents knowing kids who owned a gun. The next highest rate of exposure was in residential mobility where reports of having moved more than one time 61.6% during the four years ranged from zero to 13 moves. The highest category of exposure 72.8% for an individual item was knowledge of weapons among peers. Witnessing the victimization of another during their lifetime followed this dimension. The highest rate reported within witnessing the victimization of

another were adolescents having seen someone being robbed (42.4%). Both categories of feeling afraid and hearing gunshots in the neighborhood were reported at the same rate across the four years (36%).

The distribution of suicide ideation scores remained remarkably consistent for the 4-year period ranging from 4.8% to 6%. There was a doubling in the incidence of depression (14% to 29.6%) by the fourth year, and an almost ten percent increase in mental distress (22.6% to 31.2%) was found by the fourth year. These last findings suggests that time and age are important in studying the outcomes of depression or suicide ideation, in that there may be a decaying effect in regards to suicide ideation, and a persistence in the effect of adversity on depression.

Relationship Between Adversity and Outcomes

As anticipated, and interrelatedness of adverse exposures within this sample validates previous findings in the literature of the common co-occurrence of such events in the lives of adolescents and that such adverse experiences are not isolated events. In general individual adverse exposures studied were consistent with a number of recent studies suggesting that childhood exposures typically overlap and co-occur (Bergen et al., 2003; Finkelhor & Hashima, 2001; Howard et al., 2002; Johnson et al., 2002; Jong et al., 2000; Kendall-Tackett et al., 1993; Kessler et al., 1997; McMahon et al., 2003; Spat Widom, 1999; Stevens et al., 2003; Turner & Lloyd, 1999; Turner et al., 2006).

The average age at the start of the study for those reporting multiple exposures was 16 years old. By the end of the study, almost half of the girls had experienced at least one pregnancy. While those of non-white origin experienced, in general, more adverse

exposures, those experiencing over seven adverse exposures were more likely to be white adolescents.

Although not reaching levels of significance, adolescents of Hispanic origin in this population reported slightly higher levels of suicide ideation than did their peers. There is a conflict in the literature concerning those who report suicide ideation versus the evidence of suicide completers. To date, female adolescent completers tend to be white; however, recent national data suggests that ideators and attempters tend to be adolescent Hispanic females (Eaton, Kann, Crosby, & Flores, 2007). Explanations offered by the CDC research team for the differences are family characteristics, acculturation, and socio-cultural differences. Nevertheless, further exploration of how family characteristics contribute to these differences is needed.

By the end of the entire study over 27% of the daughters had dropped out of school. Just over 27% were still enrolled in or had completed high school, and over 45% had some post secondary education. Interestingly, those with the highest cumulative exposures, over seven, either reported having dropped out of school or having gone onto to post secondary. These results may be explained by the Challenge Model for risk and protective factors found in the risk literature, which posits that a curvilinear relationship exists such that stressors can actually lead to an enhanced competence (Luthar & Zigler, 1991). This is in contrast to the additive or cumulative model of risk that proposes that exposure to one risk factor does not necessarily lead to a poor outcome, but with the presence of four or more risk factors, there is a 10-fold increase in psychological distress or disorder (Kazdin et al., 1997; Kirby & Fraser, 1997; Luthar & Zigler, 1991).

Not surprisingly, evidence was found for the significant direct association between adverse exposures to victimization and being afraid outside to both the outcomes of depression and suicide ideation. Parental mental illness, maternal abuse, and knowledge of weapons amongst peers were significantly associated with suicide ideation.

A possible alternative explanation for the increased suicide ideation found with time on TANF, may be found in the stress-vulnerability model proposed by Rich and Bonner in 1987 (as cited in the GAP Report No. 140, 1996). Specifically, that there is a transaction between social-emotional alienation, cognitive distortions, and inadequate adaptive abilities providing a predisposition for suicidal thoughts and behaviors. Economic insecurity and peer disruption seems particularly relevant to this sample given all of the participants at the start of the study were receiving public assistance and that they also experienced on average higher levels of residential mobility; up to 13 moves over the four year study.

If one assumes that there is a combination of factors that may contribute to the stress and vulnerability of an adolescent female, such as limited resources and high levels of residential mobility, combined with exposure to victimization, then a possibility of increased risk for suicide ideation seems plausible. The findings of a decrease in depression with time on TANF are in line with previous findings of studies of female adolescent's perceptions of parental economic stress and depression (Frojd et al., 2006).

The lack of persistence in depression in relationship to time on TANF, may be both conceptually and theoretically explained by the stress process model proposed by Pearlin (1981); that an adaptation to chronic stressors is a mechanism of our physiological need to return to homeostasis. A further interpretation of the results of an

adolescents' positive adjustment to the economic circumstances of their mothers receiving public assistance over a period of time may be a function of their increasing age. Developing personal resources and behavioral options for changing the course of their own lives through further education or additional supportive relationships may be the most reasonable explanation (Yagub, 2002).

In addition to the main results, there were a number of important findings that were contradictory to the current assumption that divorce and parental incarceration is a risk factor and not protective. Specifically, depression was negatively associated with having an incarcerated parent and parental separation and divorce. Investigations of the broader concepts of victimization in general, personal victimization is thought to be a function of the dependency status of both women and children (Finkelhor et al., 2001). Along these lines, perceptions of whether events are depriving or liberating may mitigate stressful experiences as demonstrated in this study where having a parent incarcerated or experiencing the divorce of parents was potentially protective in the face of victimization.

As mentioned earlier, a previous review of this data set, and the qualitative responses by the daughters and mothers on the relationship of the perpetrators to the daughter found that of those who had been victimized (47%) reported that the perpetrator was a family member or father figure, including a mother's boyfriend. These results are similar to national data where half (51%) of childhood sexual victimizations are perpetrated by parents as found in the comprehensive review of national databases conducted by Finkelhor and Hashima (2001). Once again, though not fully investigated in this study, a large number of adolescents in this data set reported running away suggesting a need to further understand the experiences of these youth.

Summary of Hypotheses

Overall, the results offer partial support the hypotheses of the study. The most profound results were demonstrated with exposure to adolescent victimization. There was a significant and positive association between adolescent victimization and depression, suicide ideation, and mental distress which fully supported the first hypothesis. Those reporting exposure to victimization were almost five times more likely to score above the cut-off scores for depression.

No support for the second hypothesis was found for the overall category of household dysfunction contributing to any of the outcome variables. The lack of findings on the cumulative index of household dysfunction may be due to lack of variance, however, it is important to note that the individuals reporting parental mental illness or maternal abuse were over three times more likely to report suicide ideation.

Partial support was found for the third hypothesis, which proposed that exposure to community violence would have a positive association with depression, suicide ideation, and mental distress. Evidence was found for the significant association of community violence to CES-D scores at each of the four points in time and to overall mental distress across the study.

The fourth hypothesis was not supported which proposed that the number of adverse exposures would have a cumulative impact or “dose response” relationship with the level of depression, suicide ideation, and overall mental distress. No support was found for the fifth hypothesis. The total AAE score did not make a contribution to the change in depression, suicide ideation, and overall mental distress.

Limitations of Study

There were a number of limitations or restrictive weaknesses in the study, which may have contributed in the lack of support for the proposed hypotheses. Methodological issues included: sample size, measurement, retrospective recall, and design issues. The small sample size constrained the analyses and restricted the power with which to draw conclusions. Another weakness, and perhaps the most profound was the lack of variance in the study due to the high rates of exposures. However, the lack of variance in familial and contextual exposures is the most plausible explanation for the constrained support of the respective hypotheses. A further explanation would be theoretical, as implied by the socio-ecological framework that proximal threats or stressors are more important than familial and distal factors experienced in the broader community in regards to mental health outcomes.

An additional limitation was in the area of measurement. The instrument for measuring depression, the CES-D scale (Radloff, 1977) is a measurement of depressive symptomatology not a measure to meet criteria for clinical depression. In regards to the outcome of suicide ideation, only one question for suicide ideation was used and may have constrained the results versus having a more comprehensive instrument assessing suicide gestures, hopelessness, and suicide attempts.

The development of the composite variables for the AAE score were based on similar composites developed by Felitti and colleagues (1998) utilizing select questions from various scales not originally intended for these purposes. In this regard, age variations in the adolescent girls (13-17) in the first year of the study may have contributed to differences in perceptions and reports of adverse experiences. Moreover,

the data were based on retrospective recall and may have resulted in underreporting. Current evidence from other longitudinal studies demonstrates that retrospective self-reports of adverse exposures are likely to underestimate actual occurrence (Della et al., 1990; Kessler et al., 1997).

Finally, as in most studies, there may also be mediating or moderating variables that were not examined that play a role in the relationship between adverse exposures and the outcomes of depression and suicide ideation. This is certainly suggested by the results only explaining a small proportion of the variance for the outcomes under examination. An array of alternative explanations for the results of this study could include the relationship of the perpetrator to the adolescent victim, chronicity of exposures, and narrowness of the outcomes studied.

Contributions of this Study and Implications for Public Health

The study aimed to contribute to the existing knowledge base in three ways: first, by investigating the prevalence of stressors across multiple domains in the lives of female adolescents raised in the context of welfare. Secondly, by capitalizing on longitudinal data to clarify the ‘dose response’ or cumulative impact of exposures to adverse events and the developmental trajectory of depression and suicide ideation; and lastly, by exploring the impact of exposures across time and the change in scores for depression, suicide ideation, and mental distress over time.

One of the most poignant findings of this study sample of adolescent girls growing up in poverty is that there was a significant level of exposure (89%) having experienced over three adverse events, almost three times the national rates (Kessler et al., 1997). In another recent national study on the relationship between suicide attempts

and childhood adverse exposures reported approximately 64% of both males and females experienced multiple adverse exposures (Dube et al., 2001). Other studies conducted in the United States estimate the prevalence of violence at 75% for those who have been exposed to at least one violent act in their lifetime (Barnett et al., 1997).

In examining the greater report of suicide ideation in the youngest group, previous research on pre-adolescents and adolescents found that youth with families of low control, low cohesiveness, and high conflict were more likely to report suicidal thoughts and behaviors (GAP Report No. 140, 1996). An interpretation of this finding may be that this younger group is more vulnerable to the stressors they have been exposed to and lack adequate resources to respond to the exposures versus their older peers.

This disturbing evidence adds to the issues of concerns for this population of “at risk girls” who are over exposed to adversity suggesting a need for interventions to protect or inoculate these adolescents from such extensive exposures. The implications for both public health prevention policy and practice for risk and protective factors are far reaching, given the level of depression seen in populations receiving public assistance. Both preventative strategies and intervention strategies that are age and gender-specific are warranted at the family and community level offering support for victims of domestic and community violence. First points of entry into any public health systems including schools or medical settings should develop trauma sensitive screenings for adverse exposures.

Given the importance of school environments and that drop out was directly associated with increased suicide ideation, evidence based strategies for fostering high school completion and reinforcing protective factors such as social and peer support, are

needed. The development of family services that would offer interventions addressing the needs of these fragile families and the level of violence within the families is also critical. Given the relationship of maternal abuse and maternal illness on poor outcomes in daughters, interventions of therapeutic support seem warranted. Lastly, widespread preventative approaches aimed at reducing victimization in both families and communities are perhaps most important.

It is also noteworthy, that the majority of studies on TANF recipients and depression have been on mothers from 20 to 40 years old. In contrast, existing studies on adolescents receiving public assistance have primarily focused on poor behavioral outcomes such as school attendance, pregnancy, and substance abuse.

Researchers interested in social characteristics have cautioned that focusing on disorder- specific outcomes may be utilizing an over-deterministic theoretical perspective and that there is a need to focus on broader mental health outcomes of both distress and resilience that would allow for greater understanding of the pathways and the mechanisms that may be influencing such outcomes (Aneshensel et al., 1991; Gennetian, Duncan, Knox, Vargas, Clark-Kauffman, London, 2002; Yaqub, 2002).

The results of this study suggest that factors other than poverty are at play for such outcomes and that sensitivity to differences in social group characteristics and vulnerabilities are needed to further explore alternative explanations for depression and suicide in such 'at risk' populations. Specifically, given the results that parental incarceration and divorce were protective for these adolescents offers a cautionary note that generalizing constructs of risk and protective factors of such social characteristics is dangerous.

Recommendations for Future Research

There are multiple recommendations that include theoretical, conceptual, and methodological issues that have emerged from this study for future research, but also implications for policy changes. There remains a paucity of longitudinal studies on adolescents investigating the onset of depression and suicide ideation utilizing a theoretical framework. It has been argued that adolescents are at greater risk in regards to threats and strains as they transition into adulthood and are exposed to a constellation of various stressors imposed on them from social structures, expectations, community environments, family experiences, and issues of dependency.

A theoretical consideration for future research would be to develop more inclusive or non-specific outcomes for studying the impact of stressors on mental health. The results of this study supports the need to further explore the implications of multiple, co-occurring stressors and related determinants for poor mental health outcomes. A basic premise of social stress theory is that the effects of stress are non-specific, as evidenced by the empirical data of an array of disorders that occur after an exposure to a stressor. The danger of misclassification of persons who are seemingly non-disordered due to specific categorization and thereby missing other manifestations of stress exposures is an approach argued by Aneshensel and colleagues (1991).

Specifically, symptoms associated with depression during adolescence may manifest in various ways that do not meet a diagnostic category. Such outcomes could include: interpersonal and academic dysfunction, helplessness, anger, eating disorders, sexual promiscuity, running away, and substance abuse, all of which were not directly assessed in this study. Neither were specific symptoms associated with suicide ideation

assessed, such as increased anxiety, depression, stress, hopelessness, and loss of self-esteem (Hazler & Mellin, 2004). Moreover, given that suicide is a relatively infrequent event, but a tragic and preventable outcome in the lives of many adolescents, there is a need for further exploration of mediating and moderating influences on other alternate endpoints such as suicide gestures, suicide attempters, and suicide completers.

Studies are also needed to assess the impact of screening efforts for specific adverse exposures in adolescents, existing interventions and the timeliness of such interventions to circumvent poor outcomes and to increase protective processes for adolescents. Studies utilizing longitudinal methodologies that can more clearly assess the effects of time on the trajectory of depression over time, and where intervention points for specific ages should be placed to change a negative trajectory would be helpful in the future. Such information would allow for the examination for mechanisms of influence and risk amplifiers for poor mental health outcomes among adolescents exposed to adversity.

In addition, studies that further explore protective mechanisms that would potentially moderate exposures creating more malleable and flexible outcomes would be an important contribution to public health policy, as there seems to be powerful unnamed variables present in the lives of some adolescents that encourage resilient outcomes, despite extreme exposures to adversities.

The literature on cumulative measures of household dysfunction, while recently incorporating residential mobility/instability as a lifetime score, have not considered *running away* as part of the construct. Current studies define mobility by the number of moves and do not explore differences in the nature of the move. The preceding, distal,

and proximal factors of adolescent residential instability present a troublesome gap in the literature, considering that running away in adolescents is associated with extremely poor outcomes such as psychological distress, substance abuse, victimization, and youth homelessness, further investigation is warranted (Kingree, Braithwaite, & Woodring, 2001).

This study suggests that future research assessing the potentially liberating effect from stressful exposures in the home environment through parental divorce or parental incarceration is needed. While the results found here that parental divorce or incarceration is protective is counter-intuitive, further knowledge of adolescents attribution of adverse experiences with parental figures is clearly needed to understand the buffering effect for mental health outcomes that parental separation or incarceration may offer in the face of perceived threats, family chaos, witnessing domestic violence, and child abuse.

Finkelhor and colleagues (2001) suggest that the primary theoretical concern for the child or adolescent victim of an adult perpetrator is that of dependency issues, which certainly implies the need for clearer policy around these issues but a deeper investigation of runaway youth as well and the reasons for the behaviors. Youth, in general, are required to live with adults and have little choice of where they want to live, who they want to live with, or where they want to go to school. They are typically not free to leave or are financially unable to leave hostile home environments, hostile siblings, or even exposures to school violence or street crime. To this end, an important consideration for future studies would be to utilize qualitative methods that would offer greater explanatory power to further understand and identify the 'critical moments' and the micro-processes

(Thomson & Holland, 2002) that occur between social realities and the individual biography of each adolescent that define the choices to runaway or remain dependent.

Conclusions

In summary, findings from this study considered the cumulative impact, or in the rubric of epidemiology, the ‘dose response’ relationship, of exposures to household dysfunction, community violence, and personal victimization on depression and suicide ideation over time. The results found that exposure to adolescent victimization was the primary predictor for depression, suicide ideation, and mental distress.

It is hoped that this research has contributed both conceptually and empirically to our understanding of the pathways and the critical processes and interactions between individual, family, and contextual stressors impacting the developmental period of adolescence. This study was conducted based on the assumption that these results will help to bring to awareness the prevalence of adverse exposures occurring in the lives of adolescents females and hopefully guide future efforts towards trauma sensitive and gender specific interventions that may help to alleviate the burden of depression and suicide ideation.

It is argued by some that “the sufferings of childhood are indelibly stamped on the adults” (Engels, 1845/1958; Krieger & Smith, 2004). The higher rates of depression in females living in poverty may be due to the relationship of such indelibly stamped exposures. The results of this study offer evidence on the high prevalence rates of adversity occurring in the lives of these adolescents, and the cumulative impact of such exposures on depression and suicide ideation. This study found that those experiencing

victimization were almost five times more likely to report suicide ideation, and over two times more likely to develop depression.

Public health goals of reducing depression and suicide will fail without greater considerations and interventions to address the fundamental facts of exposures of youth to an array of adversities. Efforts towards reducing community violence and personal victimization as well as developing trauma sensitive interventions that would buffer household dysfunction may play an important role in preventing depression, and suicide ideation.

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APPENDICES

Appendix A

Measures Included in the 2003 Adolescent Interview Protocol

Domains	Source
Client Demographics	Leginski, W. A., Croze, C., Driggers, J., Dumpman, S., Geertsens, D., Kamis-Gould, E., Namerow, J. J., & Lincoln, Y. S. (1989). <i>Data Standards for Mental Health Decision Support Systems</i> . (ADM89-1589). Rockville, MD: National Institute of Mental Health.
Health Status (SF-12)	Keller, S.D., Kosinski, M., & Ware, J. E. (1996). A 12-Item Short-Form Health Survey (SF-12). A construction of scales and preliminary tests of reliability and validity. <i>Medical Care</i> , <i>32</i> (3), 220-223.
Mental Health Status (<i>i.e.</i> , symptomatology [PSC] and depression [CES-D])	Jellinek, M. S., Murphy, J. M., & Burns, B. J. (1986). Brief psychosocial screening in outpatient pediatric practice. <i>The Journal of Pediatrics</i> , <i>109</i> , 371-378. Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. <i>Applied Psychological Measurement</i> , <i>1</i> , 385-401.
Substance Abuse Status and Use (SSI)	Winters, K. C., & Zenilman, J. M. (1994). The Simple Screening Instrument for Alcohol and Other Drug Abuse and Infections. (TIP #11). Rockville, MD: Substance Abuse and Mental Health Services Administration, Center for Substance Abuse Treatment.
Functioning	Substance Abuse and Mental Health Services (1996). Managed care multi-site study.
Quality of Life with: Living Situation, Family Relationships, Finances, Work & School, & Health	Lehman, A., (1988). A quality of life interview for the chronically mentally ill. <i>Evaluation and Program Planning</i> , <i>11</i> , 51-62.
Life Events	Monaghan, J. H., Robinson, J. O., & Dodge, J. A. (1979). The Children's Life Events Inventory. <i>Journal of Psychosomatic Research</i> , <i>23</i> , 63-68.
Religiousness/Spirituality	Fetzer Institute & National Institute on Aging (1999). <i>Brief multidimensional measurement of religiousness/spirituality for use in health research</i> . Kalamazoo, MI: Fetzer Institute.
Self-Efficacy	Connolly, J. (1989). Social self-efficacy in adolescence: Relations with self-concept, social adjustment, and mental health. <i>Canadian Journal of Behavioural Science</i> , <i>21</i> , 258-269. Bandura, A. (2001). <i>Guide for Constructing Self-Efficacy Scales</i> . Stanford, CA: Stanford University.
Self-Esteem	Rosenberg, M. (1989). <i>Society and the Adolescent Self-Image</i> (rev. ed.). Middletown, CN: Wesleyan University Press.
Social Supports	Harter, S. (1985). <i>Manual for the Social Support Scale for Children</i> . Denver, CO: University of Denver.
Locus of Control	Nowicki, S., & Strickland, B. R. (1973). A locus of control scale for children. <i>Journal of Consulting and Clinical Psychology</i> , <i>40</i> , 148-154.
Service Needs and Use	Self-developed.

Domains	Source
Hopes and Aspirations	Self-developed.
High Risk Behaviors	Goodenow, C. (1999). <i>Massachusetts Youth Risk Behavior Survey</i> . Massachusetts Department of Education. http://www.doe.mass.edu/lss/yrbs99/acknowledge.html Hess, J. C., & Rothgeb, J. M. (1999). <i>Measuring the impact of welfare reform: Issues in designing the survey of program dynamics questionnaire</i> . Washington, DC: US Census Bureau.
Family Relationships (FAD Version 3)	Epstein, N. B., Baldwin, L. M., & Bishop, D. S. (1983). The McMaster family assessment device. <i>Journal of Marital and Family Therapy</i> , 9: 171-180.
Attitudes Toward Marriage	Johnson, C. A., Stanley, S. M., Glenn, N. D., Amato, P. R. (2001). <i>Marriage in Oklahoma: 2001 Baseline Statewide Survey on Marriage and Divorce</i> . Stillwater, OK: Oklahoma State University.

Appendix B

Measures Included in the 2003 Mother's Interview Protocol

Domains	Source
Client Demographics	Leginski, W. A., Croze, C., Driggers, J., Dumpman, S., Geertsen, D., Kamis-Gould, E., Namerow, J. J., & Lincoln, Y. S. (1989). <i>Data Standards for Mental Health Decision Support Systems</i> . (ADM89-1589). Rockville, MD: National Institute of Mental Health.
Health Status (SF-12) (about daughter, few general questions about self)	Keller, S.D., Kosinski, M., & Ware, J. E. (1996). A 12-Item Short-Form Health Survey (SF-12). A construction of scales and preliminary tests of reliability and validity. <i>Medical Care</i> , 32(3), 220-223.
Mental Health Status (i.e., symptomatology [PSC] (about daughter) and depression [CES-D] (about self)	Jellinek, M. S., Murphy, J. M., & Burns, B. J. (1986). Brief psychosocial screening in outpatient pediatric practice. <i>The Journal of Pediatrics</i> , 109, 371-378. Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. <i>Applied Psychological Measurement</i> , 1, 385-401.
Substance Abuse Status and Use	Adapted from other studies.
Functioning (about daughter)	Substance Abuse and Mental Health Services (1996). Managed care multi-site study.
Quality of Life with: Living Situation, Family Relationships, Finances, Work & School Health (about self)	Lehman, A., (1988). A quality of life interview for the chronically mentally ill. <i>Evaluation and Program Planning</i> , 11, 51-62.
Life Events (about daughter)	Monaghan, J. H., Robinson, J. O., Dodge, J. A. (1979). The Children's Life Events Inventory. <i>Journal of Psychosomatic Research</i> , 23, 63-68.
Religiousness/Spirituality (about self)	Fetzer Institute & National Institute on Aging (1999). <i>Brief multidimensional measurement of religiousness/spirituality for use in health research</i> . Kalamazoo, MI: Fetzer Institute.
Service Needs and Use	Self-developed.
Hopes and Aspirations	Self-developed. (about daughter)
High Risk Behaviors (about daughter)	Goodenow, C. (1999). <i>Massachusetts Youth Risk Behavior Survey</i> . Massachusetts Department of Education. http://www.doe.mass.edu/lss/yrbs99/acknowledge.html Hess, J. C., & Rothgeb, J. M. (1999). <i>Measuring the Impact of Welfare Reform: Issues in Designing the Survey of Program Dynamics Questionnaire</i> . Washington, DC: US Census Bureau.
Family Relationships (FAD Version 3)	Epstein, N. B., Baldwin, L. M., & Bishop, D. S. (1983). The McMaster family assessment device. <i>Journal of Marital and Family Therapy</i> , 9: 171-180.
Attitudes Toward Marriage	Johnson, C. A., Stanley, S. M., Glenn, N. D., Amato, P. R. (2001). <i>Marriage in Oklahoma: 2001 Baseline Statewide Survey on Marriage and Divorce</i> . Stillwater, OK: Oklahoma State University.

ABOUT THE AUTHOR

After a decade of work in South East Asia, teaching classical ballet and working for the 1988 Olympic Games as a liaison, Katherine Best returned to the States and earned a Bachelor's degree in Psychology from the University of South Florida. By 2002, she had completed the dual Masters in Social Work and Masters in Public Health. Winning an award for her outstanding thesis on costs and length of stay for substance exposed neonates she began working at the Florida Mental Health Institute under the direction of Dr. Robert Friedman and Dr. Rodger Boothroyd. Her areas of research have included risk and protective factors, resilience, ethics in research, trauma exposures in children, and social needs for adults living in poverty. In 2004, as a licensed clinical social worker, Katherine founded the Encouragement Institute, a collaborative group practice in Sarasota treating individuals and families.