

CHILDHOOD TRAUMA AND ADOLESCENT MENTAL HEALTH:
A TRANSDISCIPLINARY APPROACH FOR SOCIAL
WORK RESEARCH AND PRACTICE

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ABSTRACT

**CANDACE KILLIAN-FARRELL: Childhood Trauma and Adolescent Mental Health:
A Transdisciplinary Approach for Social Work Research and Practice
(Under the direction of Sarah E. Bledsoe)**

This dissertation presents a transdisciplinary model to guide future social work research and practice with childhood trauma and adolescent mental health. The included studies aim to: 1) analyze and describe the transdisciplinary problem of childhood trauma in a vulnerable population 2) research associations between childhood trauma and transdisciplinary adolescent mental health outcomes, and 3) systematically review intervention approaches to a complex adolescent mental health outcome from a transdisciplinary perspective.

Comprehensive transdisciplinary theoretical research informs the development of the transdisciplinary model of childhood trauma and adolescent mental health. Epidemiological methods are used to examine trauma prevalence in a sample of adolescent mothers and multivariate regression models are used to analyze trauma subtypes/polytraumatization as risk factors for adolescent perinatal depression. An amended Cochrane Collaboration protocol guides a systematic review of the literature for adolescent complex trauma intervention studies.

The first paper confirms childhood trauma an epidemic problem with over 80% of adolescent mothers experiencing trauma, particularly those with perinatal depression. The second paper finds that childhood sexual abuse, childhood loss, and polytraumatization are significant risk factors of adolescent perinatal depression. The final paper finds complex

trauma interventions for adolescents limited in number and methodological rigor, and that a trans-diagnostic approach may be helpful to evaluate intervention efficacy in complex populations. The studies presented illustrate the transdisciplinary nature of childhood trauma and adolescent mental health, specifically adolescent perinatal depression and complex trauma. They also demonstrate how transdisciplinary principles can be integrated into the way these problems are conceptualized, measured, interpreted and discussed. This work establishes a foundation for future research on the transdisciplinary model which may eventually help to guide transdisciplinary intervention research on childhood trauma and adolescent mental health.

I dedicate this work to my husband, Marty, without whose love and support I wouldn't have made it this far, and to my daughter, Caroline, who is my light and inspiration. I also dedicate this work to my parents and to all my other family and friends who have supported me over the last six years.

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PREFACE

Parts of this work were done in collaboration with other talented researchers. The Introduction and Chapter 1 were fully conceptualized and written by me. Chapter 2 presents a paper on which I was first author. With Dr. Bledsoe's guidance, I conceptualized, designed and executed the study, and drafted the paper. Dr. Rizo assisted me with Contact Tactics Scale scoring and analysis, as well as past year prevalence and lifetime prevalence estimates. Brianna Lombardi assisted me with verifying data, as well as manuscript preparation and submission. The paper was submitted for publication to the *Journal of Interpersonal Violence* and is currently under review with the following citation:

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All co-authors on the paper have given permission for me to include this work in my dissertation.

Chapter 3 represents unpublished work performed in collaboration with the same team as Chapter 2. I am the lead author and fully responsible for the conceptualization, design, analysis, and writing of this paper under the guidance of Dr. Bledsoe. Brianna Lombardi helped me with aspects of the multivariate analysis. All co-authors have given permission for the inclusion of this work in my dissertation.

Chapter 4 represents unpublished research that was designed and performed primarily by myself under the guidance of Dr. Bledsoe. Brianna Lombardi assisted me as a second

independent data collector (database searches) and Samuel Lawrence assisted me as a second independent data extractor to improve reliability of results.

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LIST OF ABBREVIATIONS

TD	Transdisciplinary
PND	Perinatal Depression
CT	Complex Trauma

INTRODUCTION

There is a trauma epidemic in our society that constitutes a significant public health crisis affecting over half of children in the United States and costing an estimated \$124 billion dollars annually (V. J. Felitti et al., 1998; Wang, Holton, & America, 2007). Trauma from childhood maltreatment and other negative childhood experiences are leading causes of this epidemic and may result in academic difficulties, social and behavioral problems, and intense emotional suffering. For example, 80% of individuals with a history of child maltreatment will have at least one psychiatric diagnosis by age 18. Survivors are also 59% more likely to be arrested as a juvenile and 30% more likely to commit a violent crime. Further, 30% of these individuals will eventually abuse their own children, perpetuating this costly cycle (U.S. Department of Health and Human Services, 2012). These negative outcomes are associated with neurobiological changes that adversely affect brain development and may result in profound impairments in emotion regulation, attachment, and cognitive function (De Bellis, Woolley, & Hooper, 2013; Stronach et al., 2011).

Childhood trauma is a risk factor for the development of a variety of psychiatric illnesses. Neurobiological and neurodevelopmental changes associated with childhood trauma have been linked to a spectrum of psychiatric illnesses including post-traumatic stress disorder (PTSD), mood disorders, and personality disorders (Coates, 2010; Cutuli, Raby, Cicchetti, Englund, & Egeland, 2013; Kim, Cicchetti, Rogosch, & Manly, 2009). Evidence is particularly strong for the role of child maltreatment in the development of adolescent and adult depressive disorders, ADHD, substance use disorders, personality disorders, and

anxiety disorders across the lifespan (Cutuli et al., 2013; Dackis, Rogosch, Oshri, & Cicchetti, 2012; De Bellis, 2002; Oshri, Rogosch, & Cicchetti, 2013; Prayez, Wodon, Van Hyfte, & Linkowski, 2012; Turner, Finkelhor, & Ormrod, 2006). Further, many of the neurocognitive deficits and impaired neurodevelopmental outcomes resulting from childhood trauma likely contribute to functional outcomes and symptom presentations that aren't categorized diagnostically in the DSM 5. However, treatment of these impairments may be critically important to address in order to help clients recover functionally and to prevent the development of associated symptoms later in life.

Strategic Goal 1.4 of the National Institute for Mental Health (NIMH) Strategic Plan calls for new ways of classifying psychopathology on the basis of cognitive, affective, and psychophysiological processes, as well as observable behavior. The Research on Domain Criteria (RDoC) project is underway to achieve this objective, illustrating a trend toward a new approach to conceptualizing, classifying, researching and eventually treating psychiatric illness. Yet, attempts to conceptualize, describe and categorize childhood trauma outcomes and risk processes in this non-diagnostic, process-based approach are just beginning. Garland and Howard (2014) describe this emergent transdiagnostic perspective and argue this perspective may offer a more efficient and pragmatic way for social work practitioners to assess and treat mental health problems. This perspective involves going beyond diagnostic categories to identify and treat transdiagnostic processes that may underlie symptom presentations. They point out that one of the key tenets of this perspective recognizes the “homeostatic function of psychological symptoms over the apparent structural differences between types of psychological problems” (p. 144). Thus, a particular symptom represents an attempt at environmental adaptation, which implies that a full understanding of any mental

health problem requires consideration of many factors which influence client functioning. These factors may be represented by different disciplines and must be analyzed across disciplines as opposed to being understood and analyzed separately as a single disease state.

The apparent complexity of the etiology, risk and protective processes, and intervention efforts for both childhood trauma and mental health problems are undeniable. They will likely require an increasingly complex and integrated effort in order to fully understand and treat the mental health consequences of childhood trauma at all stages of the problem. Therefore, in line with a transdiagnostic perspective, there is the need for a strong framework for conceptualizing and researching trauma and mental health outcomes. Such a framework will serve to organize and power a research agenda in this area. Much literature exists from a variety of disciplines that has determined neurobiological correlates, environmental risk and resiliency factors, developmental considerations, as well as social and psychological processes related to the development of psychiatric disorder following childhood trauma. However, likely due to the insularity of many disciplines, as well as a lack of an organizing framework, much of this basic science has yet to be translated into potential assessment and intervention practices which could greatly advance the quality and individuality of psychiatric illness prevention and treatment.

This dissertation presents a transdisciplinary model for conceptualizing and researching childhood trauma and adolescent mental health outcomes and highlights elements of transdisciplinary research through three different social work research studies. Research presented begins the process of translating science from other disciplines into concepts social workers can access for research and practice. Chapter 1 defines the proposed transdisciplinary framework, and presents a transdisciplinary model of childhood trauma and

mental health outcomes. This model begins to carve a place for social work in future transdisciplinary childhood trauma and mental health outcome and intervention research and practice. Chapter 2 presents a paper which uses epidemiological methods to identify childhood trauma as a transdisciplinary problem in a vulnerable population relevant to social work. Chapter 3 presents a paper which examines trauma domains and subtypes as potential risk factors for adverse adolescent mental health outcomes. Chapter 4 presents a systematic review of complex trauma interventions for adolescents. This paper examines a transdiagnostic mental health outcome and analyzes intervention research from a variety of disciplines for a social work audience as they relate specifically to adolescent complex trauma. The dissertation concludes with a discussion of how the transdisciplinary model may be applied in future research and the implications for social work research and practice.

The specific aims of this dissertation are consistent with the adoption and application of a transdisciplinary approach to the study of childhood trauma and adolescent mental health. These aims are to 1) research the risk processes linking childhood trauma, psychosocial risk and protective factors, neurobiological outcomes and mental health, and develop a transdisciplinary model to guide future social work research and practice for adolescent mental health, 2) analyze and describe the transdisciplinary problem of childhood trauma in a vulnerable population (pregnant adolescents), 3) begin to research associations between childhood trauma and transdisciplinary adolescent mental health outcomes (perinatal depression), and 4) examine intervention approaches to a complex adolescent mental health outcome from a transdisciplinary perspective. It is hoped this dissertation work will provide a foundation for future research which could lead to the development,

evaluation, modification, and implementation of the next generation of mental health interventions by social work providers in the community.

CHAPTER 1: INTRODUCTION

Research and practice related to childhood trauma and mental health are relevant to the field of Social Work. Social workers have been and continue to be primary stakeholders in both child welfare and mental health fields since the beginning of the discipline. Maltreated and mentally ill children and adults are an incredibly vulnerable and stigmatized population needing social work advocacy and services. In fact, social workers are currently the largest providers of community mental health and child welfare services in the US (U.S. Department of Labor, 2011).

There has been a growing recognition of the need for research that can transcend the boundaries of traditional academic disciplines in order to better address complex social problems such as trauma and mental health. This type of research is not a new concept, but has recently gained attention in the biological and social sciences as the need for new approaches to treat complex health problems grows. For example, recent research in a variety of academic disciplines has centered on identifying links between the experience of childhood traumatic stress and various developmental biological, psychological, and social outcomes related to mental health in adolescence. It has become increasingly clear, that these outcomes do not exist in isolation, nor do the risk processes that create them.

Despite this trend in research, no model currently exists that incorporates multidisciplinary concepts translated across academic disciplines. Even more problematic is the fact that no model currently provides for an approach in which aspects of the problem are not only incorporated but transcend any one discipline's framework in order to allow for both

outcome and intervention research that are truly innovative in nature. The Transdisciplinary Model of Childhood Traumatic Stress and Adolescent Mental Health Outcomes, presented in this chapter, aims to address this critical gap in the child trauma and mental health literature.

Defining Transdisciplinary Research

“Transdisciplinary” is a term that is used and misused in academia. It is sometimes confused with multidisciplinary and interdisciplinary research. However, each concept has its own distinctive meaning, strengths, and limitations. These concepts can be understood as an integrative continuum of efforts to solve complex social problems. At one end of this continuum would be “unidisciplinarity” (UD), which refers to the traditional disciplinary “silo” approach in which scholars within academic disciplines work in isolation to research a discipline-defined problem with their discipline defined conceptual frameworks and methodology (Hall, Vogel, & Gehlert, 2014; Kemp & Nurius, 2015). “Multidisciplinary” (MD) research falls next on the continuum, and refers to scholars within different disciplines conferring with each other on a mutual problem of interest, but then working independently on that problem within discipline specific frameworks and methods (Choi & Pak, 2006; Fuqua, Stokols, Gress, Phillips, & Harvey, 2004). Knowledge is shared and research occurs through an additive approach (Fawcett, 2013).

Moving toward the more integrative end of the research continuum, we find the ‘interdisciplinary’ approach. The goal of interdisciplinary research is to transfer knowledge between disciplines to better address a common problem (Nicolescu, 1997). Disciplinary knowledge is synthesized and a new holistic perspective of that problem may result. While much knowledge can be gained about a problem using this approach, complex interactions between different aspects of the problem may be missed (Gehlert et al., 2010). Research involving the biological, social, behavioral, and environmental risk processes involved in a

complex problem such as mental health requires an even more integrative approach (Choi & Pak, 2006; Gehlert et al., 2010). This brings us to the most integrative of research perspectives – a transdisciplinary (TD) approach.

Transdisciplinarity involves collaboration that moves beyond shared knowledge to include novel research paradigms of pooled disciplinary theory and the development of methodology that transcends individual disciplines (Nurius & Kemp, 2014). TD research involves a shared conceptualization of a complex social problem, theoretical perspective, and empirical approach among disciplines (Choi & Pak, 2006). Kemp and Nurius (2015) explain that, “...each participant works at the “interface” of the collective disciplines to more fully grasp complex causal mechanisms and craft novel and accelerated solutions”. TD research is focused on complex ‘real world’ problems, is highly action oriented, and aims to find actionable solutions for the common good (Klein, 2004; Pohl, 2011). This approach fits well within the recent push for increased research translation from funding sources such as the National Institutes of Health, as well as the nature of social work as an applied science.

Transdisciplinary Research and Social Work Education, Research, and Practice

‘Transdisciplinary research has been an emerging topic of conversation in science for the past 50 years. The term has been associated with several overlapping lines of discourse in the literature (Osborne, 2015). These include the application of systems theory to education and research innovation, a sociological science-policy approach to research, and innovating research methodology for the solution of ‘real world’ social problems, particularly in health and environmental sciences (Gibbons, 1994; Hadorn, Biber-Klemm, Grossenbacher-Mansuy, & Hoffmann-Riem, 2008; Nowotny, Scott, & Gibbons, 2001; Pohl & Hadorn, 2008; Rapport, 1997). The common threads in these transdisciplinary discussions involve a meta-disciplinary research effort which ties basic science with applied science using a shared

paradigm and methodology to affect social change (Osborne, 2015). Thus, it is no wonder social work has joined in the discourse on transdisciplinary research, education, and practice over the past 20 years. In fact, social work research is arguably inherently transdisciplinary in conceptualization. While some social workers may fear transdisciplinarity threatens a loss of social work's unique identity, it may be that transdisciplinarity is what makes social work such a unique discipline. education and training in order to prepare new social work researchers for research on the complex problems affecting our society (S. Kemp & Nurius, 2014; Nurius & Kemp, 2014). Other social work proponents of this approach have argued for this research approach to address critical social problems such as health disparities and gender violence (Gehlert et al., 2010; Messing, Adelman, & Durfee, 2012). There has also been the development of a transdisciplinary model for evidence-based behavioral practice (Bellamy et al., 2013). Childhood trauma and adolescent mental health are arguably complex social problems that would also benefit from a transdisciplinary approach to research and practice.

In 2013, the Grand Challenges Executive Committee (a group of leading social work researchers) from the American Academy of Social Work and Social Welfare introduced the Grand Challenges for Social Work Initiative. This initiative involves the identification of a collection of complex problems affecting society that can help guide social work research and practice in the 21st century. Some benefits of promoting these grand challenges include: the encouragement of innovative and collaborative research, the development of a platform for scientific diplomacy/ team science, and the ability to bring great minds together from academia and the community to address these complex problems (Barth, Gilmore, Flynn,

Fraser, & Brekke, 2014; Uehara et al., 2013). A transdisciplinary framework is a perfect fit for pursuing these grand challenges.

The first grand challenge of social work is to “Ensure healthy development for all youth” (American Association for Social Work and Social Welfare, 2016). Research has shown that childhood trauma is one of the largest threats to social, psychological, and neurobiological development. Compromised adolescent mental health can be conceptualized as an outcome of impaired development due to factors which may include childhood trauma. However, adolescence also provides an opportunity to catch developmental processes of all types which have gone off track, repair any developmental delays, reinstate healthy development, and prevent future developmental impairment resulting in functional impairment throughout adulthood. Child development and developmental health are extremely complex constructs that involve risk and resiliency processes at multiple levels. Social work, psychology, medicine, neurobiology, sociology, genetics, public health, and public policy are among the many disciplines concerned with adolescent mental health. Mental health practitioners, child welfare services, healthcare providers, public and private education providers, prisons, and family members are just a few of the many stakeholders in childhood trauma and adolescent mental health. Thus, a transdisciplinary model to help guide the conceptualization and research on adverse adolescent mental health outcomes related to childhood trauma is a critical step in advancing our understanding of the problem and working together toward a more complete solution. To address this need, a Transdisciplinary Model of Childhood Trauma and Adolescent Mental Health was developed and is presented in Figure 1.1.

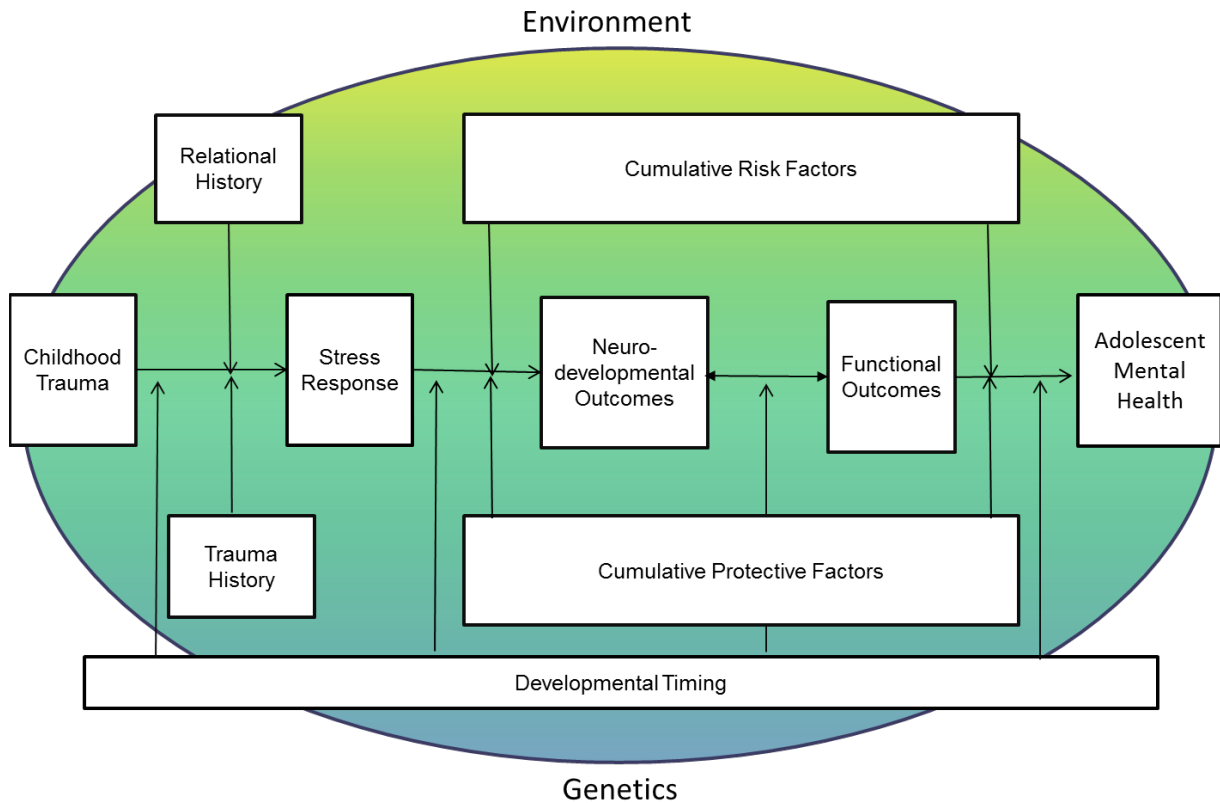


Figure 1.1. Transdisciplinary model of childhood trauma and adolescent mental health.

Transdisciplinary Model of Childhood Trauma and Adolescent Mental Health

There are many theories across a variety of disciplines that have been used to explain adolescent mental health outcomes of childhood trauma. The transdisciplinary model merges theoretical perspectives into a meta-framework for understanding and researching this complex problem in innovative ways. This model integrates work primarily from the following academic research disciplines: social work, public health, psychiatry, neurobiology, endocrinology, psychology, sociology, genetics, and epidemiology. The theoretical foundation of the model draws from these disciplines, as well as the methodology needed to fully test the model assumptions. The model consists of a core mediational risk process combined with moderating influences and interactions from a variety of developmental biopsychosocial risk and protective factors.

The core risk process of the transdisciplinary model is based on Stress-Response theory, Neurobiological theory, Developmental Psychopathology, and Behavioral theory. Childhood trauma experience triggers the model's risk process, and is purposely general to allow for the study of multiple types and conceptualizations of traumatic events or traumatic load. Childhood trauma is hypothesized to trigger a physiological stress response which may become chronically dysregulated, leading to altered neurodevelopmental outcomes, including changes to brain structure and function. These outcomes are then hypothesized to mediate stress and functional outcomes such as impaired cognition, emotional dysregulation, and altered social processes. Functional outcomes are hypothesized to mediate neurodevelopmental outcomes and behavioral symptoms that are typically reported and identified when mental health problems arise. Behavioral symptoms are the "real world" manifestations of the other mediating outcomes (i.e. aggression, unstable relationships, substance abuse, self-harm behaviors, avoidance, etc.).

Other primary components of this transdisciplinary framework include key moderators of the core risk process. The relationship between the initial trauma and stress response is hypothesized to be moderated by relational history and trauma history. Inclusion of relational history as a moderator is based on attachment theory and research suggesting that quality of attachment during development and current levels of social support may exacerbate or buffer immediate effects of trauma, particularly traumatic interpersonal events. Inclusion of trauma history as a moderator reflects recent research on polytraumatization that suggests a stepwise relationship between the number of trauma experiences and risk for negative outcomes. This moderator is also supported by more traditional research on

traumatic re-enactment. Both a history of previous trauma and internally re-enacting a traumatic event may impact stress-response regulation and load.

The next three relationships in the risk process are moderated by cumulative risk and cumulative protective factors. Grounded in risk and resilience theory, it is hypothesized that each individual will bring to this process their own accumulation of past and present risk and protective factors. It is hypothesized that it is the individual's balance of these factors, set within the broader framework, which moderates this neurodevelopmental and behavioral risk chain. This moderation is purposely general to allow for examination of a variety of conceptualizations of risk and resiliency, as well as more specific examination of individual risk and protective factors. Ultimately, examination of the most powerful moderators may better inform the development of stage-specific intervention.

Finally, the core risk process and moderators in this model take place within two important contexts. They operate within a primary developmental framework. Specifically, developmental timing is hypothesized to moderate each relationship within the core risk process and to provide a background for the cumulative risk and protective factors. This accounts for physiological and sociocultural aspects of development which may accelerate or inhibit the risk process at any particular point. This includes biological "critical periods" and societal functioning across the lifespan. The risk process is also hypothesized to be encompassed by an interplay between genes and the environment. Based on epigenetic theory, all components of the model are informed by the constant unfolding of this gene-environment interaction (see Figure 1.1).

Currently, research in different disciplines focuses on different parts of this model. This has provided valuable information about some aspects of childhood trauma and

adolescent mental health, as well as important information about associations, and in some cases direct relationships. However, few studies examine aspects of this risk chain collectively. One goal of this model is to promote a more comprehensive conceptualization of this risk process to guide future research. A second goal of this model is to promote a holistic conceptualization of this risk process to encourage innovation in the treatment of trauma-related adolescent mental health problems. Intervention in this risk chain can and should eventually occur at all stages of this process to encompass multiple levels of therapeutic solutions.

Conclusions and Implications

Based on this conceptualization, current research is typically located in different parts of this spectrum. For example, much research has concentrated on understanding antecedents of childhood trauma, the nature of physiological responses to a traumatic event, and the immediate therapeutic response to trauma exposure in childhood. Likewise, much research in Social Work, Psychology, and Psychiatry has focused on the functional and behavioral outcomes of childhood maltreatment, as well as the psychiatric and diagnostic outcomes associated with this problem (PTSD, acute stress, trauma symptomology and impairment). Even intervention research has been localized, particularly around prevention, psychological first response, functional intervention, and intervention for diagnostic psychiatric outcomes.

However, there is a lack of research focusing on the center part of the model, namely the neurodevelopmental outcomes and links between these outcomes and other components of the model. This may be primarily due to the fact that science and technology has just recently identified these processes and made the study of these outcomes possible. It is no surprise that the primary disciplines conducting this research are Neurobiology, Neuroscience, and Psychiatry. However, as more science supports the relevance and

unavoidable impact of these mediating processes and outcomes, it becomes impossible for any discipline with a stake in the study, research, and treatment of childhood trauma and/or mental health to ignore these processes.

Transdisciplinary research is arguably the future of mental health research and treatment. Science has become less insular and more open to a complex and less reductionist approach. The recognition of such growing complexity among leaders of funding agencies such as NIMH and the federal government, as well as leaders of the field who dictate diagnostic and treatment approaches, makes a shift from current research and practice models likely. If social work does not keep up with these advances and paradigm shifts, our field's work with this tremendous public health problem will be gradually rendered obsolete.

Social workers need to know how to understand and interpret cutting edge research, adapt to shifting paradigms, and work as part of a transdisciplinary team. Social workers must be able to translate findings from other disciplines into practical intervention approaches that can ensure the clients we serve receive the best possible treatments and services available. Most importantly, social workers must be able to understand and work with the science and the interventions that develop in order to adapt and disseminate these interventions for the specific cultures and disadvantaged groups which need them most.

CHAPTER 2: TRAUMATIC EXPERIENCE, POLYTRAUMATIZATION, AND PERINATAL DEPRESSION IN A DIVERSE SAMPLE OF ADOLESCENT MOTHERS

Abstract

Purpose. This study examines the prevalence of trauma subtypes, polytraumatization, and perinatal depression in a diverse sample of adolescent mothers to help inform perinatal depression prevention, screening, and treatment efforts.

Methods. We conducted a secondary analysis of a convenience sample of adolescent mothers (N=210) from a prospective longitudinal study of perinatal depression. Participants were recruited from a county-based, public health prenatal clinic and data was collected in the prenatal and postpartum periods.

Results. In this sample, 81% of adolescent mothers reported at least one trauma experience; 75% reported lifetime experience of IPV. The most prevalent trauma types among adolescent mothers reporting perinatal depression were sexual trauma (11.4%), childhood loss (28.3%), emotional adversity (17.1%), and polytraumatization (43%).

Conclusions. Trauma is alarmingly prevalent among adolescent mothers. Results suggest standards of care for adolescent mothers should include screening adolescent mothers for trauma history and provision of appropriate referrals for IPV. Findings support the need for trauma-informed treatment in perinatal public health clinics to decrease potential health risks to both mother and baby.

Keywords. Adolescent Pregnancy; Trauma; Polytraumatization; Perinatal Depression

Introduction

Traumatic stress during childhood and adolescence has garnered much attention in the health and mental health literature over the past few decades. This is due to the proliferation of studies linking various forms of trauma, such as childhood maltreatment, violence exposure, and natural and manmade disaster experience, to a variety of negative outcomes. These negative outcomes include PTSD and a range of psychopathologies including depression in adult and adolescent populations (Heim, Newport, Mletzko, Miller, & Nemeroff, 2008; Kaufman & Charney, 2001; Kilpatrick et al., 2003; Suliman et al., 2009; Teicher & Samson, 2013). Childhood trauma exposure has also been linked to increased risk of teenage pregnancy, health problems, and increased infant mortality rates (Brown et al., 2009; Dube et al., 2009; Hillis et al., 2004; Maniglio, 2009; Noll, Haralson, Butler, & Shenk, 2011; Noll & Shenk, 2013).

Adolescent mothers are a diverse group, but include many young minority women of low socioeconomic status. They are a vulnerable population that has many risk factors that increase their chance of experiencing negative psychological outcomes. The dynamics of becoming pregnant at such an early age may create role strain and can lead to social and occupational difficulties (Morris & Levine Coley, 2004). These difficulties may be compounded by a lack of support from family, friends, and the baby's father, as well as pre-existing lack of resources which can lead to poor mother and infant outcomes (Chedraui, 2008; Meltzer-Brody et al., 2013; Shah, Gee, & Theall, 2014). For instance, adolescent mothers are more likely to deliver low birth weight babies, to experience perinatal depression, and to eventually mistreat their own children thus perpetuating an intergenerational cycle of trauma (Cederbaum, Putnam-Hornstein, King, Gilbert, & Needell,

2013; Meltzer-Brody et al., 2013; Putnam-Hornstein, Cederbaum, King, Eastman, & Trickett, 2015).

Trauma and adolescent mothers. Trauma has been linked to increased risk for teen pregnancy, so there is no surprise that adolescent mothers might experience an elevated rate of trauma compared to the general population (Noll & Shenk, 2013; Noll, Shenk, & Putnam, 2009). In fact, Putnam-Hornstein, Cederbaum, King, Cleveland, and Needell (2013) conducted a large study of adolescent mothers from California and found that approximately 45% of the sample had been reported victims of maltreatment to child protective services. Of these adolescent mothers, approximately 21% had substantiated cases of abuse. This study examined demographic variations of trauma prevalence but did not examine maltreatment subtype or polytraumatization (Putnam-Hornstein et al., 2013). Another study found only a 13.7% rate of substantiated abuse although the assessed maltreatment only included preconception CPS reports after age 10, so earlier maltreatment reports were not considered (Cederbaum et al., 2013). A recent study found slightly lower, but comparable rates to the Cederbaum study, but was also limited to abuse reports to CPS after age 10 (Putnam-Hornstein et al., 2015).

Other studies have reported higher levels of abuse in the population using self-report methods. These studies have found rates of maltreatment between 47%-62% (H. N. Bailey, Moran, & Pederson, 2007; Bert, Guner, & Lanzi, 2009; Lesser & Koniak-Griffin, 2000; Mylant & Mann, 2008; Noll et al., 2009). Several have examined rates of subtypes of child maltreatment. One study identified approximately 47% of the sample that had experienced sexual, physical or emotional abuse individually (Bert et al., 2009). Another identified 53% of adolescent mothers as experiencing physical abuse, with 23% reporting sexual abuse, and

18% reporting both (Lesser & Koniak-Griffin, 2000). A third study found that 35% of their sample reported physical abuse and 34% reported sexual abuse specifically (H. N. Bailey et al., 2007). These studies all highlight elevated rates of different subtypes of maltreatment among adolescent mothers. However, they were limited by small sample sizes. Of these studies, 2 reported IPV rates between 60%–67% among adolescent mothers (Lindhorst & Oxford, 2008; Mylant & Mann, 2008). Other types of trauma such as familial loss, natural disaster, or caregiver impairment are rarely reported for adolescent mothers.

Polytraumatization. General trauma studies have expanded the focus from singular trauma experiences to polytraumatization. Polytraumatization accounts for the experience of multiple subtypes of traumatic events over the course of development. Studies indicate that a compounding risk effect occurs as the number of trauma experiences increase that are associated with negative outcomes, including physical impairment, psychiatric impairment, and adolescent pregnancy (D. Finkelhor, R. K. Ormrod, & H. Turner, 2007; Finkelhor, Turner, Shattuck, & Hamby, 2015; J. D. Ford, Wasser, & Connor, 2011; Gustafsson, Nilsson, & Svedin, 2009; Hickman et al., 2013; Hillis et al., 2004; Pereda & Gallardo-Pujol, 2014). Traumatized populations studied in this literature include college students, maltreated children, adolescent psychiatric populations, and a variety of ethnic populations including Spanish, European, and African survivors. However, no existing studies examining polytraumatization and PND comprehensively in adolescent mothers could be identified.

Study background. A prospective epidemiological study of perinatal depression in adolescent mothers was conducted at the University of North Carolina at Chapel Hill by Meltzer-Brody et al. (2013). One of the study's most significant findings was that 71.7% of depressed and 44.4% of non-depressed adolescent mothers reported a history of at least 1

experience of IPV, sexual abuse, or physical abuse. Based on the use of self-report measures, cultural considerations, and general disclosure patterns, this is likely an underestimation of the true prevalence. The rate of trauma in this population was extraordinary, but due to the focus of the original paper, no further analysis was conducted with this variable. More research is needed to better understand the trauma history of adolescent mothers, including specific subtypes of trauma experiences and polytraumatization.

Current study. To address the limitations and gaps identified above, a secondary data analysis of the data collected and analyzed by the Meltzer-Brody study was conducted to investigate the prevalence of specific trauma subtypes and polytraumatization among adolescent mothers. Specifically, this study (1) examined the prevalence of childhood and adolescent trauma experiences in a diverse sample of adolescent mothers from the southeastern United States, and (2) examined between-groups differences in trauma prevalence among depressed and non-depressed adolescent mothers.

Methods

Participants. A convenience sample (N = 210) of adolescent mothers was recruited from a county-based, urban public health prenatal care clinic from 2010-2011 during routine prenatal visits during the second or third trimester and six weeks postpartum. Participant demographics are presented in Table 2.1. Participants ranged in age from 14 to 20 years, with a mean age of 18.4 years. The majority of participants identified as racial/ethnic minority. The sample was approximately 41% Latina and 41 % African American. The study survey was completed in Spanish by 24.8% of participants. More than 86% of participants reported an annual household income of less than \$30,000. Most participants were unmarried although close to half (43.5%) reported living with a partner at that time. Most participants were primiparous and delivered full-term infants. There was an overall 89% participant retention

rate with 25 (10.6%) participants lost to follow up postpartum. However, data on demographic information and trauma experience was measured at time one and participants' reported trauma histories were included in descriptive analyses. Chi-square tests reveal that differences in attrition rate by depression group were not significant.

Table 2.1

Demographic Description of Depressed and Non-depressed Adolescents

	Total (<i>n</i> = 210)	Depressed (<i>n</i> = 68)	Non-depressed (<i>n</i> = 137)
Characteristic	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)
Age	18.4(1.4)	18.4(1.5)	18.4(1.3)
Race/Ethnicity			
White	13.8	13.2	14.6
African American	40.5	44.1	38.0
Latina	41.4	39.7	42.3
Other	4.3	2.9	5.1
Marital status (unmarried)	89.2	92.2	88.9
Relationship status			
Single	20.3	27.9	15.6
Not living with partner	36.2	32.4	39.3
Cohabiting	43.5	39.7	45.2
Household income (<i><</i> \$30,000)	86.1	87.2	85.4
Educational status			
Unenrolled	69.6	72.3	67.2
Part-time student	10.8	9.2	11.9
Full-time student	19.6	18.5	20.9
Work Status (Unemployed)	76.4	80.3	74.2
Unplanned pregnancy	75.5	77.9	73.3
Primiparous	72.6	66.7	76.0

Procedures. Data were collected using questionnaires that participants completed at two time points: during pregnancy and approximately 6-weeks postpartum. Questionnaires included demographic questions and standardized measures of study variables. All instruments and procedures used in the original study were approved by the appropriate institutional review board (Meltzer-Brody et al., 2013). The present study examined demographic characteristics and trauma experiences collected during pregnancy and information on depression collected during pregnancy and postpartum.

Measures. Trauma experiences, with the exception of IPV, were measured using a modified structured self-report questionnaire from previous research (Leserman et al., 1996; Meltzer-Brody et al., 2007). Experiences of IPV were measured with the Revised Conflict Tactics Scale-2 (CTS2) (Straus, Hamby, Boney-McCoy, & Sugarman, 1996). Categories of trauma experiences included (1) child maltreatment (sexual abuse and/or physical abuse); (2) IPV (sexual, physical and/or psychological abuse by an intimate partner); (3) interpersonal trauma (caregiver impairment due to substance use or severe psychiatric illness, caregiver or sibling death, institutionalization, violence exposure); and (4) environmental trauma (serious illness/accident, natural disaster).

Trauma subtype variables. Trauma subtype variables were developed based on yes/no responses and binary composite scores were created indicating whether a trauma experience occurred. Reliability of all composite and scale variables was calculated in our sample using Cronbach's alpha.

Sexual abuse. Sexual abuse was defined as genital touching or vaginal or anal intercourse, where force or threat of harm was present. The threat of force or harm was either explicit or indicated by a 5-year age differential between the victim and perpetrator. This

trauma subtype was assessed with 4 items. Of these, 2 items assessed unwanted sexual molestation (one item asked about sexual molestation before the respondent's 13th birthday, and one asked about sexual molestation after the 13th birthday). The other 2 items assessed for unwanted sexual intercourse (one asked about unwanted sexual intercourse that occurred before the respondent's 13th birthday, and one asked about incidents after the respondent's 13th birthday). Each item was scored as a dichotomous *yes/no* variable indicating whether the event had occurred. For each item, a response of *yes* was coded 1, and a response of *no* was coded 0. The *sexual abuse* variable is a composite variable ($\alpha=0.80$) representing any sexual abuse that was reported (0 = 0 score on all 4 items, 1 = score of 1 or more on any item).

Physical abuse. Childhood physical abuse was defined as incidents distinct from those of childhood sexual abuse that included a life-threatening physical attack with the intent to kill or seriously injure, or other physical abuse such as being beaten, kicked, or burned. This trauma type was assessed using 2 inventory items. Each item was presented and scored as a *yes/no* question (*yes* = 1; *no* = 0). The *physical abuse* variable was a composite variable ($\alpha=0.96$) reflecting whether the participant had experienced any form of physical abuse (0 = no childhood physical abuse; 1 = at least 1 of the 2 physical abuse items was endorsed).

Emotional adversity. Childhood emotional adversity was measured by 3 items assessing a respondent's childhood exposure to trauma experiences such as parental substance abuse; caregiver impairment or absence due to severe parental psychiatric illness, suicide, or prison; and childhood institutionalization in foster care, orphanage, reformatory, or incarceration. Based on preliminary exploratory factor analyses, these items were selected

to best represent childhood emotional adversity. Unfortunately, we did not have a good measure of either emotional neglect or psychological abuse. A composite variable ($\alpha=0.96$) was created from these 3 items to reflect whether the participant had experienced any form of childhood emotional adversity that had not been captured in the maltreatment variables (0 = no childhood emotional adversity; 1 = at least 1 of the 3 childhood adversity items was endorsed).

Childhood loss. The *childhood loss* variable was measured by 2 items, each of which represented the death of a close family member (even if by different circumstances): the death of a caregiver or sibling during childhood; or death of an immediate family member due to homicide or drunk driver. Each item was a dichotomous *yes/no* variable indicating reported presence or absence of such a loss. A composite variable was created ($\alpha=0.85$) with a total score of 1 or more was coded as 1, and total scores showing no loss were coded as 0.

Witnessing violent death. Another item asked if during childhood the participant had ever witnessed the violent death of another person. This dichotomous item (0, *no*; 1, *yes*), was included as a separate trauma subtype. Unfortunately, our ability to measure other general violence exposure was limited.

Serious illness/accident. A single item was used to assess whether the participant had personally experienced a life threatening accident or illness. This item was coded as a dichotomous variable (0, *no*; 1, *yes*).

Natural disaster. This item assessed participant exposure to any serious natural disaster. It was coded as a dichotomous variable (0, *no*; 1, *yes*).

Intimate partner violence. Participants' experiences of lifetime and past-year IPV were assessed using 3 subscales of the Revised Conflict Tactics Scale (CTS2) (Straus et al.,

1996) ($\alpha = 0.87$): psychological aggression (8 items) ($\alpha = 0.81$), physical assault (12 items) ($\alpha = 0.81$), and sexual coercion (4 items) ($\alpha = 0.45$). Reliability for this measure was calculated within our sample. The CTS2 items were rated on an 8-point scale ranging from 0 to 7 (0, this never happened; 1, once in past year; 2, twice in past year; 3, happened 3 to 5 times in past year; 4, happened 6 to 10 times in past year; 5, happened 11 to 20 times in past year; 6, happened 20 plus times in past year; 7, not in the past year, but it did happen before).

Lifetime and past-year prevalence scores were created for each IPV subscale and overall IPV victimization. Lifetime IPV prevalence was used to assess if a participant had experienced any IPV (0, *no*; 1, *yes*), any physical IPV (0, *no*; 1, *yes*), any psychological IPV (0, *no*; 1, *yes*), and any sexual IPV victimization at some point in her lifetime (0, *no*; 1, *yes*). Past-year frequency scores were calculated for each of the 3 subscales and the entire scale by recoding the response item reflecting lifetime victimization (i.e., the response item “not in the past year, but it did happen before” was recoded from 7 to 0), recoding the response items to their appropriate midpoints (e.g., the response item “happened 3 to 5 times” was recoded from 3 to 4), and summing the items for each subscale. Past-year IPV prevalence was used to assess if a participant had experienced any IPV (0, *no*; 1, *yes*), any physical IPV (0, *no*; 1, *yes*), any psychological IPV (0, *no*; 1, *yes*), and any sexual IPV victimization (0, *no*; 1, *yes*), during the past 12 months.

Trauma domain variables. Trauma experience domain variables—child maltreatment, interpersonal trauma, and total trauma—are composite binary variables based on yes/no responses from the trauma inventory. *Child maltreatment* included any self-reported physical and/or sexual abuse. The variable *interpersonal trauma* included experiences that disrupted important relationships such as child maltreatment,

institutionalization, witnessing the violent death of a loved one, caregiver substance use, caregiver severe psychiatric illness, caregiver or sibling death, and IPV. The *total trauma* composite variable included all trauma subtypes. If any trauma subtype was indicated, then the domain encompassing that subtype was scored positive. The *polytraumatization* variable included the number of trauma subtypes endorsed by the participant (range: 0–8). Given the small percentage of participants reporting the highest numbers of trauma subtypes, we collapsed responses for reports of 5 or more trauma subtypes.

Child maltreatment composite. The child maltreatment composite variable ($\alpha=0.66$) was created from the *physical abuse* and *sexual abuse* composite variables. Unfortunately, our trauma measure did not specifically assess for neglect or psychological abuse. Therefore, a limitation of this study is that maltreatment by neglect or psychological abuse is not represented in our *child maltreatment* variable. This composite variable is a binary variable (0 = no sexual or physical abuse reported; 1 = at least one form of sexual or physical abuse reported).

Interpersonal trauma. A composite variable ($\alpha= 0.49$) was created to examine interpersonal trauma as a specific trauma domain. This variable was coded as 1 if a participant endorsed experiencing any of the following trauma subtypes: sexual abuse, physical abuse, childhood emotional adversity, childhood loss, or lifetime exposure to any form of IPV. These trauma types were included based on the nature of the trauma affecting close interpersonal bonds and attachment. Other forms of violence might be considered traumatic but were not included because they do not affect the participant's direct interpersonal world or attachment figures. Conversely, emotional adversity might not be considered interpersonal violence, but experiences of emotional adversity were considered to

be interpersonal trauma for the purposes of this study given the effect such experiences can have on primary attachment relationships of the participant.

Overall trauma composite. An overall *trauma composite* variable ($\alpha=0.49$) was created to assess the presence of any type of traumatic experience assessed on any other trauma measure. *Overall trauma exposure* was operationally defined as a positive response on any of the items of the trauma inventory or CTS2. All dichotomous *yes/no* responses for trauma items were summed for each participant, and a total value of 1 or more positive responses was coded as a 1, whereas no positive responses was coded as a 0.

Polytraumatization. Polytraumatization was measured to include total number of individual trauma subtypes endorsed by a participant. In the primary polytraumatization variable, trauma subtypes included were *sexual abuse, physical abuse, emotional adversity, lifetime exposure to IPV, childhood loss, violence exposure, serious illness, and natural disaster*. *Polytraumatization* was a continuous variable coded 0 to 8, based on the number of trauma subtypes a participant endorsed. Due to the variance in our data and literature findings suggesting that risk seems to plateau at 5 or more distinct types of trauma, we chose to report on categories of 0 to 5 or more trauma types (Mersky, Topitzes, & Reynolds, 2013).

Perinatal depression. PND is defined as depression experienced during pregnancy or postpartum. PND was measured using the Edinburgh Postpartum Depression Scale (EPDS) (Cox, Holden, & Sagovsky, 1987). The EPDS was developed specifically for assessing postpartum depression, and compared to standard depression screens, the EPDS relies much less on symptoms of depression that overlap with symptoms of pregnancy and the postpartum period (Brouwers, van Baar, & Pop, 2001). The 10-item EPDS is a self-report screening scale and the response format is frequency-based. Each item asks a question about

a potential symptom and the participant has 4 response options (i.e. I have felt sad or miserable - 0, no, not at all; 1, not very often; 2, yes, some of the time; 3, yes, almost always). Each item is scored from 0 to 3 with 7 items reverse scored. The scores are summed, yielding a total score between 0 and 30.

In our analysis, perinatal depression was indicated by an EPDS score ≥ 10 at 1 or both time points (i.e., prenatal visit, 6-weeks postpartum visit). A cutoff score of ≥ 12 on the EPDS is consistently correlated with a clinical diagnosis of major depressive disorder, when assessed with a structured clinical interview (Cox et al., 1987). EPDS scores of 10 to 12 have been associated with an accurate diagnosis of minor depressive disorders. The EPDS scale had high reliability in our sample ($\alpha=0.86$). Therefore we examined reports of any clinically significant depressive symptoms in our sample to ensure we did not overlook any clinically significant depression. Multiple reports in the literature have documented that the EPDS demonstrates good sensitivity and specificity in identifying women suffering from perinatal depression (Finer & Zolna, 2011)

Data analysis. Data were managed and analyzed using SPSS 21.0. Univariate analyses were conducted to describe trauma and PND prevalence. Trauma prevalence was calculated for the total sample and by PND status subgroups. We used chi-square to test for significant between-group differences with Bonferroni adjustment for multiple comparisons. Five (2.5%) participants did not report PND status and ten participants (5.0%) had missing data for one or more trauma measures. List wise deletion was utilized in bivariate analyses as it was determined data were missing at random.

Results

Depression prevalence and participant characteristics by depression status.

About a third of the sample (33.2%) screened positive for PND (see Table 2.1). Chi-square

tests revealed no significant differences in demographic characteristics between depressed and non-depressed groups, with the exception of *relationship status*. The percentage of depressed single mothers (27.9%) was nearly twice that of non-depressed single mothers (15.6%).

Trauma prevalence. *Trauma experiences.* A majority of participants (81.0%) reported at least one trauma experience. Trauma prevalence results are presented in Figure 2.1, Figure 2.2, and Table 2.2. IPV was the most prevalent traumatic experience reported (lifetime = 74.6%; past year = 73.6%). Lifetime psychological IPV was most prevalent (72.6%) followed by lifetime physical IPV (47.3%) and lifetime sexual IPV (13.9%). Past-year IPV prevalence was similar to lifetime prevalence. Childhood loss of a primary caregiver or sibling was reported by 28.3% of participants. Approximately 14% of participants reported child physical or sexual abuse (sexual = 11.4%; physical = 7.8%). More than 17% of participants reported emotional adversity. An additional 11.2% of participants reported witnessing a violent death or surviving a natural disaster, and 4.4% reported surviving a life-threatening illness or accident.

Interpersonal trauma. 80% of participants reported experiencing lifetime interpersonal trauma. Of these participants, 45.0% reported non-IPV related interpersonal trauma.

Polytraumatization. Polytraumatization was reported by 43.0% of participants. Approximately 35% of all participants reported 2 or 3 distinct trauma subtypes. No participant reported more than 7 trauma subtypes.

Trauma and perinatal depression. Trauma prevalence was examined by PND status. All trauma subtypes were examined independently and by trauma domain. For all

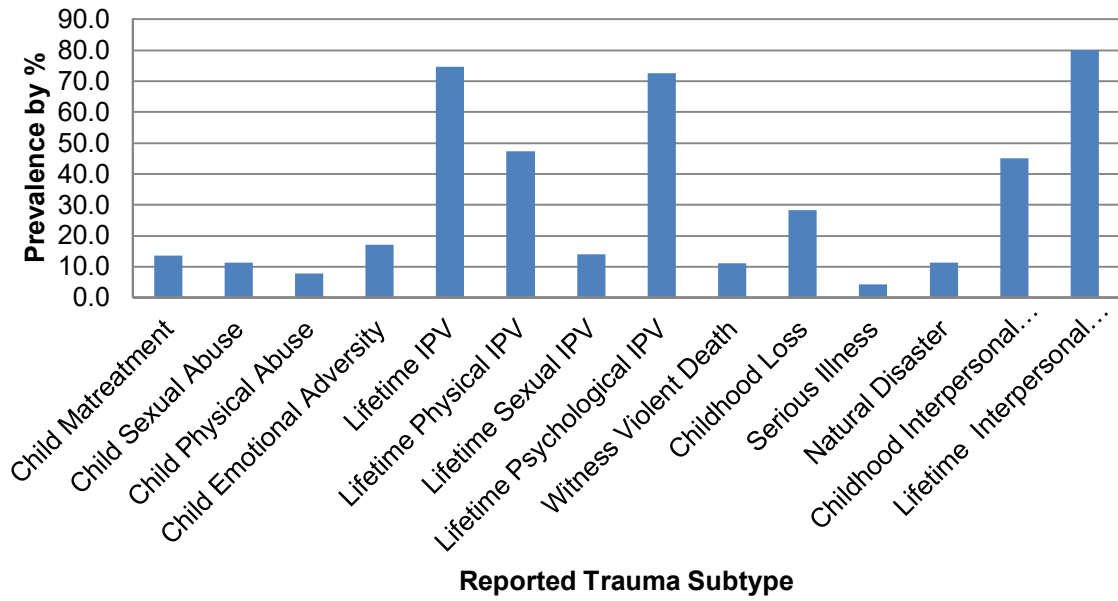


Figure 2.1. Trauma prevalence by subtype.

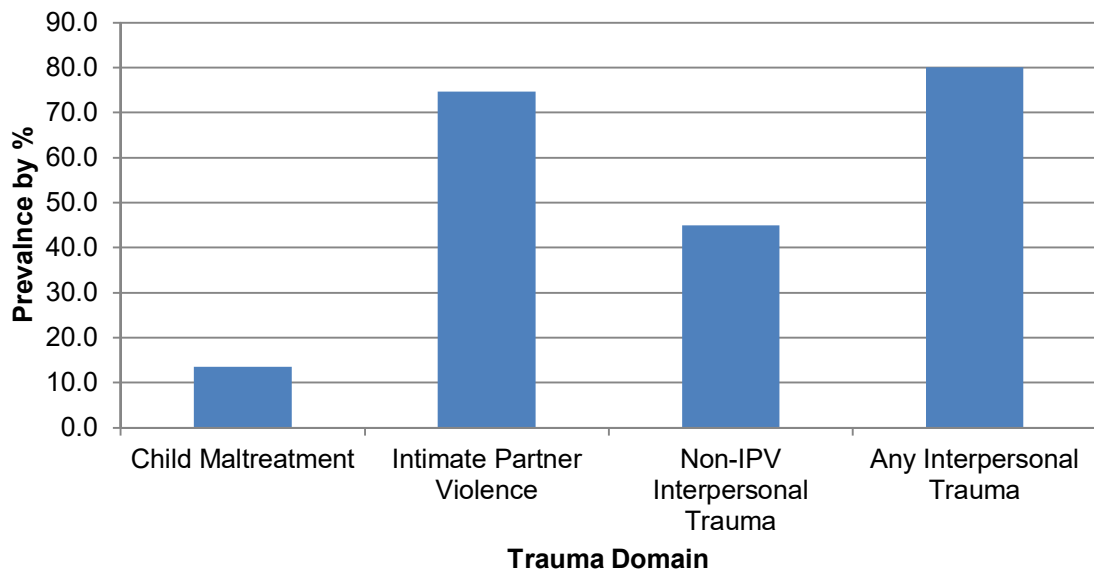


Figure 2.2. Trauma prevalence by trauma domain.

Table 2.2

Trauma Prevalence in Depressed and Non-depressed Adolescent Mothers

Trauma type	Total (%)	Depressed (%)	Non-depressed (%)
Any trauma	81.0	88.2	77.3
Child maltreatment***	13.5	25.8	8.2
Sexual abuse***	11.4	23.8	5.2
Physical abuse	7.8	12.5	5.9
Emotional adversity	17.1	24.2	12.7
Childhood loss**	28.3	41.5	23.0
Lifetime IPV	74.6	77.8	73.9
Physical IPV	47.3	47.6	46.6
Psychological IPV	72.6	74.6	72.2
Sexual IPV*	13.9	22.2	10.5
Past year IPV	73.6	77.8	72.2
Physical IPV	45.8	47.6	44.4
Psychological IPV	71.1	73.0	70.7
Sexual IPV*	13.9	22.2	10.5
Witnessed violent death	11.2	15.2	10.5
Non-IPV interpersonal trauma***	45.0	64.8	35.7
Total interpersonal trauma	80.0	88.2	75.9
Illness or accident	4.4	4.6	4.4
Natural disaster	11.2	16.9	8.2
Polytraumatization events			
0	17.7	12.1	20.0
1	38.2	24.1	44.0
2	23.1	31.0	20.0
3	12.4	17.2	10.4
4	3.8	6.9	2.4
≥ 5	4.8	8.6	3.2

Note. N = 210.

trauma subtypes prevalence was higher among depressed participants. IPV prevalence between depressed and non-depressed participants did not differ significantly with the exception of sexual IPV. In addition, prevalence of poly-traumatization decreased as the number of trauma experiences increased ($M = 1.6$ trauma subtypes, $SD = 1.4$). Non-depressed participants had higher prevalence of experiencing one trauma subtype. As the number of trauma subtypes experienced increased, the prevalence of polytraumatization among depressed participants exceeded that of non-depressed participants.

Overall trauma experience was not significantly greater among depressed participants, as both groups reported high rates of trauma. However, there were specific trauma subtypes that depressed participants were more likely to report. Depressed participants reported more maltreatment ($\chi^2(1) = 1.20, P < 0.001$), sexual abuse ($\chi^2(1) = 15.09, P < .001$), emotional adversity ($\chi^2(1) = 4.29, P < 0.05$), and childhood loss ($\chi^2(1) = 7.35, P < 0.01$) than non-depressed participants. Physical abuse was not significantly different between groups nor was surviving a natural disaster, though the difference was notable ($\chi^2(1) = 3.45, P = 0.06$). Significant differences were not detected between groups for lifetime or past-year IPV. However, the depressed group did report significantly higher prevalence of sexual IPV ($\chi^2(1) = 4.78, P < 0.05$). Participants in the depressed group were significantly more likely to report having experienced interpersonal trauma ($\chi^2(1) = 4.31, P < 0.05$) and non-IPV interpersonal trauma ($\chi^2(1) = 14.67, P < 0.001$) than those in the non-depressed group.

Participants who experienced one or less trauma subtype were significantly less likely to be in the depressed group ($\chi^2(5) = 13.76, P < 0.05$). Although nonsignificant, the overall data trend showed that as the number of trauma experiences increased, the percentage of

participants in the depressed group also increased. Polytraumatization scores using IPV subtypes as separate categories did not significantly alter overall polytraumatization findings. Table 2 presents the trauma subtypes that were significantly different among groups.

Discussion

Our study aimed to (1) examine the prevalence of trauma experiences in childhood and adolescence in a diverse sample of adolescent mothers and (2) examine differences in trauma prevalence between depressed and non-depressed groups of adolescent mothers. Overall trauma prevalence in our sample of adolescent mothers was higher than reported rates in other studies (H. N. Bailey et al., 2007; Haider, 2013; Noll et al., 2009) and remarkably higher than national estimates for the general population (V. Felitti et al., 1998). The rates of PND in this sample, although higher than average estimates in the general population (Vesga-Lopez et al., 2008), are overshadowed by the epidemic of trauma experienced by these young women.

Prevalence of trauma subtypes among adolescent mothers. All subtypes of trauma were present in our sample. Most had a prevalence of over 10% which is higher than in the general population (Finkelhor et al., 2015). IPV was the most frequently reported type of trauma experienced, and notably higher than national estimates of IPV among adolescents (Haynie et al., 2013; Wolitzky-Taylor, Ruggiero, Danielson, & Resnick, 2008). Of the participants experiencing some form of IPV, nearly all experiences had occurred within the past year. This brings up issues of developmental timing. The high past year IPV prevalence coupled with the prevalence of childhood interpersonal trauma supports prior research suggesting early victimization may make an individual more likely to be re-victimized in an intimate partner relationship. Adolescent mothers often have chaotic lives characterized by multiple stressors and role strain. Our results seem to corroborate these findings and add that

child maltreatment and IPV may be specific major factors implicated in the unstable circumstances many of these young women must cope with.

Child maltreatment, measured by reported sexual and physical abuse, was on the lower end of substantiated maltreatment experiences (13%–21%) reported in previous studies (Cederbaum et al., 2013; Mylant & Mann, 2008). However, these studies included all maltreatment subtypes. Thus, if other forms of maltreatment, including neglect and psychological abuse, were included in our measures, the prevalence of child maltreatment in this study sample might be higher. An experience of emotional adversity (e.g., parental substance abuse and/or severe psychiatric illness), was reported by 17.1% of participants and likely included participants who would also be eligible for inclusion in the neglect and emotional abuse category. Slightly less than half of participants reported non-IPV interpersonal trauma, which was nearly identical to the prevalence rate of child maltreatment reported by Putnam-Hornstein et al. (2013). The general decreasing trend in the number of distinct trauma subtypes is consistent with existing literature; however, prevalence of polytraumatization was substantially higher than national estimates for the general population (D. Finkelhor et al., 2007).

The high prevalence of childhood loss was another interesting finding. Although childhood loss of a sibling or caregiver was reported by nearly a third of participants, this trauma subtype has not been widely researched. Thus, additional research on the prevalence and risks associated with childhood loss is needed to better understand the role of grief and loss for adolescent mothers' health and mental health.

Trauma prevalence and perinatal depression. Depressed participants reported higher levels of trauma than non-depressed participants, particularly among those who

reported non-IPV interpersonal trauma. Prevalence rates of interpersonal and non-interpersonal trauma were higher among depressed participants. Sexual abuse was most significantly associated with PND. The depressed group reported experiences of sexual abuse at nearly 4 times the prevalence of the non-depressed group. Further, lifetime sexual IPV prevalence was significantly higher in depressed than non-depressed adolescent mothers. These findings may suggest an association between sexual trauma and PND, which could potentially be based on the proximal nature of sexual trauma to the perinatal experience. Depressed participants also reported more childhood loss than non-depressed participants. Children experience loss developmentally, and trauma associated with the loss of sibling or caregiver may be re-experienced during the transition to adolescence and later in a caregiving role.

A primary finding was the high prevalence of IPV overall, regardless of PND status. While sexual IPV was higher in depressed participants, significant group differences were not detected for IPV and other IPV-subtypes. IPV non-significance could be explained by several factors. Considering most participants experienced IPV within the past year, it could be that, as opposed to concurrent trauma experiences, trauma history has a greater impact on PND risk. Dysfunction of the hypothalamic-pituitary-adrenal (HPA) axis has been implicated in the development of PND and noted in infants born to mothers with antenatal depression (Brand et al., 2010; Glover, O'Connor, & O'Donnell, 2010). Early trauma exposure might dysregulate the HPA axis during development, priming the adolescent for depression (Glover et al., 2010). Individuals experiencing concurrent IPV, but not earlier trauma, might be protected during a critical developmental period. It is also possible that differences in PND could not be identified given the lack of variability in IPV victimization.

Another explanation suggests IPV might be less associated with PND in adolescents. Adolescent relationships are extremely fluid, and there might be periods when the relationship is positive and supportive. For adolescent mothers in particular, attention and support from the baby's father protects against PND (Meltzer-Brody et al., 2013). Among couples with consistent threat of chronic IPV, such threat might be normalized or managed (i.e., coped with) through an activated stress-response system (e.g., hyperarousal) in ways that enhance survival.

Trauma, polytraumatization, and adolescent perinatal depression. The polytraumatization prevalence in this population was consistent with the general adolescent polytraumatization literature in that there was a general decreasing linear trend in the number of trauma types experienced by participants. The majority of the adolescent mothers experienced one or two trauma types and few experienced more than four types overall. Also, the prevalence of polytraumatization in depressed participants was nearly double that of the non-depressed group. This finding suggests polytraumatization may increase risk of PND. In most of the polytraumatization literature, the increased risk of depression increases with each additional subtype of trauma experienced, leveling off around 4 -5 total trauma subtypes reported. Our results did not follow this pattern. However, the increased risk of PND for those experiencing three instead of two trauma types was borderline significant. We did not have many participants report experiencing more than three trauma subtypes, making the analysis of these polytraumatization groups underpowered. However, there could potentially be a significant effect of increased risk of PND after two trauma experiences if the analysis was repeated in a larger sample.

Limitations. Results from this secondary data analysis should be interpreted with caution. Measures relied on self-reports, which can be a limitation due to memory bias. Also, trauma was measured using an inventory composed of yes/no items, thus limiting our ability to assess the severity, duration, frequency, and individual perception of traumatic experiences and whether treatment was received. The measure did not assess for all subtypes of trauma, notably excluding neglect, emotional maltreatment, discrimination, acculturation, and immigration-related trauma. Participants were recruited during prenatal visits and, despite researcher attempts to assure confidentiality, may not have felt comfortable disclosing sensitive issues. Some participants were members of cultures that might vary in their interpretations of trauma or privacy norms. Additionally, many participants came from different cultures in which the traumatic events we inquired about may be interpreted differently and with different privacy norms restricting disclosure of some personal information. Fortunately, the measures did provide different questions and subscales allowing for separation of multiple subtypes of trauma and IPV exposure which enabled us to assess different types of IPV and trauma not previously examined in the literature.

Another limitation is that this study used a convenience sample. Thus, while the results are striking, they cannot be generalized to an overall population of adolescent mothers. We suggest that a larger study with a more nationally representative sample should be conducted to corroborate our findings. Also, there were 25 participants who had complete data on the trauma inventory and EPDS at time point 1, but did not have complete data on the EPDS at the second time point. This data was included in all analyses due to our definition of PND existing at either time point. Including this data increases the potential for Type 2 error because some of the participants lost to the study through attrition might have had

postpartum depression that was not captured in our analyses. Most of the limitations bias our results toward underestimation of the prevalence of trauma in the population of adolescent mothers; making the epidemic levels we identified even more striking. Despite limitations, study findings add to the sparse literature on trauma and PND among adolescent mothers. To our knowledge, this is the first study to provide a detailed descriptive examination of childhood loss, poly-traumatization, and PND in adolescent mothers.

Implications. Adolescent mothers often have chaotic lives characterized by multiple stressors and role strain. Our results corroborate these findings and add that IPV and child maltreatment are major factors implicated in the unstable circumstances facing young mothers and their children. Additional research is needed to corroborate our findings. Such research should use detailed trauma measures and advanced statistical analyses to better understand the association between trauma and PND as well as other negative maternal and child outcomes in a large, nationally representative sample of adolescent mothers. Trauma assessment should include both the extent and duration of trauma experiences to link those experiences to critical periods of development, particularly neurodevelopment. This research might enable greater specificity in identifying trauma-affected biological processes that indicate negative outcomes or increase risk of specific negative outcomes. Future research should also include a greater focus on childhood loss. The loss of close family members, and particularly a primary caregiver is likely triggered when a young mother faces becoming a new caregiver herself. How she feels about the loss of her own caregiver may affect the ways in which she perceives her own role as caretaker and how she interacts with her baby.

Given the high prevalence of trauma experiences, particularly IPV and interpersonal trauma, we recommend trauma-informed perinatal care as the standard of care for all

adolescent mothers. Interventions for adolescent mothers should include a trauma component and the capacity to address grief and loss, particularly interventions addressing depression or psychiatric health. At minimum, providers should thoroughly screen adolescents for trauma history throughout care, including childhood loss and IPV (past and current), and provide referrals and resources for trauma-informed care and IPV services. Given that nearly three-quarters of the sample reported IPV (74.6%), we recommend that education and prevention related to IPV be adopted as a standard of care. This standard, along with frequent screening for PND, is critical for depressed adolescent mothers given the risk to mother and baby associated with PND. Any adolescent with PND symptoms should be screened for past and current trauma experiences and provided with trauma-informed evidence-based intervention.

When compared with prevention efforts, ambulatory care is typically associated with more costly treatment and poorer outcomes. Although all trauma experiences are not preventable, many can be prevented. We urge providers and policy makers to focus on the prevention of trauma experiences during childhood, particularly in young women, to address the current trauma epidemic in adolescent mothers. Reducing polytraumatization through prevention might substantially reduce negative outcome risk for adolescent mothers, improving the well-being of mothers and children. Overall, the early detection and treatment of childhood trauma is critical in ameliorating the effects of trauma and providing effective services that promote optimal health and development of adolescent mothers and their babies.

CHAPTER 3: TRAUMA SUBTYPES AND POLYTRAUMATIZATION AS RISK FACTORS FOR ADOLESCENT PERINATAL DEPRESSION

Abstract

Purpose. To examine the significance of trauma subtypes and polytraumatization as predictors of perinatal depression (PND) within a diverse group of adolescent mothers.

Methods. This is a study of adolescent mothers from the prenatal period to 6-weeks postpartum. A diverse group (40% African American, 42% Latina, 14% White, 4% Other) of 205 adolescent mothers aged 14-20 years old ($M=18$, $SD=1.4$) was recruited during routine prenatal visits at a county-based, public health prenatal clinic in the southeastern United States. Child and adolescent trauma history, intimate partner violence (IPV), and depression measures were gathered prenatally and approximately 6-weeks postpartum.

Results. Sexual abuse and childhood loss were the most potent predictors of PND. Sexual IPV also predicted risk for PND in adolescent mothers, although physical and psychological IPV alone did not. Polytraumatization was also a strong risk factor for adolescent PND, and risk increased from two through four or more different trauma subtypes experienced.

Conclusions. Future research should examine the mechanisms of sexual abuse, childhood loss, and polytraumatization as specific and distinct risk factors for adolescent PND. Screening for these trauma subtypes may enhance referral, prevention and treatment of perinatal psychiatric illness in this population.

Introduction

The adolescent birth rate in the U.S. remains one of the highest among all industrialized countries, exceeding Canada and the United Kingdom (Nations, 2013). Adolescent pregnancy costs the U.S. up to \$28 billion a year through lost tax revenue, public assistance, and increased healthcare, foster care, and criminal justice services (Hoffman, 2008; Pregnancy, 2013). Adolescent mothers and their children are at increased risk for a variety of negative biopsychosocial outcomes (e.g., low birth weight, impaired mother-child bonding and increased infant mortality) as well as perpetuation of a cycle of family poverty and violence (Lanzi, 2009; Phipps, 2011; Szigethy, 2001; Weissman, 2006). Further, infants born to young mothers are more likely to have impaired cognitive development, disrupted stress systems, and poorer educational and health outcomes throughout life (Bonari et al., 2004; Brand et al., 2010; Davis & Granger, 2009; Kingston, Heaman, Fell, Chalmers, & Maternity Experiences Study Group of the Canadian Perinatal Surveillance System, 2012).

Adolescent pregnancy and perinatal depression. A serious issue compounding the already substantial risks experienced by adolescent mothers is perinatal depression (PND). Estimates for the prevalence of PND in adolescent mothers range from 12% to 57% (Siegel & Brandon, 2014; Szigethy, 2001). Multiple studies have found that adolescent mothers are more likely to suffer from PND and associated outcomes compared to their adult counterparts (Figueiredo, Pacheco, & Costa, 2007; Kingston et al., 2012; Lanzi, 2009; Raisanen et al., 2014). Existing studies have indicated teens are more likely to be depressed if they have poor social support, increased stress, a history of depression, impaired attachment, and low self-esteem, all which are associated with adolescent motherhood (Desrosiers et al., 2014; Fagan & Lee, 2010; Nunes & Phipps, 2013). Childhood trauma has also been linked to risk of adolescent pregnancy and the development, course and severity of PND in adolescent

mothers (Madigan et al., 2014; Meltzer-Brody et al., 2013; Noll et al., 2009; Tzilos, Zlotnick, Raker, Kuo, & Phipps, 2012).

Risk factors for PND in adolescents have often been treated as similar to risk factors for adult women. However, a study by Nunes and Phipps (2013) compared risk factor models for adolescent and adult PND and found that typical adult risk models did not fit well with adolescent mothers. Many studies of adolescent mothers and perinatal depression are limited due to their origination from cross-sectional and retrospective survey designs, often using small sample sizes. An additional limitation that has become increasingly relevant is the lack of data from Spanish-speaking adolescents. This is problematic due to the rapid growth and high adolescent birth rates found in the U.S. Latino population.

Traumatic experience and perinatal depression in adolescent mothers.

Interpersonal trauma. One of the most commonly identified forms of childhood interpersonal trauma is child maltreatment. Child maltreatment affects approximately 1 in 5 children in the U.S (Finkelhor et al, 2015). Although it is known that maltreated children are more likely to become pregnant during adolescence than their non-maltreated peers (Noll, 2009), research on the impact of specific forms of child maltreatment on adolescent PND risk is limited. Tzilos et al. (2012) found that a history of physical and sexual abuse was associated with a greatly increased severity of depression in pregnant adolescents. Kingston et al. (2013) found similar results for adolescent mothers experiencing physical abuse in the two years prior to pregnancy. However, these results are more indicative of adolescent abuse and not representative of child maltreatment which may lead to different developmental effects. Further, these studies have not been widely replicated and other forms of

maltreatment, including polytraumatization have not been closely examined in this population.

There is less research on other forms of interpersonal trauma. Ammerman et al. (2009) examined interpersonal trauma as a composite variable including sexual and physical abuse, witnessing domestic violence or violent crime, IPV and violent crime victimization in a sample of young mothers, some of whom were adolescents. They examined trauma subtype prevalence and identified interpersonal trauma overall as a risk factor for depression in early motherhood. To the best of our knowledge, no research examining other forms of interpersonal trauma and PND in adolescent mothers exists. Early interpersonal trauma such as childhood loss and emotional adversity have not been examined.

Intimate partner violence. A number of studies have found that adolescents are at higher risk of experiencing IPV during and after pregnancy compared to adult women (Covington, Justason, & Wright, 2001; Silverman, Raj, Mucci, & Hathaway, 2001). Despite the high prevalence of IPV among adolescent mothers, the literature has focused on IPV as a risk factor for PND primarily among adult women. A growing body of research with adult women has established the influence of IPV during pregnancy on PND (Leung, Kung, Lam, Leung, & Ho, 2002; Romito et al., 2009; Tiwari et al., 2008). Studies suggest that women who report experiencing IPV during pregnancy are more likely to develop postnatal depression compared to non-abused women (Patel, Rodrigues, & DeSouza, 2002) and that physical, psychological and sexual IPV victimization before and during pregnancy are associated with greater severity of depressive symptoms (Cerulli, Talbot, Tang, & Chaudron, 2011; Martin et al., 2006). Although most studies on IPV and pregnancy focus solely on physical abuse, or aggregate findings based on various forms of abuse (B. A. Bailey &

Daugherty, 2007; Bell, Busch-Armendariz, Sanchez, & Tekippe, 2008; McMahon, 2011), some notable exceptions have independently examined different types of IPV experienced during pregnancy (Ludermir, Lewis, Valongueiro, de Araujo, & Araya, 2010; McMahon, 2011; Woolhouse, Gartland, Hegarty, Donath, & Brown, 2012). For example, Ludermir et al. (2010) found the association between physical and sexual IPV and postnatal depression was significantly reduced after accounting for psychological IPV and other confounding factors. The overall findings on the impact of IPV on PND are persuasive, yet they have not yet been generalized to the vulnerable population of adolescent mothers.

Non-interpersonal trauma. Little, if any, literature exists examining other trauma subtypes such as natural disaster in relation to adolescent or adult PND. However, much evidence exists linking these types of trauma to negative mental health outcomes in other adolescent populations (Adams et al., 2014; Caffo & Belaise, 2003; Furr, Comer, Edmunds, & Kendall, 2010; Landolt, Vollrath, Gnehm, & Sennhauser, 2009; Pinquart & Shen, 2011; Pinquart & Teubert, 2012). The mediating mechanism between any trauma type and mental health problems likely includes dysregulated stress response. It follows that these types of trauma could increase risk of PND among adolescents considering the mounting evidence that pregnancy adds vulnerability to hormonal regulation of the stress response (Christian, 2012) .

Study background and objectives. A prospective epidemiological study of PND in adolescent mothers recently found that over 80% of adolescent mothers participating in the study reported experiencing some form of interpersonal trauma in childhood or adolescence (Killian-Farrell et al., Under Review). Results indicate increased prevalence of trauma subtypes and polytraumatization in depressed groups. The current study builds on prior work

by examining the predictive relationships between these trauma subtypes, polytraumatization, and PND in pregnant adolescents. It addresses some of the limitations in the general literature by examining an expanded range of traumatic experience and polyvictimization. It also uses a large sample from a prospective longitudinal study, and data from an ethnically diverse group of adolescent mothers. Based on prior research findings, it is hypothesized that 1) adolescent mothers who have experienced any type of interpersonal trauma will be significantly more likely to experience PND; and 2) adolescent mothers with a history of polytraumatization will be significantly more likely to experience adolescent PND.

Methods

Sample. The study used a convenience sample ($N=205$) of adolescent mothers aged 14-20 years old who were recruited from a county-based public health prenatal clinic in the southeastern U.S. during routine prenatal visits. Table 3.1 presents descriptive information on the sample. The average age of participants was 18 years. A majority (86%) of participants described themselves as racial/ethnic minority, with approximately 42% identifying as Latina, and 40% identifying as African American. 86% percent of participants reported low socioeconomic status defined by a total household income \leq \$30,000 per year. The majority were primiparous and delivered full-term infants. There was an overall 89% participant retention rate with 25 (10.6%) participants lost to attrition after the first data point. We handled missing trauma data using listwise deletion because the number of participants in this group was a small percentage of the overall sample ($<15\%$). All participants included had complete EPDS data at one or both time points. Chi-square tests with demographic, trauma, and depression variables indicate that differences in attrition rate by group were not significant.

Table 3.1

Sample Descriptive Characteristics

Demographic Characteristic	Total <i>N</i>	<i>M (SD)</i> or %
Age	204	18.40 (1.39)
Race/ethnicity	205	
White		14.1% (n=29)
African American		40.0% (n=82)
Latina		41.5% (n=85)
Other		4.44% (n=9)
Marital status (Unmarried)	190	90.0% (n=171)
Relationship status	203	
Single*		19.7% (n=40)
Not living with partner		36.9% (n=75)
Cohabiting with partner		43.4% (n=88)
Household income (< \$30,000)	121	86.0% (n=184)
Education status	199	
Unenrolled		68.8% (n=137)
Part-time		11.1% (n=22)
Full-time		20.1% (n=40)
Work status (Unemployed)	198	76.3% (n=151)
Unplanned pregnancy	203	74.9% (n=152)
Primiparous	199	72.9% (n=145)

Measures. Measures assessing demographics, depression, and trauma were collected as part of a larger battery of assessments at routine perinatal visits. All data on demographics and trauma were collected at the first time point during the participant's second or third trimester. Depression data was collected at the first time point and again at approximately six-weeks post-partum. More extensive details on study measures and procedures have been published elsewhere (Meltzer-Brody et al., 2013).

Demographic variables. A demographic questionnaire was constructed for the study which collected information including race/ethnicity, educational level, socioeconomic status (SES), work status, relationship status, and factors related to the participant's pregnancy (i.e., total number of pregnancies, whether the pregnancy was planned).

Perinatal depression. PND was measured using the Edinburgh Postpartum Depression Scale (EPDS). The EPDS is a 10-item, self-report screening instrument with good concurrent validity. It is commonly used internationally to assess postpartum depression. In our study, PND refers to the presence of significant depression symptoms in the prenatal and/or postpartum period (i.e., the PND score was a composite variable created to indicate the presence of PND if a subject had a positive score at either data point). In our analysis, we used a score of ≥ 10 as indicating significant levels of depressive symptoms at both antenatal and postpartum data points. A score of ≥ 12 on the EPDS is consistently shown to be correlated with a clinical diagnosis of major depressive disorder, when compared to a structured clinical interview (Cox et al., 1987). EPDS scores of 10-12 have been associated with an accurate diagnosis of minor depressive disorders. Multiple reports have documented that the EPDS demonstrates good sensitivity and specificity in identifying women suffering from PND (Gaynes et al., 2005).

Trauma exposure. Trauma history was assessed using a trauma inventory from previous research (Leserman & Drossman, 2007; Leserman et al., 1996; Leserman, Li, Drossman, & Hu, 1998; Meltzer-Brody et al., 2007). Trauma exposure variables used in this study included: child maltreatment (i.e., sexual abuse, physical abuse), IPV (i.e., sexual, physical and/or psychological abuse by an intimate partner), other forms of interpersonal and environmental trauma (i.e., caregiver substance use or severe mental illness, childhood loss of a caregiver or sibling, institutionalization, foster care, violence exposure, natural disaster), and polytraumatization. Unless otherwise specified, each item was scored as a dichotomous yes/no variable indicating trauma exposure (i.e., 1 = yes, 0 = no).

Childhood sexual abuse. Childhood sexual abuse was defined as genital touching or vaginal or anal intercourse where force or threat of harm was present that occurred. The threat of force or harm was either explicit or indicated by a 5-year age differential between the victim and perpetrator. Four items assessed this trauma subtype (two for molestation and two for penetration). One molestation and one penetration item assessed sexual abuse before age 13, and the other two items assessed the same experiences after age 13. A sexual abuse composite variable was created for all sexual abuse before age 13, and a separate variable was created for sexual abuse after age 13. A total composite variable was created to indicate history of any sexual abuse during childhood or adolescence.

Childhood physical abuse. Childhood physical abuse was defined as incidents separate from childhood sexual abuse that included life-threatening physical attack with intent to kill or seriously injure or other physical abuse such as being beaten, kicked, or burned. This was assessed using two inventory items assessing physical abuse in childhood or adolescence.

Childhood emotional adversity. Childhood emotional adversity was measured by three items assessing a subject's childhood exposure to parental substance abuse; caregiver impairment or absence due to severe parental mental illness, suicide, or prison; and childhood institutionalization due to foster care or juvenile incarceration. Based on the literature and exploratory factor analyses, these items were selected to best represent childhood emotional adversity. This variable was created to reflect participant experience of these forms of childhood emotional adversity not captured in other trauma variables.

Child maltreatment composite. The child maltreatment composite variable indicates a participant has reported experiencing physical abuse and/or sexual abuse in childhood or adolescence.

Intimate partner violence. Participants' experiences of lifetime and past-year IPV were assessed using three subscales of the Conflict Tactics Scale (CTS2) (Straus et al., 1996): psychological aggression (8 items), physical assault (12 items), and sexual coercion (4 items). The CTS2 items were rated on an 8-point scale ranging from 0 to 7 (0 = *this never happen*; 1 = *once in past year*; 2 = *twice in past year*; 3 = *3 to 5 times in past year*; 4 = *6 to 10 times in past year*; 5 = *11 to 20 times in past year*; 6 = *20 plus times in past year*; 7 = *not in the past year, but it did happen before*).

Past-year frequency scores were calculated for each of the subscales by recoding the response items to their appropriate midpoints (e.g., the response item *3 to 5 times* was recoded from 3 to 4), recoding the response item reflecting lifetime victimization (i.e., the response item *not in the past year, but it did happen before* was recoded from 7 to 0), and summing the items for each subscale. The physical and psychological subscales both had a Cronbach α of 0.81. The sexual IPV subscale coefficient was lower ($\alpha = 0.45$); however, this

may reflect the few items in this subscale. The Cronbach alpha for the complete scale in our sample was 0.87.

Lifetime and past-year prevalence scores were also created for each IPV subscale and overall IPV victimization using the dichotomous yes/no (1/0) coding scheme. Lifetime IPV prevalence (LTP) indicates whether a participant had experienced any IPV victimization (i.e., physical, psychological, or sexual) at any point in her lifetime. Past-year IPV prevalence (PYP) was used to assess if a participant had experienced IPV victimization during the past year.

Childhood loss. Childhood loss was measured by two items: the death of a caregiver during childhood or loss of an immediate family member due to homicide. A positive response for one or both items was coded as endorsing childhood loss.

Violence exposure. Violence exposure was measured by an item assessing if the participant had ever witnessed the violent death of another person in childhood.

Natural disaster. This variable was measured by one item assessing participant exposure to any serious natural disaster.

Interpersonal trauma. A variable was created to examine interpersonal trauma as a specific domain of trauma. This variable was coded positive if a participant reported experiencing any of the following trauma subtypes: childhood sexual abuse, childhood physical abuse, childhood emotional adversity, childhood loss, or any form of IPV.

Overall trauma composite. Overall trauma exposure was operationally defined as a positive response on any of the trauma experiences assessed. All dichotomous yes/no responses for trauma items were summed for each participant, and a total value of one or more positive response was coded as a “1” and no positive response was coded as a “0.”

Polytraumatization. Polytraumatization reflects the total number of individual trauma subtypes endorsed by a participant. Trauma subtypes included in the polytraumatization variable were childhood sexual abuse, childhood physical abuse, childhood emotional adversity, IPV, childhood loss, violence exposure, serious illness, and natural disaster. This was a continuous interval variable coded on a scale of 0-8.

Data analysis. Two primary multivariate logistical regression models were specified to identify the relative strengths of the relationship between trauma and PND. The first model examined independent subtypes as predictors of PND and the second model examined levels of polytraumatization as predictors of PND. A trauma domain model was also specified in which trauma domains (i.e., interpersonal trauma, child maltreatment, and past year IPV) were tested for significance after controlling for individual subtypes. This was an exploratory analysis to test the relative strengths of trauma domains and individual subtypes as PND predictors. A similar analysis was performed on the polytraumatization model to determine the robustness of the model results after controlling for trauma subtype. Missing data was managed using listwise deletion because data appeared to meet the qualifications for missing at random (MAR) and no variables utilized in the multivariate models had >10% missing. IBM SPSS Version 23 was used for all data analysis.

The first primary logistic regression model specified PND as the outcome variable (0= *score of < 10*; 1= *score of ≥ 10*) and included the following covariates and independent variables: (a) age (in years), (b) race (1 = *minority*; 0 = *non-minority*), (c) first pregnancy (1 = *primiparous*; 0 = *not primiparous*); (d) relationship status (2 =*married or partnered and cohabiting*, 1 = *partnered but non-cohabiting*, 0 = *single*) (e) lifetime physical IPV (1 = *yes*, 0 = *no*,) (f) lifetime sexual IPV (1 = *yes*, 0 = *no*), (g) lifetime psychological IPV (1 = *yes*, 0 =

no), (h) childhood sexual abuse (1 = *yes*; 0 = *no*), (i) childhood physical abuse (1 = *yes*; 0 = *no*), (j) childhood emotional adversity (1 = *yes*; 0 = *no*), (k) childhood loss (1 = *yes*; 0 = *no*) (l) witnessed violence (1 = *yes*; 0 = *no*), and (m) natural disaster (1 = *yes*; 0 = *no*). Primary model specification was guided by trauma subtype groupings and variables in the bivariate results from Killian-Farrell et al. (under review). Each trauma subtype variable was entered into the model one at a time to observe model change with the addition of each variable.

The polytraumatization model estimated the number of traumatic subtypes reported as independent predictors (0 = no trauma, 1 = 1 traumatic experience, 2 = 2 traumatic experiences, 3 = 3 traumatic experiences, and 4 = 4 or more traumatic experiences) of adolescent PND. Reports of 4-8 trauma subtypes were collapsed into one category based on low frequency of the high numbers of trauma reported. Age and race were included as covariates in this model based on direct theoretical relevance, and primiparous status was included based on its significance in the primary trauma subtype model.

Results

Individual trauma subtypes and PND. Results of the first trauma subtype multivariate logistic regression model are presented in Table 3.2. Diagnostic tests were conducted on the data and confirmed the data met the basic assumptions for logistic regression analysis for normality and independence of variables. There was no significant influential data. A Variance Inflation Factor (VIF) test confirmed that the data did not have a harmful multicollinearity problem as all variables had a VIF score of less than 2 in the primary models and below the accepted cutoff of VIF=5 in the domain models (Berk, 2004).

After all trauma subtype variables were added to the demographic variables, the model remained statistically significant [$\chi^2(17) = 31.22, p < .05$], indicating excellent model fit. Using a two-tailed test, sexual abuse, childhood loss, sexual IPV, and primiparous status

Table 3.2

Demographic and Trauma Subtype Risk Factors for PND in Adolescent Mothers

Variable	OR	95% Confidence Interval (CI)	SE	P value
Age	0.935	0.683-1.280	0.150	0.675
Race	1.006	0.365-2.773	0.520	0.992
Primiparous*	0.388	0.162-0.931	0.173	0.034
Planned Pregnancy	0.821	0.327-2.064	0.386	0.676
Work Status	1.321	0.417-3.593	0.659	0.577
Education Status	0.565	0.227-1.408	0.263	0.221
Relationship Status:				
Partnered: Non-Cohabiting	0.512	0.165-1.593	0.297	0.248
Partnered: Cohabiting /Married	0.687	0.221-1.140	0.398	0.518
Childhood Sexual Abuse**	9.425	2.213-40.145	6.968	0.002
Childhood Physical Abuse	0.966	0.221-4.225	0.727	0.963
Childhood Emotional Adversity	0.825	0.277-2.459	0.460	0.729
Childhood Loss*	4.476	1.304-9.264	1.739	0.013
Witnessed Violence	0.582	0.160- 2.120	0.384	0.412
Natural Disaster	1.926	0.586-6.331	1.169	0.281
Lifetime Sexual IPV*	3.744	1.279-10.964	2.053	0.016
Lifetime Physical IPV	0.708	0.290-1.729	0.323	0.448
Lifetime Psychological IPV	0.927	0.319-2.697	0.505	0.889

*p<.05, **p<.01

emerged as significant independent risk factors for PND in this cohort of adolescent mothers.

Experiencing childhood sexual abuse (Odds Ratio (OR) = 9.43, $p < 0.01$) increased the risk of PND by 843%. Participants who reported losing a caregiver or sibling during childhood (OR = 3.48, $p < 0.01$) were 248% more likely than participants who did not report loss to experience PND. Participants experiencing sexual IPV at any point in their lifetime (OR = 3.74, $p < 0.05$) were at 274% greater risk of PND than those who did not report this type of trauma. Also, one demographic variable, primiparous status was also significant (OR= 0.39, $p < 0.05$) indicating participants having their first child were 61% less likely to be depressed

than participants with previous births. No other demographic variables or trauma subtypes were significant risk factors for PND in this sample.

Overall, our sensitivity analysis upheld the results for the trauma subtypes as robust independent risk factors for PND. Our trauma domain model included the composite variables child maltreatment, interpersonal trauma, IPV, and demographic variables. These domains were specified based on the domains tested in bivariate analyses in Killian-Farrell and colleagues (under review). After significant trauma subtypes were entered into the model to control for their individual effects, trauma domains no longer remained significant. Thus, it appears that sexual abuse and childhood loss are stronger predictors of PND in adolescent mothers than child maltreatment or interpersonal trauma. However, both child maltreatment and interpersonal trauma domains were significant in independent bivariate analyses.

Notably, overall IPV was not a significant predictor of PND in any model

Polytraumatization and perinatal mental health. Results of the Polytraumatization and PND model are presented in Table 3.3. The polytraumatization model was significant ($\chi^2=16.43$, $p<0.05$). Only one of the demographic variables was a significant predictor of PND in this model. Partnered adolescent mothers who were not cohabiting with their partners were 64% less likely to be depressed than single participants. Overall, there was a clear linear trend in polytraumatization with PND risk increasing as number of trauma subtypes reported increased. Adolescent mothers who experienced one trauma subtype were not significantly more likely to report PND than those reporting no trauma. However, participants reporting two trauma subtypes were 224% more likely to experience PND than those reporting no trauma. Participants reporting three trauma subtypes were 236% more likely to experience PND, although this was nearly significant ($p=0.51$). Participants reporting four or more

traumas were 286% more likely to experience PND than their non-depressed peers.

Sensitivity analyses conducted to check for model robustness and further examine data revealed that sexual abuse is the only independent trauma subtype that was a stronger risk factor than polytraumatization for PND.

Table 3.3

Polytraumatization Logistic Regression Model

Variable	OR	95% CI	SE	p
Age	1.027	0.810-1.302	0.124	0.827
Race	1.061	0.426-2.639	0.493	0.9
Primiparous	0.608	0.297-1.246	0.223	0.174
Relationship Status				
Partnered: Non-cohabiting	0.363	0.144-0.919	0.172	0.032
Partnered: Cohabiting /married	0.526	0.219-1.261	0.235	0.15
Trauma subtypes				
1	1.225	0.439-2.424	0.643	0.698
2	3.235	1.073-9.750	1.821	0.037*
3	3.358	0.995-11.336	2.085	0.051
4+	3.861	1.045-14.256	2.573	0.043*

* $p < .05$.

Discussion

Relationship between trauma subtypes and adolescent PND. Our multivariate analyses indicate that childhood sexual abuse, childhood loss, and sexual IPV significantly increase the risk of PND in adolescent mothers. However, other trauma types including childhood physical abuse, childhood emotional adversity, witnessing violence, natural disaster, physical IPV and psychological IPV were not significant predictors of PND in this sample. Our results partially support the findings of Tzilos et al. (2012) in that childhood sexual abuse was a strong predictor of PND, but does not support their results for childhood physical abuse. Our results also contradict the findings of Kinston et al. (2013) who reported

physical abuse was a significant predictor of adolescent PND. However, they examined physical abuse in adolescence, while our results reflect physical abuse occurring in childhood or adolescence which could explain the discrepancy.

Our finding that childhood sexual abuse is such a strong predictor of PND in adolescent mothers both individually and in relation to other risk factors is not surprising. Aside from corroborating the few existing studies (Lesser & Koniak-Griffin, 2000) that have similar results, sexual abuse is well established as a strong predictor of adolescent pregnancy risk in general (Noll et al., 2009). Further, the sexual nature of this particular type of trauma may make it more likely that the process of pregnancy and birth itself may trigger traumatic memories and symptoms which could lead to increased depression. Additionally, the interpersonal nature of sexual abuse and its impact on attachment, trust and interpersonal relationships in general might be more likely to trigger depression during pregnancy. The finding that sexual abuse is a strong risk factor is also consistent with current research examining the impact of biological factors such as HPA axis dysregulation in PND (Brand et al., 2010; Bublitz & Stroud, 2012). The particularly “taboo” nature of sexual abuse, as well as developmental reminders of the abuse during adolescence could make this trauma subtype particularly stressful to survivors and thus more likely to contribute to stress dysregulation.

The result that childhood loss is a strong risk factor for adolescent PND is another important finding, particularly given that it was nearly as robust a predictor of PND in adolescent mothers as CSA. There is a dearth of research in the literature that has focused specifically on the effects of loss of a caregiver or sibling during childhood on adolescent PND. However, it is a theoretically relevant risk factor considering how this population is dealing with their own transition to motherhood which could exacerbate any feelings of grief

associated with caregiver loss, and maternal loss, in particular. Further, studies have found lack of social support to be a primary risk factor for adolescent PND (Meltzer-Brody et al., 2013). Going through pregnancy at such a young age is stressful, but doing so without close family members providing social support is likely even more stressful. More research is needed to examine specific effects of loss, grief, and traumatic grief on PND in this population to develop better support services and interventions for adolescent mothers with histories of childhood loss.

Another interesting result of this study was that both lifetime physical and psychological IPV were not significant predictors of adolescent PND. Lifetime total IPV was also not a significant predictor in our trauma domain model. These results contradict the vast majority of literature on IPV and PND in adult women. However, total IPV prevalence was so high in this sample, that there was likely not enough variance to detect differences in IPV as a domain variable. In terms of IPV subtype results, there may be several reasons physical and psychological IPV were not significant predictors for PND. Firstly, adolescent IPV may differ from IPV in adults in that adolescents in abusive relationships may be less likely to be married and/or cohabiting than adult women potentially meaning the abuse is less frequent or persistent. It's also possible that adolescents' increased need for social support particularly from the baby's father during pregnancy, may provide some protective effect, even if the relationship is also physically or psychologically abusive.

Our IPV results are more in line with the study by Ludermir et al. (2010) who found less association between IPV and PND. They found an initial relationship between physical and sexual IPV that disappeared when controlling for psychological IPV and other confounding factors. While we did not find psychological IPV to be significant, the non-

significant impact of physical IPV on PND risk is similar. However, it's notable that sexual IPV was a significant predictor of adolescent PND in our study. In our sample, about one third of those reporting sexual IPV had a history of sexual abuse, so this may partially explain this finding. However, sexual IPV may also be an indicator of more severe IPV, or a type of IPV that is more threatening and stressful in the context of pregnancy that could explain why it may be more predictive of adolescent PND.

Our trauma domain results expand on the work of Ammerman et al. (2009) by examining the effect of individual trauma subtypes and the interpersonal trauma domain overall. Our sample was younger than their study sample and our interpersonal trauma domains did not include identical trauma subtypes. However, there was still much overlap and our results indicate that once childhood sexual abuse, sexual IPV, and childhood loss are accounted for, interpersonal trauma as a separate domain is no longer a significant predictor of PND. Our finding may indicate certain types of interpersonal trauma are significantly more likely to predict PND in adolescent mothers. However, our results also suggest that interpersonal trauma overall remains a greater risk than non-interpersonal trauma due to the fact that all significant trauma subtypes in any model were interpersonal in nature.

Polytraumatization and risk for PND in adolescent mothers. Our polytraumatization results are consistent with recent studies in other adolescent populations suggesting that the effects of traumatization on mental health outcomes increase up to a certain number of subtypes of traumatic experience, (i.e., 4 or 5 trauma subtypes), and then plateaus (D. Finkelhor, R. Ormrod, & H. Turner, 2007; Turner, Shattuck, Finkelhor, & Hamby, 2015). The result that one trauma subtype did not significantly increase the risk of PND in our sample is likely explained by the high prevalence of IPV and other trauma

subtypes that independently did not predict PND. Thus, one subtype of trauma may significantly increase risk, but only if the trauma is sexual abuse or loss. However, these subtype differences seemed to disappear as the number of trauma subtypes experienced increased. Our sensitivity analysis did suggest that this is true for all trauma except for sexual abuse, which remained a stronger predictor than total polytraumatization level. This strongly suggests sexual abuse may involve mechanisms that are separate or more severely impact PND than other types of trauma.

Overall, our findings may be weakened by sample size limitations (particularly among higher levels of polytraumatization). The significance of multiple trauma subtypes and the linear patterns identified suggests this pattern exists for PND risk in adolescent mothers. Additional studies using a larger sample size and a more specific polytraumatization measure are needed to further clarify and expand on this finding. This work is crucial in order to identify, screen and treat adolescent mothers who may not report sexual abuse, but are at elevated risk of PND due to cumulative trauma exposure. Elaboration of these findings may also help to delineate differences in the mechanism linking trauma to PND and thus provide better information on the types of interventions needed to effectively resolve PND related to polytraumatization.

Comparative relationships between concurrent and childhood trauma subtypes.

Our study suggests sexual abuse and loss can have a particular impact on pregnant adolescents, even if they occur early in childhood. Therefore it's crucial to emphasize that this past trauma is as important as trauma within past year or concurrent with pregnancy. However, other types of childhood trauma were not significant risk factors, so it is also clear that, in this case, type of trauma may be more important than timing. This is supported by our

finding that lifetime and past year sexual IPV was also a predictor of adolescent PND.

However, additional research, including a larger sample and more detailed measure of trauma subtype timing, is necessary to fully understand the impact of the developmental timing of trauma experience on risk for PND in adolescent mothers.

Lifetime and past-year physical and psychological IPV were not significant risk factors for PND in our sample. This suggests concurrent trauma (other than sexual IPV) may not be a predictor of PND for adolescent mothers. However, we only examined ongoing IPV and not other subtypes of concurrent trauma. Therefore, future research should also focus on identifying interactions between other trauma subtypes and timing on PND risk. Grouping trauma subtypes by domain (i.e., interpersonal trauma) may also illuminate differences in concurrent risk profiles. Overall, more specific research focusing on elements of all types of IPV in this population are needed to corroborate these results. Research on IPV is also needed to better understand how this adolescent population may experience IPV differently than their adult counterparts. This could potentially shed light on differences in IPV as a PND risk factor and thus inform future practice and policy surrounding intervention for this issue.

Limitations. One limitation of our study was our trauma measure. Our measure did not assess duration or frequency of childhood abuse. Only sexual abuse items accounted for childhood vs. adolescent abuse limiting our ability to examine developmental timing of trauma experience. All trauma examined is self-reported and is not confirmed by CPS. Also, despite study attempts at engagement, participants may or may not have felt comfortable reporting on sensitive issues. Additionally, differences in cultural background may result in differences in interpretation of events and different privacy norms may restrict disclosure due to the personal nature of the information. This limitation, however, suggests that our results

may be an under-estimation of the actual trauma prevalence within this population and thus a potential under-estimation of the impact of trauma on PND in our results.

Another notable limitation was sample size. While overall the sample size was larger than previous studies, it was not large enough to statistically detect potentially smaller effects in our models or the effects of less endorsed trauma subtypes. There was limited variance evident in the analyses due to low numbers of some trauma subtypes reported. For example, this limitation prevented severe illness/accident from being included in our multivariate models. It also increases the chance that effects of some of the less reported trauma subtypes may be under-detected. It is important to note that we did not have data on a small number of participants ($n=25$) at the antenatal time point. We chose to include this data because a significant score at the antenatal time point indicates the presence of PND. However, we are aware that this may result in underreporting depression as we do not have data on these participants postnatally. We are aware of the potential bias toward Type 2 error and consider it a limitation of this analysis. Finally, we used a convenience sample recruited from a single site which limits the generalizability of our results.

Implications and contributions. Despite these concerns, our results add to the sparse literature examining relationships between trauma types and PND in adolescent mothers. Further, it is the first to our knowledge to examine the role of childhood loss in a quantitative study of PND. The results of this study indicate that trauma, and sexual abuse and loss in particular, may increase the risk of developing PND for adolescent mothers. In other words, trauma in childhood, as well as recent or concurrent abuse may negatively impact adolescent mothers' perinatal mental health.

Additional research is needed to corroborate our results. Such research should use more rigorous trauma measures to better assess the features of the childhood trauma subtypes most likely to lead to PND. Also, trauma assessments identifying not only subtypes of trauma, but time periods in which the abuse occurred would be interesting to examine to determine if there are “critical periods” in which abuse or other trauma may be particularly related to the development of PND. Postpartum depression should also be assessed at time points after 6 weeks post birth in order to control for any effects of the “honeymoon period” of increased support, which has been observed with many mothers immediately following delivery.

Future research on the effects of loss and grief in childhood on adolescent PND is also warranted. The complicated nature of loss should also be considered when working with immigrant populations. Loss of a caregiver may involve deportation or leaving family in a patient’s home country. Considering the growing population of Latina immigrants, research into other forms of loss and their effects on adolescent PND is critical.

Overall, results reinforce the importance of a thorough biopsychosocial assessment and trauma screening to help identify pregnant adolescents at risk for PND. Our results also suggest childhood loss may be a risk factor medical professionals need to screen for and provide referral for supportive services. It is recommended that any PND intervention for adolescent mothers include a trauma component and the capacity to address issues of grief and loss. Concurrent grief counseling may be another option to consider based on the proximity of the loss and level of resolution the patient reports in regards to the deceased. Interventions aimed at increasing the young mothers’ healthy social network and providing

social support may be particularly important for improving the mental health and development of adolescent mother and baby.

CHAPTER 4: A TRANSDISCIPLINARY SYSTEMATIC REVIEW OF INTERVENTIONS FOR ADOLESCENTS WITH COMPLEX TRAUMA

Abstract

Background and purpose. Research indicates that chronic childhood trauma exposure can alter brain development and produce symptoms beyond traditional posttraumatic stress disorder (PTSD). Adolescence is a critical developmental period for intervention with these processes, yet intervention studies targeting adolescent complex trauma (CT) have not been evaluated. This review aims to: 1) examine interventions available for adolescents with complex trauma and evaluate study rigor, and 2) analyze the complex trauma construct and its relationship to study interventions and outcome measures.

Methods. A systematic review protocol and risk of bias rating system was developed using Cochrane Collaboration guidelines. Two independent investigators used customized search strings to complete data searches and extraction from eight electronic databases. Intervention studies for adolescents explicitly targeting complex trauma (CT) were reviewed and analyzed.

Results. Only N=4 CT intervention studies with quasi-experimental or experimental designs and N=6 case studies could be identified from the literature. 90% of interventions were effective, but most studies had small sample sizes and other significant methodological limitations. 50% of studies had a strong conceptualization of CT and interventions targeting multiple CT domains of impairment. However, study outcome measures primarily assessed PTSD and other affective and behavioral impairment.

Conclusions and implications. CT interventions for adolescents were limited. Existing intervention studies lacked rigor and primarily addressed a narrow range of symptoms. More rigorous evaluation studies and dismantling studies of existing multicomponent interventions and their efficacy at addressing all domains of CT impairment are suggested.

Introduction

It has been estimated that over 50% of children will experience a traumatic event during their development (V. J. Felitti et al., 1998). Children who experience traumatic events are particularly vulnerable to a range of negative outcomes, including emotional problems, poor social adjustment, and academic failure (Delaney-Black et al., 2002; Hazen, Connelly, Roesch, Hough, & Landsverk, 2009; Maughan & Cicchetti, 2002). The adverse effects of childhood traumatic stress on the brain and body may follow a child into adolescence and adulthood, increasing risk for lifelong medical and psychiatric problems (Mersky et al., 2013; Putnam, Harris, & Putnam, 2013; Scott et al., 2011). Simultaneous or sequential occurrence of chronic trauma such as child maltreatment that begins in early childhood and occurs within the primary caregiving system is particularly harmful to a child's biopsychosocial outcomes (Cook et al., 2005). Exposure to these initial traumatic experiences results in emotional dysregulation and the loss of safety, direction, and the ability to detect or respond to danger cues. This may lead to subsequent trauma exposure in adolescence and adulthood, thus compounding the impact on an individual's health and development (Gutman & Nemeroff, 2003; Spinazzola et al., 2014)

Conceptualizing complex trauma. Complex Trauma (CT) is a term used to describe the type of complicated and compounded trauma exposure experienced by some individuals, as well as the complex syndrome of biopsychosocial changes and symptoms which may

occur following that trauma. For the purpose of this study, we examine CT as an outcome that encompasses social, biological and developmental impairments beyond a traditional Diagnostic and Statistical Manual of Mental disorders, 5th edition (DSM-V) diagnosis of Posttraumatic Stress Disorder (PTSD). The childhood brain is particularly susceptible to traumatic stress due to key periods of accelerated development in brain structure, function, organization, and integration. Disruption of this growth due to prolonged trauma exposure and ensuing physiological responses can lead to impaired development and organization in the hippocampus, corpus callosum, and prefrontal cortex (De Bellis, 2001). Neuroimaging studies illustrate decreased hippocampal volume evident in the brains of adults who experienced complex trauma versus those who did not (Dannlowski et al., 2012; Teicher, Anderson, & Polcari, 2012). Chronic early trauma exposure is also associated with dysregulation of the hypothalamic–pituitary–adrenal axis (HPA axis) or stress system in children and adults which is associated with a variety of somatic and psychiatric symptoms (Frodl & O'Keane, 2013; McCrory, De Brito, & Viding, 2010).

These impairments may play a role in explaining the lack of emotional regulation, somatic complaints, and attachment difficulties experienced by many traumatized children. Lack of organization and integration of the prefrontal cortex leads to underdevelopment of the major executive functions including attention, problem solving, impulse control, and other higher level cognitive processes (Gutman & Nemeroff, 2003; Koenigs & Grafman, 2009). These symptoms of complex trauma, manifested in childhood and adolescence, are referred to by the National Child Traumatic Stress Network as “Complex Developmental Trauma” and characterized by seven main areas of impairment: affective regulation,

attachment, behavioral control, biology, cognition, dissociation, and self-concept (Cook et al., 2005).

Complex trauma as an evolving concept. Complex trauma is a concept that has evolved slowly over the past century and still remains diagnostically ambiguous. Conceptually, it has early roots in the “hysteria” identified by Freud in sexually abused patients, and early posttraumatic stress research on combat related trauma following World War I and World War II (Freud, 1896a; Kardiner, 1947). The diagnosis of posttraumatic stress disorder (PTSD) was included in the third version of the DSM following the Vietnam War to facilitate diagnosis and treatment of veterans with combat-related trauma. This conceptualization includes the three core symptom clusters which still are included in current PTSD diagnostic criteria: hyperarousal, numbing/avoidance, and re-experiencing of the traumatic event (American Psychiatric Association, 1980).

Child maltreatment focused practitioners and researchers began applying the PTSD diagnosis to patients diagnosed with trauma secondary to child maltreatment and interpersonal violence. However, many argued that these patients displayed symptoms beyond those included in traditional PTSD diagnostic criteria. For example, early attempts to capture this were described in “battered wife syndrome”, “child abuse trauma”, and “incest trauma” (John Briere, 1992; Herman, 1981; Walker, 1979). They included PTSD symptoms, but also transdiagnostic symptoms such as depression, anxiety, substance use, self-destructive behavior, and relationship instability. These were identified as comorbid disorders and typically treated separately or not at all.

Due to concerns regarding the diagnostic validity of PTSD for severely interpersonally traumatized populations, trauma researchers examined PTSD symptomology.

Factor analyses revealed that symptoms adult survivors of multiple or chronic childhood interpersonal trauma were significantly different than those identified by traditional PTSD diagnostic criteria. These symptom clusters, conceptualized as Complex PTSD (CPTSD) and Disorders of Extreme Stress Not Otherwise Specified (DESNOS), were highly comorbid with traditional PTSD diagnosis but confirmed as distinct syndromes (Herman, 1992; Pelcovitz et al., 1997). Attempts were made to include DESNOS as a diagnostic category in DSM-IV, and it was successfully added to the DSM-IV-TR. However, this complex trauma conceptualization specifically describes symptom manifestation as it appears in adulthood.

Child and adolescent presentations of complex trauma proved even more complicated and less frequently well represented by PTSD diagnostic criteria in both research and practice. This was largely due to the fact that early childhood trauma exposure and polytraumatization is most likely to impair development of self-regulation resulting in a diversity of complicated symptoms (Cicchetti & Toth, 1995). An attempt was made to describe and categorize complex trauma in children and adolescents as Developmental Trauma Disorder (DTD) (B. A. van der Kolk, 2009). DTD was proposed as a new diagnostic category to be included in the DSM 5, but was ultimately not included. Thus, with no diagnostic consensus to describe complex trauma in child and adolescent populations, the concept in the research literature is likely identified by a variety of names and is potentially operationally ambiguous. The NCTSN Complex Trauma workgroup outlined seven areas of impairment characterizing complex trauma listed above (Cook et al., 2005). This is a guideline for conceptual validity in research and practice, and is used in this study.

Complex trauma intervention. Due to the conceptual ambiguities and diagnostic limitations associated with complex trauma, intervention research has understandably lagged

behind intervention research for PTSD. Common empirically-supported treatments for PTSD, such as cognitive behavioral therapies and prolonged exposure therapies, have been criticized as inadequate at best and re-traumatizing at worst in patients with severe complex trauma due to these patients' compromised self-regulatory capabilities and difficulty maintaining personal safety (Courtois, 2004). Several research groups have done an admirable job of adapting and developing treatments for adult CT patients, and evaluating their effectiveness in the literature (Cloitre et al., 2010; Dorrepaal et al., 2014; Dorrepaal et al., 2012; Feeny, Zoellner, & Foa, 2002; Patricia A. Resick, Nishith, & Griffin, 2003). However, the extent and quality of research supporting intervention for CT in children and adolescents is much less clear. This is problematic in light of the fact that intervention early in the developmental process is most likely to effectively remediate some of the biopsychosocial impairment resulting from complex trauma exposure in early childhood. Further, early intervention may serve as secondary prevention in the development of more extreme psychiatric symptoms and developmental impairment.

Adolescence is a critical time for development and thus for complex trauma intervention. While intervention earlier in childhood is ideal, complex trauma events are often not identified or disclosed until late childhood/early adolescence. Further, an adolescent may have more age-related resources with which to benefit from treatment. Fortunately, the brain is still significantly malleable and in a critical period of brain integration. Therefore, intervention gains may be better incorporated and developmental deficits may still be addressed. Also, two of the areas most impaired by complex trauma exposure are attachment and self-concept which affects one's ability to form relationships with others. Adolescence is a critical stage of interpersonal development and thus intervention at this stage is crucial in

order to help survivors gain the intrapersonal skills and qualities necessary to achieve these developmental tasks (Erikson, 1968). Identification of empirically-supported treatments for adolescents with complex trauma symptoms is needed to ameliorate present suffering and prevent further negative developmental and psychosocial outcomes affecting the individual, family, and society.

Current study. No systematic review of the intervention literature for adolescent complex trauma could be found. Such a review is critically needed to determine which interventions have been empirically supported for treatment specifically with adolescent populations experiencing CT adaptations. It is also necessary in order to provide information on the quality of this literature and the conceptual/operational validity of the CT population and measures utilized. It is important to determine the extent to which current interventions address the seven areas of impairment encompassed in adolescent CT.

To fill this gap in the literature, a systematic review of the trauma and mental health literature was conducted to identify studies evaluating adolescent CT interventions. The goal of this systematic review was to identify and evaluate the evidence base for interventions for adolescents with CT. The specific aims of this review were to: 1) examine interventions available for adolescents with CT and evaluate study rigor, and 2) analyze the complex trauma construct within these studies and examine its relationship to study interventions and outcome measures. In the absence of well-designed intervention studies, associative and descriptive relationships are explored. Study quality is evaluated based on methodological rigor and estimated risk of bias. Finally, the conceptual consistency of complex trauma in the literature and corresponding outcome measures is evaluated in available studies.

Methods

Conceptual and operational definitions. Complex trauma refers to the clinical syndrome identified in research and practice that includes the presence of trauma symptoms which exceed PTSD diagnostic criteria. This syndrome results from frequent or chronic trauma exposure during childhood and results in impairment in the development of multiple psychological and physiological systems including emotion regulation, attachment, stress response, and brain structure and function (H. N. Bailey et al., 2007; Cook et al., 2005; Herman, 1992; Marinova & Maercker, 2015; Thomaes et al., 2010) . For the purpose of this review, complex trauma may also be identified in the literature as “complex PTSD”, “chronic PTSD”, “chronic trauma”, “Type 2 trauma”, “multiple event trauma”, “developmental trauma” and “disorders of extreme stress (DESNOS)” (Herman, 1992; Pelcovitz et al., 1997; Terr, 1991; B. A. van der Kolk, 2009; Bessel A. van der Kolk et al., 2005). These terms were selected from a review of trauma literature and with expert consultation from two licensed clinical social workers with trauma treatment experience and expertise.

The NCTSN definition of ‘complex trauma’ developed by the 1995 Child and Adolescent Complex Trauma workgroup of experts in child and adolescent trauma practice and research is utilized in this study for the purpose of analysis (Cook et al., 2005). This definition includes seven distinct areas of developmental impairment: affect regulation, attachment, behavioral control, biology, cognition, dissociation, and self-concept. Data were collected on intervention targets addressing these areas of impairment and are included to illustrate the transdiagnostic and transdisciplinary nature of complex trauma in order to underscore the need for transdisciplinary intervention.

Intervention can be defined to include a broad array of treatments, programs, or policies at an individual, group or societal level. For the purpose of our study, an intervention

refers to any individual, family, or group treatment or program with the explicit purpose of treating complex trauma symptoms to improve adolescent outcomes. For study inclusion all interventions must be explicitly developed and/or applied to treat CT impairments and symptomology caused by multiple or chronic exposure to childhood trauma. Secondary prevention efforts are considered if they aim to remediate CT symptoms or developmental impairments as well as prevent future negative outcomes.

Our study is specifically interested in interventions for adolescents due to the distinct biopsychosocial developmental needs of this population. We define an adolescent as any child between 13 and 18 years of age. This age range was selected in order to focus on adolescence as a distinct stage and include participants most likely to have similar developmental needs.

Search protocol. An amended protocol based on Cochrane Collaboration guidelines (Higgins JPT, 2011) was used to search for studies evaluating adolescent interventions for complex trauma. A copy of this study's pre-specified protocol is available in Appendix A. Data flow is reported according to PRISMA guidelines (Moher et al., 2015) reflecting best practice standards. Data flow information is displayed in the PRISMA diagram (Figure 4.1). According to these guidelines we conducted three levels of review. We first searched all text with our search string in each database for relevant article title/abstracts. Next, all resulting title/abstracts were reviewed for study inclusion according to our preset inclusion/exclusion criteria. Selected title/abstracts were compiled and duplicates were eliminated. Finally, a full text review of all selected title/abstracts was conducted by two independent reviewers and articles meeting criteria were selected for data extraction.

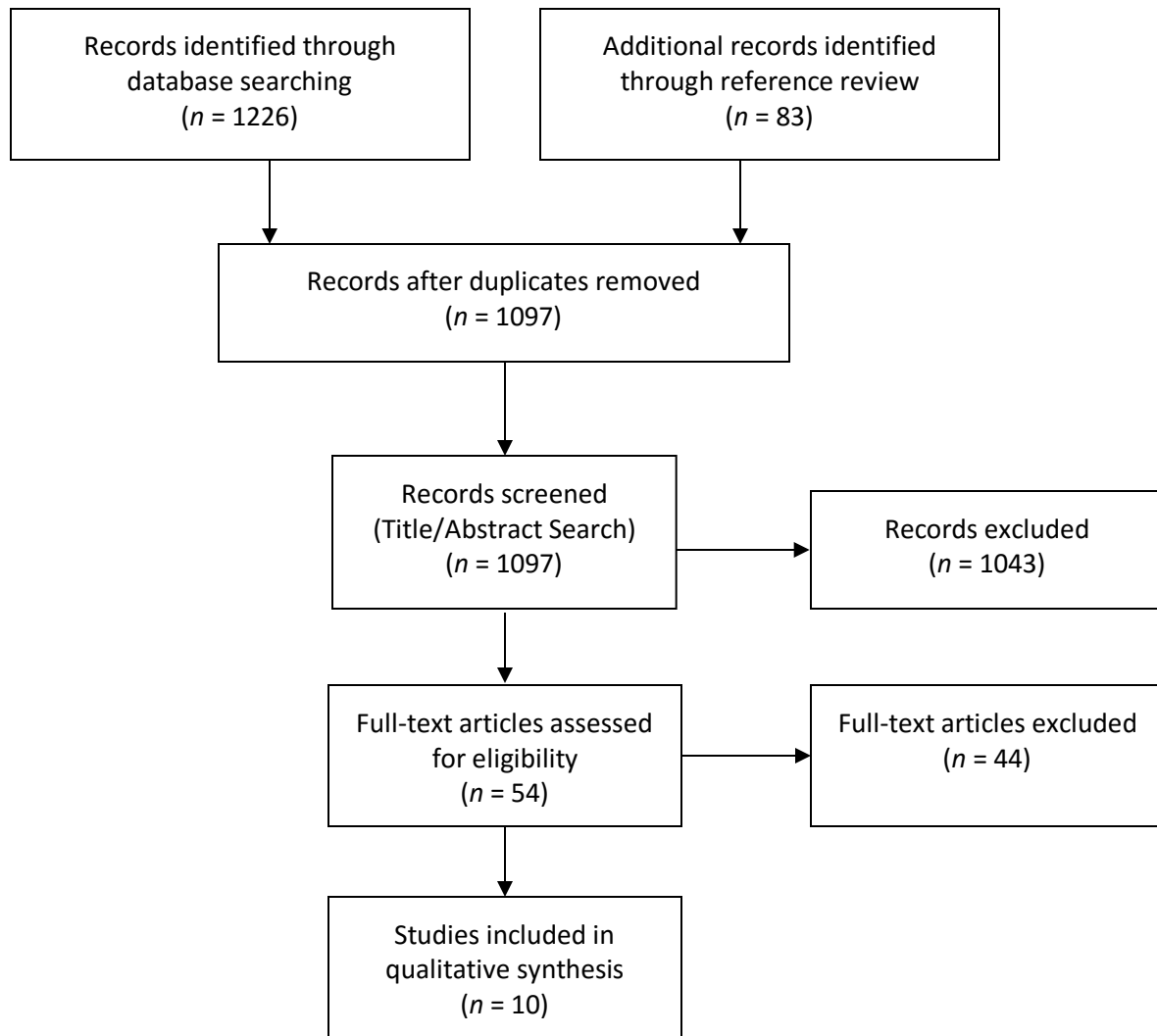


Figure 4.1. PRISMA flow diagram.

Search strings were constructed by the authors according to study aims, NCTSN complex trauma guidelines, and established terminology for complex trauma from practice and research literature. A university research librarian and two trauma therapists also provided expert feedback and guidance in the search process. The search strings contained three components: 1) complex trauma syndrome 2) intervention design 3) age range (adolescent age 12-18). The final search string was fine tuned for each database to ensure the widest possible inclusion of studies. The final search strings are presented in Appendix B. A total of eight electronic databases were searched for a transdisciplinary review of Complex

Trauma interventions. *CENTRAL* database was searched for registered systematic reviews and clinical trials. The databases *PubMed*, *PsycInfo*, *CINAHL*, and *Social Work Abstracts* were searched to enable review of studies from different disciplinary perspectives. *PILOTS* database was searched for its content focus on trauma literature. *Social Service Abstracts* and the *Campbell Library* were searched to ensure the intervention literature was thoroughly reviewed.

Grey literature was included in our search. Dissertations, book chapters, and conference abstracts from the selected databases meeting our predefined criteria were included in our review. References of all descriptive complex trauma review articles were searched for additional studies. To ensure an inclusive search, no limitations were made on study date of publication or publication language.

Study selection. To identify articles with the greatest relevance to the current study, each article was assessed by two separate reviewers using the preset inclusion and exclusion criteria. Studies including an adolescent sample with study-defined complex trauma meeting our age limitation were considered. Any intervention meeting our operational definitions for a CT intervention and all other inclusion/exclusion criteria was included. Study inclusion criteria for the title/abstract and full-text review were: 1) adolescents aged 12-18 with, 2) reported ‘Complex Trauma’ or specified operational synonym (see search string) 3) study design: qualitative, case study, pretest-posttest, quasi-experimental design, experimental design, or systematic reviews with meta-analysis 4) grey literature and peer-reviewed studies. Studies were excluded from the abstract and full-text review based on the following criteria: 1) non-chronic or CT syndrome (ie. non-complex PTSD or non-trauma diagnoses only), 2) descriptive intervention articles, 3) adolescent participants with co-morbid psychosis, or

pervasive developmental disorders (ie. autism), 4) adult studies including 18 year-old participants and studies of children with an average participant age of less than 13 years-old.

Case studies and quantitative studies were included in data extraction, read for contextual analysis of data and discussion, and included in our qualitative analysis.

Descriptive reviews of CT interventions for adolescents were pulled separately from the title/abstract and full text review for two purposes: 1) reference review and 2) contextual background for better data interpretation and discussion. A review of reference lists of these articles was conducted to expand the parameters of our search and to identify any studies that may have been missed due to operational differences in complex trauma terminology. However, descriptive reviews were not included in data extraction. Although important to the study of CT, these articles did not meet our criteria for data analysis.

Data collection. A data extraction form was created based on a data extraction form utilized for a systematic review and meta-analysis by Tripodi, Bledsoe, Kim, & Bender (2011). Amendments to the form were made to reflect study aims and complex trauma conceptualization/areas of impairment. Data were extracted by two independent assessors and compiled for analysis. The two data collectors were trained by the principal investigator and interrater reliability between the two independent reviewers was assessed at 88% agreement. Disagreements on article inclusion were discussed in project team meetings and decisions were made using group consensus and consultation with systematic review and content experts. Data extracted included both quantitative and qualitative information needed to adequately assess study content, quality and level of bias. The data extraction form used is included in Appendix C.

Assessment of study rigor. The methodological quality of the included studies was assessed by evaluating study risk of bias. This was done with a method adapted from the Cochrane Collaboration tool (Cochrane Statistical Methods Group) that judges each study as “low risk of bias” or “high risk of bias” based on study design criteria. The evaluation guide addresses selection bias, attrition bias, and reporting bias based on seven domains of design criteria: random allocation; allocation concealment; blinding of participants; blinding of outcome assessors; completeness of outcome data; selective outcome reporting; and other bias due to problems not covered by the other domains (Cochrane Statistical Methods Group, 2011). A system was devised by the author in which inclusion of design criteria to minimize bias was assessed as follows: 6-7 domain areas was rated as low risk of bias, 3-5 criteria was rated as moderate risk of bias, and 1-2 criteria was rated as high risk of bias. Risk of bias for each article was assessed by two independent data collectors and disagreements were discussed and resolved by consensus or expert consultation.

Results. Our initial search efforts yielded more than 1200 abstracts for review. Of these abstracts, 62 articles were identified for full text review, and 10 articles were selected for study inclusion. Of the included articles, $N = 6$ are case studies and $N = 4$ are primary studies which employ more rigorous designs. Due to inherent differences in the goals, scope, and rigor of case studies and the other types of study designs, the two groups of studies are presented separately and compared where appropriate. A description of the primary articles with pretest-posttest, quasi-experimental or experimental designs is presented in Table 4.1 and case studies are presented in Table 4.2. Overall level of methodological rigor is examined in the group of primary studies only. This is due to differences in the purpose and method of case studies which make risk of bias an inappropriate assessment of study quality. A

Table 4.1

Primary Studies of Adolescent Complex Trauma Interventions

Author	Intervention	Design	Sample description	Results
Habib, M., Labruna, V., and Newman, J. (2013)	Structured Psychotherapy for Adolescents Responding to Chronic Stress (SPARCS)	Quasi-experimental- One group pretest-posttest	N=24 adolescents in residential settings with extensive trauma histories and profound behavioral, emotional, and interpersonal difficulties. 43 % Caucasian, 34 % African-American, 17 % Latino, and 5 % other.	Significant improvement in PTSD symptoms; intrapersonal distress, interpersonal problems, somatic complaint, behavioral dysfunction, and critical items (ie.SI) No significant improvement in social problems.
Hodgdon, H., Kinniburgh, K., Gabowitz, D., Blaustein, M., & Spinazzola, J. (2013)	Attachment, Self-Regulation, and Competency (ARC)	Quasi-experimental - Naturalistic study	N=126 Female adolescent subsample of youth (12-22 yrs) from the NCTSN Core Data Set who received services at one of two residential centers in Massachussetts. N=95/N=69 at FU1 N=55/N=43 at FU2 N=31/N=24 at FU3	Significant decreases in aggressive behaviors, attention problems, rule breaking behaviors, anxiety, depression, thought problems, somatic complaints, and PTSD symptoms except for avoidance/ withdrawal.
Madigan, S., Vaillancourt, K., McKibbin, A., and Benoit, D. (2015)	Trauma-Focused Cognitive Behavioral Therapy (TF-CBT)	Experimental-Randomized Control Trial (RCT)	N=43 Pregnant adolescents aged 12-18 with a trauma history and unresolved trauma or loss, who are affiliated with either a residential facility for at-risk adolescent mothers, or an outpatient perinatal health clinic.	Not efficacious in reducing PTSD or unresolved loss/trauma. Also no significant differences between TF-CBT and TAU groups in dissociation, depression, anxiety, or behavioral problems.
Swart, J, and Apsche, J. (2014)	Mode Deactivation Therapy (MDT)	Experimental-Randomized Control Trial (RCT)	N=84 male adolescents 15-17 legally mandated by court or Department of Youth and Family Services (DYFS) to receive treatment. All participants displayed high risk behaviors and multiple comorbidities related to history of childhood maltreatment.	MDT outperformed CBT-based TAU on all outcomes assessed. MDT group had significant decreases in anger, internalizing and externalizing behavior, fear and avoidance, and dysfunctional beliefs and cognitions.

Note. N = 4.

Table 4.2

Case Studies of Complex Trauma Intervention

Author	Intervention	Method	Participant(s)	Results
Ford, H. & Nangle, D. (2015)	Trauma-Focused Cognitive Behavioral Therapy (TF-CBT)	Case study	16 y/o Caucasian female with chronic PTSD related to childhood sexual abuse	Decreased posttraumatic stress symptoms, internalizing, and externalizing symptoms.
Hunter, J. (2010)	Prolonged Exposure (PE)	Case study	One 17 y/o and one 18y/o biracial male juvenile sex offender with extensive histories of child maltreatment	Decreased PTSD symptoms and decreased internalizing symptoms.
Kagan, R. & Spinazzola, J. (2013)	Real Life Heroes (RLH)	Case study	16 y/o female with a history of childhood maltreatment and multiple placement disruptions	Decreases in anxiety, depression, anger, hyper-response, dissociation, and posttraumatic stress symptoms. Increase in IQ, overall functioning, and attachment relationship with mother.
Keeshin, B. & Strawn, J. (2009)	Risperidone	Case study	13 y/o male with chronic PTSD related to sexual abuse and neglect	Decreased flashback frequency, hypervigilance, intrusive symptoms, and paranoia. Improved sleep and no subsequent hospitalizations
Miller, R.B. (2007)	Responsive Art Therapy	Case study	13 y/o African American female survivor of developmental trauma and loss	Increased feelings of mastery and competence, improved self-regulation, self-integration, and relationship with others.
Purvis, K., McKenzie, L.B., Razuri, E.B., Cross, D.R., & Buckwalter, K. (2014)	Trust-Based Relational Intervention (TRBI)	Case study	16 y/o Bulgarian female with history of extreme abuse and neglect	Decreased violent and self-injurious behavior, Increased pro-social behavior and improved attachment. Change in neurochemical levels.

Note. $N = 6$.

summary of the estimated risk of bias in these studies is presented in Table 4.3. Next, the CT interventions from the studies are described and presented in Table 4.4. Finally, CT conceptualization, domains of impairment, and outcome measures are examined and summarized in Table 4.5 and Table 4.6.

Study characteristics. *Participants. Primary studies.* The four primary studies had a combined sample size of 277. The combined sample was 47% male and 53% female. Two studies, Hodgdon, Kinniburgh, Gabowitz, Blaustein, and Spinazzola (2013) and Madigan, Vaillancourt, McKibbin, and Benoit (2015) had female-only samples, with the latter consisting of adolescent mothers. Swart and Apsche (2014) used an exclusively male court mandated sample. Only one study, Habib, Labruna, and Newman (2013), included a mixture of male and female participants and this sample was predominantly (4:1) female. Madigan et al. did not report racial/ethnic status of their sample of adolescent mothers. However, unlike the other three studies, they did report on socioeconomic status. Specifically, 100% of their sample had an annual family income of <\$15,000 per year. The racial/ethnic background of a pooled sample from the other three primary articles (N=234) was 51% (N=119) non-Hispanic white, 33% (N=71) African-American, 9% (N=22) Latino, .004% (N=1) Asian American, .004% (N=1) Indian-American, .01% (N=2) other race/ethnicity, and 8% (N=18) unknown race/ethnicity.

Participants were described as having experienced CT or displayed CT syndrome. Aside from that commonality, participant populations varied to include aggressive adolescent males with conduct disorder, traumatized adolescent mothers, and adolescents in the child welfare system with ‘profound mental health issues’. One similarity among participants appears to be a common level of severe emotional and behavioral impairment. Further, over

50% of participants were residing in residential treatment facilities at the time of intervention. Thus, it is not surprising that Swart et al. reported numerous co-morbidities to PTSD in their sample including anxiety, major depressive disorder, substance dependence, conduct disorder, oppositional defiant disorder, and suicidal ideation/behavior. Habib et al. and Hodgdon et al. did not report comorbidities in their sample.

Case studies. All case studies (N=6) except for one included a single participant (N=1). Hunter (2010) was the exception with N=2, although each case was described and analyzed separately. Over half of the case studies (N=4) examined interventions with adolescent females. Three of these studies (H. A. Ford & Nangle, 2015; Richard Kagan & Spinazzola, 2013; Purvis, McKenzie, Becker Razuri, Cross, & Buckwalter, 2014) examined interventions with 16-year-old females. One of these participants was Caucasian, one was Bulgarian, and the other's race/ethnicity was not specified, but all presented with CT symptoms and/or other serious emotional/behavioral problems related to severe histories of child maltreatment. Two of these three participants were receiving interventions in residential care settings and one was receiving treatment in a community outpatient setting. The fourth study (Miller, 2007) included a 13-year-old African American girl who presented in a residential treatment facility with impairments similar to those described above.

Two case studies included male adolescents. One was the Hunter study which included two male participants. The two males in the Hunter study were the oldest participants at 17 and 18 years of age. Both were biracial adolescent males in a residential treatment facility for juvenile sexual offending. The other study including a male participant was Keeshin and Strawn (2009). They examined an intervention with a 13-year-old boy presenting with CT related to severe child maltreatment. His race/ethnicity was unspecified.

He resided at home, but experienced frequent hospitalization due to the severity of his symptoms.

All case studies examined participants with moderate to severe symptoms and all reported symptoms were specifically related to histories of child maltreatment. The race/ethnicity of the case study participants varied. Over half of the case studies described interventions with adolescents in some form of residential treatment.

Methods and design. *Primary studies.* Only two randomized controlled trials (RCTs) for CT intervention for adolescents were found: Swart and Apsche (2014) and Madigan et al. (2015). Both studies used experimental designs in which random allocation of participants was conducted from convenience samples in the community. Both studies listed clear inclusion and exclusion criteria for their samples. Madigan et al. had a small sample (N=43) and significant attrition (40%) but conducted intent-to-treat analyses. This study evaluated an adapted version of Trauma-Focused Cognitive Behavioral Therapy (TF-CBT) (Judith A. Cohen, Mannarino, & Deblinger, 2006) with adolescent mothers. A variety of strong, validated measures were used to assess treatment efficacy focusing on attachment and trauma outcomes. They included the following measures: Adult Attachment Interview (AAI) (George et al., 2011), Child Posttraumatic Stress Disorder Interview (CPTSDI) (Saigh, 2004), Adolescent-Dissociative Experiences Scale (A-DES) (Armstrong, Putnam, Carlson, Libero, & Smith, 1997), Beck Depression Inventory (BDI) (Beck, 1961), Screen for Child Anxiety-Related Emotional Disorders (SCARED) (Birmaher et al., 1997), and the Youth Self-Report (YSR) – Externalizing Scale (Achenbach, 1995). Participants were randomized to either a standard care (i.e. psychoeducation and a parenting group) or standard care plus TF-CBT with no blinding.

Swart et al. had a slightly larger but still fairly small sample size (M=84) and did not use blinding. This study did not have sample attrition due to the mandated nature (adolescent males with conduct problems mandated for treatment by court) of their sample. Participants were randomized into a cognitive-behavioral treatment-based standard care or a Mode-Deactivation Therapy (MDT) (Apsche & DiMeo, 2012) intervention treatment group. Some of the measures used in this study were developed as part of the MDT methodology and not yet empirically validated (Compound Conglomerate of Beliefs Questionnaire (CCBQ), Behavior Rating Scales, Fear Assessment (Apsche & DiMeo, 2012)), but several standardized measures were also used to assess trauma and behavioral outcomes. These measures included the State-Trait Anger Expression Inventory-2 (STAXI-2) Anger In/Out/Total subscales (Spielberger, 1988) and the Child Behavior Checklist (CBCL)-Internalizing/ Externalizing subscales (Achenbach TM, 1991).

Hodgdon et al. (2013) used a quasi-experimental naturalistic study design with a purposive convenience sample of a subset of adolescents from the NCTSN Core Data Set receiving services while residing in one of two residential treatment facilities. They evaluated the Attachment, Self- Regulation, and Competency (ARC) (Kinniburgh, Blaustein, Spinazzola, & Van Der Kolk, 2005) treatment program in a milieu setting. This study had the largest initial sample of all included studies (N=124), but substantial attrition occurred between baseline and each of the three follow-up points with N=31 on CBCL scores and N=24 on PTSD scores at final data collection (FU3). This study also included no random allocation, blinding or control groups and participants were selected from the data set based on previous history of successful completion of group treatment. Further, the intervention programs differed in the two treatment locations in modality, dosage, and, to some extent,

intervention content. Measures used to examine treatment outcomes by Hodgdon et al. included the UCLA PTSD Reaction Index (Steinberg, Brymer, Decker, & Pynoos, 2004) and CBCL which are strong, standardized measures. Overall restraint use for participants over the course of the intervention period was also included as a measure of aggressive behavior change.

Habib et al. (2013) conducted a quasi-experimental pilot study of Structured Psychotherapy for Adolescents Responding to Chronic Stress (SPARCS) (DeRosa, 2005) in three residential treatment facilities for emotionally and behaviorally disturbed youth. This study had a small convenience sample (N=24) and sample inclusion and exclusion criteria were not reported. This study used a pretest-posttest design with no randomization, blinding, or control group. Treatment outcomes were assessed with the Youth Outcome Questionnaire-Self Report (YOQ-SR) (Wells, 1999) and UCLA PTSD-RI which are both well known, standardized measures, but the latter was not used with participants at one of the three treatment locations. Additionally, the intervention was not applied uniformly across the three treatment locations.

Habib et al. and Hodgdon et al. reported the least rigorous methods of the four primary articles. For more details on the interventions and measures in these studies see Tables 4.4, 4.5, and 4.6.

Case studies. A majority (60%) of the case studies were predominantly qualitative in design, although over half of the studies did include some quantitative measures of outcomes to support their case descriptions. Keeshin and Strawn (2009) presented a descriptive case report of a trial of Risperidone, an anti-psychotic medication, prescribed for an adolescent with symptoms related to CT. The purpose of this report was to demonstrate efficacy in one

adolescent patient and the authors called for a larger trial examining Risperidone as a potential treatment for adolescents with CT.

Miller (2007) also presented a descriptive qualitative study of implementation of response art (RA) with a single adolescent. Despite the obvious lack of generalizability and quantitative support for the intervention, the author presented a well-described intervention process and perceived treatment outcomes. This fit well with the intervention as it was largely based on psychoanalytic principles making examination of internal processes and counter-transference central to its implementation and treatment success. However, overall methodological rigor of both of these case studies was low.

The remaining case studies all utilized some form of quantitative outcome measures to support case descriptions and included more rigorous case designs. Kagan and Spinazzola (2013) incorporated decreased participant T-scores on the Trauma Symptom Checklist for Children (TSCC) (J. Briere, 1996) to support clinical observations of improved behavioral and emotional function following treatment. They evaluated the comprehensive Real Life Heroes (RLH) (R. Kagan, 2007) in a residential treatment facility. However, baseline scores were taken from the participant's entry into the residential treatment facility two years prior to implementing the intervention, making it less clear that the overall improvement was truly due to the intervention alone. They also measured participant IQ pre and post intervention using standardized IQ measures: the Wechsler Intelligence Scales for Children -III (WISC-3) (Wechsler, 1991) and the Wechsler Adult Intelligence Scale-IV (WAIS-4)(Wechsler, 2008).

Ford and Nangle (2015) also utilized TSCC scores, as well as CBCL Internalizing and Externalizing subscale scores to support clinical observations of change in their participant due to TF-CBT. This case study was more systematically designed and implemented and

measures were taken in an initial assessment interview immediately preceding treatment, as well as immediately following completion of treatment. Ford and Nangle also reported on maintaining intervention fidelity with an online course, further increasing the rigor of their case design.

Hunter (2010) also used a strong case design to present Prolonged Exposure (PE) therapy (Edna B. Foa, Chrestman, & Gilboa-Schechtman, 2009) intervention effects with two separate cases. He reported thoroughly on participant history, comorbidities, adjunctive treatment, and other potential confounds. This study evaluated PTSD symptoms and overall psychosocial functioning with the Child PTSD Symptom Scale (CPSS) (E. B. Foa, Johnson, Feeny, & Treadwell, 2001) and Youth Self-Report Questionnaire (YSQ) (Achenbach, 1995) at three time points: pre-intervention, post-intervention, and at a four-month follow-up appointment.

Finally, Purvis et al, (2014) presented a case study of Trust Based Relational Intervention (TRBI) (Purvis, Cross, Dansereau, & Parris, 2013; Purvis, Cross, & Pennings, 2009) in a residential setting, but the measures used (i.e. restraint use, neurochemical assays, and unspecified ‘indicators’ from clinical observation) to support the treatment outcome description were not strong. They presented decreased use of restraints with the client, a potentially valid measure of levels of aggression, but this measure can also reflect changes in residential staff and staff policy. They also took urine samples and tested for neurochemical levels prior to intervention implementation one year later. Neurochemical levels are not a reliable assessment measure for a variety of reasons not limited to the fact that they are extremely sensitive to current and ongoing stresses and are easily influenced by other factors such as time of day and hormone levels, particularly in post-pubertal females (Hinz, Stein, &

Uncini, 2011, 2012). Also, while this type of assessment is generally based on the “monoamine hypothesis” that more serotonin means better mood, etc., actual neurochemical levels and their association with specific symptoms in any one individual is essentially much more complex than interpretation of these two samples of neurochemicals would suggest or allow (Hinz et al., 2012). Overall, these case studies are interesting descriptions of intervention outcomes and suggest these interventions may hold promise, but do not provide strong empirical support for the interventions.

Study rigor and risk of bias. Two of the primary studies, Habib et al. (2013) and Hodgdon et al. (2013) were rated as having high risk of study bias. Both studies lacked a control group, random allocation, and blinding which presents a high risk for selection and confirmation bias. Both studies had incomplete data that was not controlled for and thus there is a high risk of attrition bias. Also, while both studies did not demonstrate selective reporting of outcomes, they do have a high risk of reporting bias for not reporting on multiple potential confounds such as comorbidities, concurrent adjunctive psychosocial and pharmacological treatments, treatment history, and non-reporting of a host of other obvious environmental stressors related to family placement and peer issues. The study by Habib et al. also has potential bias because of non-universal application of intervention and measurement bias due to use of an unstandardized trauma screen. The study by Hodgdon et al. has a high risk of exclusion bias since they only enrolled participants with a history of successfully completing group treatment.

The studies by Madigan et al. and Swart et al. were rated as having a moderate level of bias. Although neither study used allocation concealment or blinding, both studies used random allocation that minimizes risk of selection bias. Also, both studies demonstrated non-

selective reporting and did not have any other identifiable sources of reporting bias suggesting low risk for this type of bias. Madigan et al. did report attrition but minimized potential attrition bias by including intent-to-treat analyses and including analyses to determine if there were significant differences between completers and non-completers (there were not). This study demonstrated no obvious additional bias, utilized strong measures to minimize measurement bias, and controlled well for study limitations. The study by Swart et al. did not have attrition, but there was some risk of measurement bias because three measures used were developed with the intervention being tested and do not appear to be standardized or evaluated. However, other obvious sources of bias appear to be limited. The studies by Swart et al. and Madigan et al. appear to be of higher methodological quality as assessed by methodological rigor and bias, but still display a moderate risk of bias (see Table 4.3).

Table 4.3

Estimated Study Bias Risk

Bias Criteria	Article			
	Habib et al. (2013)	Hodgdon et al. (2013)	Madigan et al. (2015)	Swart et al. (2016)
Random allocation	No	No	Yes	Yes
Allocation concealment	No	No	No	No
Blinding of Participants	No	No	No	No
Blinding of outcome assessors	No	No	No	No
Complete outcome data	No	No	No	Yes
Non-selective Reporting	Yes	Yes	Yes	Yes
Lack of other significant bias	No	No	Yes	No
Overall estimated risk of bias	High	High	Moderate	Moderate

Note. Low Bias Risk = 6-7 criteria, Moderate Bias Risk= 3-5 criteria, High Bias Risk = 1-2 criteria

Complex trauma interventions. The study interventions and outcomes are presented in Table 4.4. There were a total of nine interventions examined in the ten studies. TF-CBT was evaluated twice, although in one of the two studies, a version adapted for the population of adolescent mothers was evaluated in which the caregiver component was omitted. The interventions tested included a mixture of individual, group and milieu modalities and treatment duration lasted anywhere from 8 weeks to two years. A majority of interventions lasted from 4-9 months, with milieu intervention components typically lasting longer and individual treatment components lasting from 12-24 weeks. Risperidone, a pharmacological treatment was evaluated, but all other interventions were psychosocial treatments.

The interventions evaluated in the primary studies were ARC, MDT, SPARCS and an adapted version of TF-CBT. TF-CBT and MDT are traditional individual psychotherapies with family components; while ARC and SPARCS are group and milieu-based therapies applied in residential treatment facilities. Case studies evaluated all other interventions, including Risperidone, RLH, TF-CBT, TRBI, PE, and response art (RA) (Miller, 2007). Participant characteristics and treatment settings were similar for studies in both design categories. All interventions were found to be efficacious in addressing the majority of participant outcomes evaluated in the individual studies with the exception of the adapted TF-CBT for adolescent mothers. This intervention did not achieve significantly better outcomes than treatment as usual (i.e. psychoeducation and parenting classes).

Intervention outcomes. *Primary studies.* All interventions tested in the primary studies were psychosocial interventions and two were individual-based psychotherapies: MDT and TF-CBT. MDT is a cognitive-behavioral based intervention designed specifically for decreasing mood and behavior issues among aggressive male adolescents with conduct

Table 4.4

Intervention Description and Efficacy in Intervention Study

Intervention	Description	Modality	Study dosage	Efficacy
Attachment, Self- Regulation, and Competency (ARC)	A framework focusing on Attachment (caregiver affect management, attunement, consistent response, routines and rituals), Self- Regulation (affect identification, modulation, and expression), Competency (executive function and self-development) and Trauma Experience Integration that applies key skills to the processing of traumatic experience. Milieu behavioral enhancement focuses on attachment. Individual and group treatment include self-regulation and competency. Treatment targets selected based on individualized client needs.	Group, Individual, Milieu	Milieu intervention daily for 6-9 months in the residential facility. Site #1-16 session group inter-vention (length unspecified) with individual sessions (unspecified length and duration). Site #2- 22 session group intervention, (unspecified duration) with weekly one-hour individual sessions.	Yes
Mode Deactivation Therapy (MDT)	An intervention rooted in cognitive theory that incorporates psychoanalytic elements—acceptance and mindfulness—of Dialectical Behavior Therapy and Acceptance and Commitment Therapy, as well as family systems theory. It includes four weeks of case conceptualization and assessment and regular mindfulness exercises. Triggers, fear, avoidance responses, thoughts, feelings, core beliefs, and dysfunctional behaviors are paired in worksheets and maladaptive mode activation processes are identified, targeted and deactivated in a Validation-Clarification-Redirection (VCR) process.	Individual, Family	Weekly individual sessions over a period of six to eight months. Session duration unspecified.	Yes
Prolonged Exposure (PE)	The protocol includes: (1) trauma psychoeducation, (2) treatment planning, (3) exposure therapies, and (4) relapse prevention planning. Patient is interviewed for trauma experience(s) to develop exposure narratives and identify places, situations, and activities that elicit anxiety. Treatment involves graduated “in-vivo” and “imaginal” exposure to anxiety-provoking memories and stimuli. Emphasis is on exposure to distressing stimuli until anxiety attenuation is achieved, but also involves correcting distorted cognitions that support avoidance behavior (e.g. unrealistic fears). “Relapse prevention” helps patient understand “triggers” and learn coping strategies.	Individual	Case #1: 19 sessions conducted twice weekly, with assigned homework between sessions. Case #2: 16 sessions conducted twice weekly, with assigned homework between sessions. Duration of treatment sessions unspecified.	Yes

Intervention	Description	Modality	Study dosage	Efficacy
Real Life Heroes (RLH)	The model utilizes the metaphor of the heroes' journey and combines attachment enhancing interventions, cognitive behavioral therapy, creative arts, and shared life storybook activities help children and caregivers develop the safety, attunement, emotional support and affect modulation skills necessary to undertake and tolerate integration of traumatic memories. Inclusion of multimodal, multi-sensory, and nonverbal activities help engage children, caregivers, and residential staff to cultivate trust, promote affect regulation and co-regulation skills, to reduce high-risk behaviors.	Individual, Family, Milieu	Milieu therapy implemented for two years. Number and duration of individual and family sessions unspecified but occurred during two year period.	Yes
Response Art Therapy	The manipulation and use of art materials in response to the client in session or as a means of processing feelings and reactions post-session. In-session response art includes using art to mirror the client's process as a form of empathic validation, model methods and manner of connecting with art materials, and create art images/symbols as communication. Post-session response art facilitates the exploration of countertransference.	Individual	One 45 minute session once per week. A total of 12 sessions over a 4-month period.	Yes
Risperidone	Anti-Psychotic Medication	Individual	0.5mg twice daily	Yes
Structured Psychotherapy for Adolescents Responding to Chronic Stress (SPARCS)	A 16-session manual-guided present-focused group intervention grounded in techniques adapted from Dialectical Behavior Therapy for Adolescents, TARGET, and Trauma and Grief Component Therapy for Adolescents. Broad goals of the treatment are "The Four C's": 1) Cultivating Awareness of Self/Other, 2) Coping Effectively, 3) Connecting with Others, 4) Creating Meaning. Promotes resilience by enhancing cognitive, behavioral, and physiological self-regulatory capacities.	Group	2 treatment groups: 1-hour group session/ week for 16-20 weeks, 1 treatment group: 90-min group session/ week for 10 weeks	Yes
Trauma-Focused Cognitive Behavioral Therapy (TF-CBT)	A manualized treatment that incorporates elements of cognitive, behavioral, interpersonal, and family models utilizing a progressive, components-based approach. Includes individual sessions, parallel parent sessions, and joint parent-child sessions. Contains treatment modules with specific goals: Module 1- Psychoeducation, Module 2- Stress Management, Module 3-Affect Expression and Regulation, Module 4-Cognitive Coping, Module 5-Creating a Trauma Narrative,	Individual and Family	25 TF-CBT treatment sessions over 9 months.	Yes

Intervention	Description	Modality	Study dosage	Efficacy
Adapted Trauma-Focused Cognitive Behavioral Therapy (TF-CBT)	and Module 6-Cognitive Processing. Same as above but without caregiver participation and family component (i.e. parent-adolescent sessions).	Individual	One 60-minute individual session, once per week, for 12 consecutive weeks.	No
Trust-Based Relational Intervention (TRBI)	An attachment-based intervention for children with an emphasis on safety, connection, and regulation. It is a caregiving model applied in residential treatment facilities intended to address various subsystems (e.g., sensory, language, physical, attachment) that allow a child to successfully navigate his or her environment. Based on three sets of principles: 1) Empowering principles which address physical and environmental needs and promote feelings of safety through environmental and physiological regulation strategies. 2) Connecting principles that build trusting relationships to promote feeling valued, nurtured, safe, and connected through mindfulness and engagement strategies, and 3) Correcting principles that teach appropriate strategies for getting needs met while navigating social interactions and responding to challenging situations through proactive and responsive skill-building strategies.	Individual, Family, Milieu	Phase 1- Intensive 5-day - 24 hour intervention in residential setting by therapist and select milieu staff. Phase 2 – Daily continuation of intervention by all residential staff and patient's caregivers in residential facility for unspecified duration. Phase 3 – Continued implementation of intervention principles in milieu around traditional residential treatment programming for unspecified duration.	Yes

problems. It also includes a family component in how the case is conceptualized as well as general family involvement in the treatment process (Apsche & DiMeo, 2012). The experimental study by Swart et al. found MDT to be significantly better than usual care at decreasing anger, fear, internalizing and externalizing symptoms in this population. This was one of the stronger studies in terms of methodological rigor and thus, results support the efficacy of MDT for this population. The experimental study by Madigan et al. was also a strong methodological study. However, it found that an adapted version of TF-CBT did not significantly improve PTSD symptoms, unresolved trauma/loss, attachment, anxiety, depression, or behavioral symptoms compared to treatment as usual in a sample of complexly traumatized adolescent mothers. It is important to note, however, that the family component of TF-CBT was eliminated from the treatment protocol and so results could only be generalized to efficacy of this adapted version within a population of adolescent mothers.

The other two primary studies evaluated ARC and SPARCS, two multicomponent interventions in residential settings. The ARC study used a naturalistic evaluation design focused on implementing and sustaining the ARC framework in residential settings. It examined outcomes of 3 groups of participants completing the group therapy component in the milieu setting with individual adjunctive sessions. Results of this study were favorable with participants demonstrating a significant decrease in a variety of internalizing and externalizing symptoms, as well as improvement in PTSD except for avoidance/withdrawal symptoms. While there were significant methodological limitations to this study, results provide promising pilot data for future studies with better controls.

SPARCS is a group therapy intervention designed for adolescent girls with a history of and current exposure to chronic stress (DeRosa, 2005). Habib et al. evaluated this

intervention in a residential setting and found that adolescents reported decreased PTSD symptoms as well as a decrease in a variety of internalizing and externalizing symptoms. However, there was no treatment effect for social problems. As with the ARC study, there were significant limitations in study design as well as high estimated risk of bias. These results cannot be generalized to support efficacy of SPARCS for all complexly traumatized adolescents in residential treatment. However, the preliminary data were promising and support further testing of the SPARCS intervention in a more rigorous study in this population.

Case studies. Both PE and TF-CBT are well-established treatments for PTSD with substantial empirical support in the literature among adult and child populations, respectively (J. A. Cohen, Berliner, & Mannarino, 2010; Deblinger, Mannarino, Cohen, Runyon, & Steer, 2011; Mannarino, Cohen, Deblinger, Runyon, & Steer, 2012; P. A. Resick et al., 2008; Patricia A. Resick et al., 2003; Scheeringa, Weems, Cohen, Amaya-Jackson, & Guthrie, 2011) . However, these are the only three studies evaluating these well-established interventions in adolescents with CT. PE was effective in decreasing PTSD symptoms and internalizing symptoms in two case studies of high-risk juvenile sexual offenders with CT being treated in a residential facility. TF-CBT was found to be effective at decreasing PTSD symptoms, internalizing, and externalizing symptoms in a case study of a 16 year-old female with CT related to childhood sexual abuse, also residing in a residential treatment facility.

Three of the interventions tested were intervention frameworks, although they also included specific interventions or intervention suggestions to be implemented in more traditional therapeutic formats. ARC, RLH, and TRBI are intervention frameworks created or adapted for implementation in residential treatment facilities. Each of these included a milieu

therapy component that involves training caregivers and/or staff in trauma-informed care for children and adolescents with CT due to severe and/or chronic exposures to trauma and violence (R. Kagan, 2007; Kinniburgh et al., 2005; Purvis et al., 2013). RLH and TRBI were each evaluated in separate case studies of two, 16-year-old females in residential treatment due to impairment resulting from severe and chronic maltreatment and attachment disruptions. In the RLH study, the participant experienced decreased mood and posttraumatic stress symptoms as well as an overall increase in global IQ over the multi-year treatment. In the TRBI study, the participant reported decreased violent and self-injurious behavior and an increase in prosocial behaviors. Further, Purvis took a neurochemical profile of the participant at baseline and following the intervention two years later and reports an increased stabilization of neurochemicals such as serotonin, norepinephrine, and GABA. In both studies, there was a reported improvement in attachment behavior and relationships.

Keeshin and Strawn (2009) evaluated Risperidone and found it to be effective at improving intrusive symptoms and hypervigilance in a 13-year-old male suffering from CT related to child maltreatment. Response art therapy was evaluated in a case study of a 13 year-old female. In this study, Miller reported that the participant evidenced increased feelings of mastery, competence, and improved self-integration.

Complex trauma intervention targets. A variety of interventions were evaluated in the reviewed studies and all explicitly claim to target multiple types of symptoms falling within multiple complex trauma domains of impairment. Only one intervention, SPARCS, was judged to address all seven domains of impairment: affect regulation, attachment, biology, behavioral control, cognition, dissociation, and self-concept. This is not surprising as SPARCS was the only intervention that was developed specifically from CT treatment

guidelines and was designed specifically for complexly traumatized adolescents (DeRosa, 2005) . However, TF-CBT and ARC were the next most comprehensive, addressing all areas of impairment except for biology. Risperidone and PE least comprehensively addressed the CT domains of impairment and focused more exclusively on affective regulation and behavioral control through biological and cognitive changes, respectively. CT Intervention targets are presented in Table 4.5.

All interventions targeted affect regulation and behavioral control, but differed in their level of attention to the other five areas of impairment. Affect regulation strategies consisted of feeling identification and expression, emotion regulation skills training, decreasing affective distress, and/or increasing positive emotion. Strategies targeting behavioral control varied, but included prosocial behavior skills training, reframing caregiver perception and management of negative behavior, and dismantling defense strategies and emotional reactivity linked to negative behaviors.

Attachment was targeted in all of the interventions except for Risperidone and PE therapy. The interventions implemented in residential care facilities, most with milieu components focused most heavily on attachment through restructuring the caregiving environment through caregiver and staff re-education and closely monitored relational intervention. In the reviewed studies, the less intensive outpatient interventions such as traditional TF-CBT, RA, and MDT addressed attachment through conjoint sessions with a caregiver and specific attention and work within the therapeutic relationship on healthy attachment behavior and trust building.

Biology was the least addressed area of impairment. This is not surprising considering nearly all interventions were psychosocial treatments. Risperidone, the one

Table 4.5

Complex Trauma Intervention Targets

Study and intervention	Affect regulation	Attachment	Behavioral control	Biology	Cognition	Dissociation	Self-concept
Ford and Nangle (2015) - TF-CBT	X	X	X		X	X	X
Habib et al. (2013) SPARCS	X	X	X	X	X	X	X
Hodgdon et al. (2013) ARC	X	X	X		X	X	X
Hunter (2010) -PE	X		X		X		
Kagan and Spinazzola (2013) –RLH	X	X	X		X		X
Keeshin and Strawn (2009) – Risperidone	X		X	X			
Madigan et al. (2015) – Adapted TF-CBT	X		X		X	X	X
Miller (2007) – RA	X	X	X			X	X
Purvis et al. (2014) – TRBI	X	X	X	X	X		X
Swart and Apsche (2014) - MDT	X	X	X		X		X

pharmacological treatment targeting biology through neurotransmitter regulation. SPARCS and TBRI incorporated interventions targeted at the biological area of impairment. SPARCS incorporates explicit physiological regulation strategies as a primary treatment component (DeRosa, 2005) . TRBI includes biological regulation in Phase 1 of the milieu intervention in which attention is focused on stabilizing physiology through nutrition and regulation of basic biological needs (Purvis et al., 2013; Purvis et al., 2009) . Other interventions may have included components with stress reduction (i.e. breathing, psychoeducation on stress response) for affective control but these were not considered to target the biological domain unless there was an explicit focus on addressing physiological impairment.

Cognition and Self-concept were addressed in most of the interventions. Cognition was typically targeted through cognitive-behavioral components to address distorted cognitions and maladaptive beliefs. Self-concept was targeted through reduction of self-blame, competency building, and integration of self through self-narrative. A few interventions included mindfulness training to increase focus on the present and attention capabilities. Risperidone and RA did not directly address cognition (although this may be improved as a side effect of better biological or affective regulation). RA was a relational, psychoanalytic art therapy and did not directly address participant cognitions. Risperidone and PE did not directly address self-concept, although this may also be a side effect of achieving other therapeutic targets. Dissociation was directly addressed in both TF-CBT versions, SPARCS, ARC, and RA through specific guidelines for grounding and bringing clients into the present. The other interventions did not include any mention of dissociation in the study descriptions.

Complex trauma conceptualization. To be included in this review all studies had to clearly describe their participants as either having complex trauma/complex trauma symptoms or that they had experienced complex traumatic experiences. However, the terminology used to describe this, as well as the extent to which this was discussed varied considerably among reviewed studies. Three of the case studies had a vague conceptualization of CT, referring to the problem as Chronic PTSD related to severe abuse and neglect or developmental trauma. They note that the problem includes symptoms beyond a specific PTSD diagnosis, but do not expand on this or use specific CT terminology. Swart et al. is also somewhat vague in their CT description. This primary article uses the term complex trauma in the title and then describes the population as having experienced multiple traumas and comorbidities, but fails to fully define specific CT areas of impairment.

However, not all studies had vague or incomplete CT conceptualizations. Three case studies refer specifically to Developmental Trauma Disorder (DTD) (B. A. van der Kolk, 2009) or CT and include more extensive description of the type of impairments that may result from this type of complex traumatization. The more specific conceptualization in these cases are not surprising as two of the three evaluated RLH and TRBI, comprehensive interventions developed for complexly traumatized children. Two of the primary studies, Habib et al. and Hodgdon et al. include similarly clear and complete conceptualizations of CT in their studies. These definitions fall in line well with those posed by the NCTSN Complex Trauma workgroup.

Madigan et al. also uses the term complex trauma to describe their multiply traumatized sample in their discussion. Interestingly, they bring this up as a potential reason they did not get the treatment results they hypothesized. They noted that TF-CBT was

developed for traditional PTSD and included the processing of one trauma. They reasoned the intervention may not have been as effective with their population due to their complex trauma experiences and presentations. This reasoning is also supported by the fact that the adaption they made for the population of adolescents they treated was to omit the family component of caregiver-patient sessions. While this might be practical for these young women who may not have involved caregivers, it also takes away a treatment component focused on attachment which would be more important in the successful treatment of complex trauma than in the treatment of single event trauma or trauma occurring outside of the caregiving system.

Complex trauma outcome measures and domains of impairment. Despite the fact most of the interventions tested were comprehensive and targeted multiple CT domains of impairment, outcome measures examined in the studies were much less varied. Seven of the ten studies measured intervention effects on posttraumatic stress symptoms. Of these seven studies, five assessed these symptoms using measures including the UCLA PTSD-RI, CPTSDI, and CPSS, which are based on traditional PTSD criteria. All of the PTS/PTSD measures were standardized measures with adequate validity and reliability. Importantly, all studies that measured PTS/PTSD symptoms outcomes did add additional measures to catch other symptoms that might be beyond PTSD and are more consistent with CT. The next most common outcome measure used was internalizing and externalizing symptoms as assessed by the two subscales of the CBCL and/or YSR which are also well validated measures. However, these measures only assess symptoms within the affect regulation and behavioral control domains of impairment. Overall, less than half the studies included outcome measures specifically assessing biology, cognition or dissociation. Only one study explicitly

assessed self-concept. Study outcomes, assessment measures, and corresponding CT domains of impairment are presented in Table 4.6. The number of CT domains of impairment assessed across studies is presented in Figure 4.2.

As noted, affect regulation and behavioral control domains were assessed in 90% of studies. Miller did not discuss affective regulation in the case study using RA, and used clinical observation as the only measure in other domains. Keeshin and Strawn did not address behavioral control symptoms in their case study evaluating Risperidone and used only clinical observation and patient report to assess change in affect regulation as their sole outcome. All other studies assessed the effect of their intervention on symptoms relating to affect regulation and behavioral control using strong measures of PTS/PTSD and CBCL/YSR subscales. Two of the studies conducted in residential settings included counts of restraint use to assess changes in levels of participant aggression and behavior. Other measures used to assess these areas included TSCC subscales on affective distress and sexual behavior, the anger subscale of the State-Trait Expression Inventory-2, BDI, and SCARED. Most case studies also included clinical observation of various treatment gains within the affect regulation and behavioral control domains.

Attachment impairment was assessed in 80% of studies. However, most outcome measures for attachment were very general and referred to social functioning or improved relationships. Several studies measured this domain with subscales from standard measures like the TSCC, YSR, or YOQ-SR. However, over half of the studies measuring attachment used clinical observation of participant change in attachment in the context of the therapeutic relationship or relationship with caregivers. Only one study, Madigan et al. (2015), actually

Table 4.6

Study Outcomes, Measures, and CT Domains of Impairment

Study	Outcomes assessed	Outcome measures	Domains of impairment
Ford and Nangle (2015)	Internalizing Symptoms, Externalizing Symptoms, Anxiety, Depression, Post-traumatic Stress Symptoms, Dissociation, Anger, Sexual Concerns, Social Functioning	YSR/CBCL –Internalizing/ Externalizing/ Total scales, TSCC –six clinical scales, Parent/ patient Report	Affect Regulation, Attachment, Behavioral Control, Dissociation
Habib et al. (2013)	PTSD symptoms, Intrapersonal Distress, Somatic Complaints, Interpersonal Problems, Social Problems, Behavioral Dysfunction, Critical Items	UCLA RI Criterion B, C, D, YOQ-SR total and 6 Subscales	Affect Regulation, Attachment, Behavioral control, Biology
Hodgdon et al. (2013)	PTSD symptoms, Aggression, Anxiety/ Depression, Internalizing, Externalizing, Attention, Following Rules, Somatic Complaints, Social Problems, Thought Problems, Withdrawal, Need for Restraint	UCLA RI, Criterion B, C, D, CBCL – 10 subscales Restraint Use	Affect Regulation, Attachment, Biology, Behavioral Control, Cognition,
Hunter (2010)	PTSD symptoms, Internalizing symptoms, Therapeutic Relationship, Distorted Cognitions, Behavior	CPSS, YSR – Internalizing, Clinical Observation	Affect Regulation, Attachment, Behavioral control, Cognition

Study	Outcomes assessed	Outcome measures	Domains of impairment
Kagan and Spinazolla (2013)	PTS Symptoms, Anxiety, Depression, Anger, Hyperresponse, Dissociation, Overt Dissociation, Dissociation-Fantasy, Sexual concerns, IQ, Attunement/ Relationship Development, Behavior,	TSCC – 9 subscales, WISC-III, WAIS-IV, Clinical Observation	Affect Regulation, Attachment, Behavioral Control, Cognition, Dissociation
Keeshin and Strawn (2009)	PTSD Symptoms	Clinical Observation and Patient Report	Affect Regulation
Madigan et al. (2015)	PTSD Symptoms, Trauma Resolution Status Attachment Status, Dissociation, Depression, Anxiety, Externalizing Behavior	AAI, CPTSDI, A-DES, BDI, SCARED, YSR – ExternalizingSSP	Affect Regulation Attachment, Behavioral Control, Dissociation
Miller (2007)	Relationship, Behavior, Feelings of Mastery, Competence, and Ego strength	Clinical Observation	Attachment, Behavioral Control, Self Concept
Purvis et al. (2014)	Need for restraint, Neuro-chemical levels, Prosocial behaviors, Behavior change, Attachment behaviors, Unspecified social, emotional and behavioral indicators	Restraint Use, Neuro-chemical Profile, Clinical Observation Unspecified Indicators	Affect Regulation, Attachment, Behavioral Control, Biology,
Swart and Apsche (2014)	Anger, Internalizing symptoms, Externalizing Symptoms, Dysfunctional Beliefs/ Cognitions, Aggression. Anxiety/Fear	STAXI-2, Anger In/Out/Total, CBCL-Internalizing/ Externalizing, CCBQ, Behavior Rating Scales, Fear Assessment	Affect Regulation, Behavioral Control, Cognition,

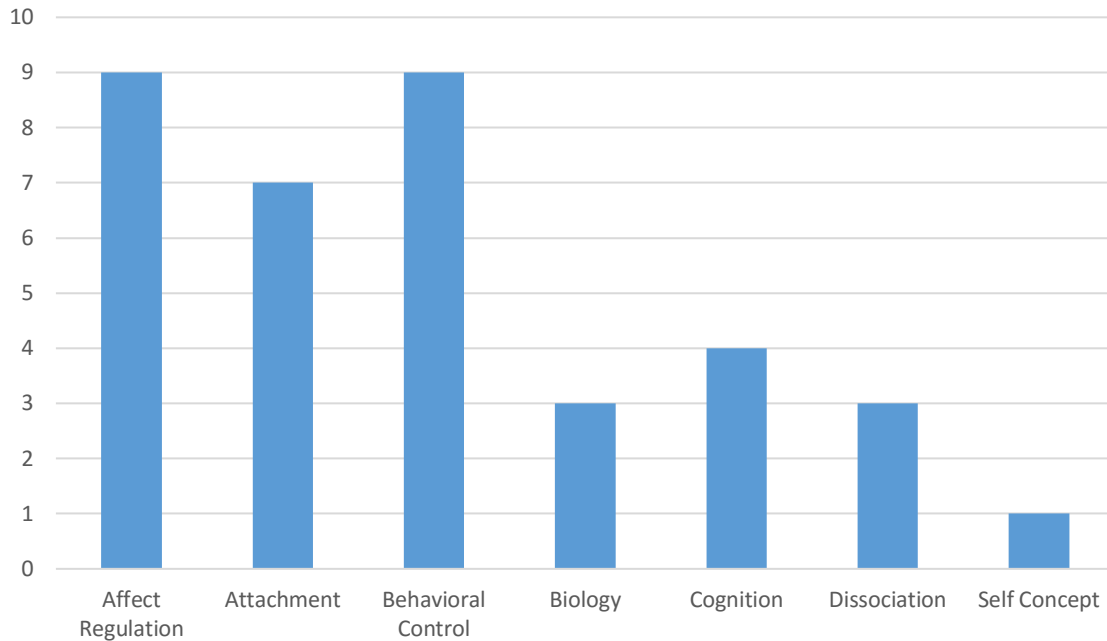


Figure 4.2. Complex trauma domains of impairment assessed.

used the AAI that has been validated with adolescents and is considered a gold standard in measuring attachment types (Allen, Moore, Kuperminc, & Bell, 1998).

Less than half of the studies assessed impairment in the cognition and dissociation domains (40% and 30%, respectively). Of studies measuring cognition outcomes, one used the WISC-3 and WAIS-4, standardized IQ measures, to examine cognitive change and another used a CBCL subscale to assess attention. However, one study relied on clinical observation and the other on an unstandardized questionnaire associated with the evaluated intervention to examine strength of beliefs/cognitions (CCBQ). Both measures have questionable validity and reliability. The dissociation measure used were more rigorous. Two of three studies measuring this domain used the standardized Dissociation subscale of the TSCC, and the third study used the A-DES, a well validated measure for dissociative symptoms.

Few studies (30%) assessed the biological domain of impairment. Of note, the one study using a primarily biological intervention (Risperidone) did not employ any biological outcome measures. Two of the studies included “Somatic Complaints” subscales of the CBCL and YOQ, which are validated measures. They are self-report measures of manifestations of the biological domain and so were included in this category, although they were not actually biological measures themselves. One study did attempt to use biological measures to assess intervention impact on this domain of impairment. Purvis et al. (2014) compared two panels of participant neurochemical levels taken from urine assays conducted before treatment began and a year later after completing treatment. The aim was to demonstrate higher levels of neurotransmitters such as serotonin following treatment, and overall neurochemical stabilization following intervention. Unfortunately, this is not a valid or reliable method for several reasons. The first is that there is no peer-reviewed evidence that monoamines like those tested in the urine assay can cross the blood-brain barrier and so neurotransmitters cannot end up in the urine and thus cannot reflect levels of these neurochemicals in the brain which are hypothesized to be responsible for much psychiatric symptomology under the monoamine hypothesis (Hinz et al., 2012). Secondly, these same chemicals have other purposes throughout the body and so even if they could reflect neurotransmitters in the brain, there is no way to ascertain that the levels reflect neurochemical balance in brain synapses instead of other parts of the body. Further, neurochemical levels are sensitive to confounding factors such as diurnal rhythms, hormonal patterns, and acute stressors that would make results assessed from examining changes in neurochemical levels from one urine assay to another one year later difficult to reliably assess (Hinz et al., 2011).

Finally, only one study reviewed explicitly included self-concept as a measurement outcome. Miller (2007) used clinical observation to assess the participant's development of competence, mastery, ego strength, and self-integration throughout response art intervention. None of the studies used any standardized measures of self-concept as outcome measures of any of the interventions.

Discussion

Our results indicate that the literature evaluating CT intervention for adolescents is limited in number (N=10) and study rigor. There were nine distinct interventions evaluated in the reviewed studies that differed by modality, target, and scope. The majority of interventions tested were multicomponent treatments designed to comprehensively address multiple areas of CT impairment. However, treatment outcomes examined in the studies tended to focus on traditional PTSD symptoms, affect, and behavioral control. Overall, most interventions were effective, but the majority of research studies had substantial methodological limitations preventing generalization of the results.

Complex trauma intervention literature. The limited number of intervention studies for this population was somewhat surprising. There has been a growing number of CT intervention studies in adult and child populations indicating CT does have a presence in the mental health treatment literature (Arvidson et al., 2011; Cloitre, Koenen, Cohen, & Han, 2002; Cloitre et al., 2010; J. A. Cohen, Deblinger, Mannarino, & Steer, 2004; J. A. Cohen & Mannarino, 1996; Richard Kagan, Henry, Richardson, Trinkle, & LaFrenier, 2014). The small number of empirical CT treatment studies targeting adolescents may be due to several factors. One explanation is the paucity of interventions developed specifically for adolescents with complex trauma. Among the interventions examined in this review, only SPARCS was developed specifically for adolescents with CT. MDT was developed for use with adolescent

males with conduct problems, many which may also experience CT, but it is not designed specifically for CT symptomology. Several of the other interventions including ARC, RLH, and TRBI specifically target CT, but were originally developed for younger children. During the review, several studies were identified and discovered that had to be excluded from our review due to participant age (Arvidson et al., 2011; J. A. Cohen et al., 2004; Dorrepaal et al., 2014; Dorrepaal et al., 2012; Julian D. Ford, 2015; Richard Kagan et al., 2014; Lanktree et al., 2012; Patricia A. Resick et al., 2003; Weiner, Schneider, & Lyons, 2009). Some of these included adolescents in their treatment samples; however, the mean age of participants was typically around 10 years of age. It may be that many adolescents are currently being treated with interventions that have only been evaluated in younger or older populations. Thus, more research examining and evaluating intervention efficacy specifically in adolescent CT samples is sorely needed.

The other interventions identified in the review (TF-CBT, PE, Risperidone, RA) were treatments developed for PTSD or other psychiatric illnesses in adult or child populations. Thus, it is apparent that some of the interventions being evaluated for use with adolescents with CT were not originally designed to address CT symptomology. TF-CBT did have some guidelines to adapt the intervention for use with CT but other interventions did not. Notably, the one study in which TF-CBT was adapted for use specifically with adolescent mothers with CT was the only study that found no significant treatment benefit over usual care. Therefore, using interventions for other types of trauma/mental health problems or different aged populations may not always be effective. This underscores the need for the development of more CT-specific interventions and research to address the unique developmental needs of adolescents.

Another area of concern was the overall low methodological rigor of the intervention studies evaluated. While there were two well-designed experimental studies (Madigan et al, 2015 and Swart et al., 2014), the majority were case studies or one-group pretest-posttest designs. This may be partially due to the fact that CT is a relatively recently identified and studied problem. It is interesting that the two most rigorous studies were published in 2014 and 2015, and the other two primary studies were both published in 2013. In fact the earliest published study identified was from 2007. It may be that complex trauma literature is nascent and more rigorous studies are currently in progress. Alternatively, it could be that the lack of rigorous intervention studies is due to the ‘complexity’ of CT and CT treatment itself. CT symptoms are not part of the traditional diagnostic system, and therefore more difficult to assess. Also, CT symptomology is often present in severely impaired psychiatric populations, such as adolescents in residential treatment facilities and impacts many different domains of functioning. Thus, evaluation studies with this population are likely more logistically challenging in terms of recruitment and implementation. Further, the interventions developed for CT specifically are multicomponent which makes evaluating treatment efficacy more complex. Specifically, interventions including milieu treatment components and concentrated environmental components may be difficult to both implement with fidelity and control for treatment confounds. Treatment dismantling studies may be helpful to accurately evaluate all aspects of complex interventions.

Regardless of these challenges, more rigorous experimental study designs, larger sample sizes, and more advanced statistical analyses are necessary to better evaluate existing interventions which may be effective in treating adolescent CT populations. The descriptive evaluations and pilot data presented in most of the studies suggest the interventions identified

in this review hold promise, but preclude the ability to generalize intervention results. Thus, these interventions cannot yet be considered empirically-based interventions for adolescents with CT. Most are evidence-informed, and some are evidenced based treatments for other populations, such as TF-CBT for treating children and adolescents with PTSD. However, the lack of methodological rigor and high levels of estimated bias in the majority of studies are problems that should be considered by practitioners when treating complexly traumatized adolescents and should be addressed by future research. Unfortunately, empirically-supported “promising” interventions appear to be the best options available to meet the needs of this population at this time.

Complex trauma conceptualization and domains of impairment. About half of the studies used CT terminology and included strong conceptualizations and description of CT in their samples. These studies all referred to complex trauma both in terms of a complex history of multiple trauma experiences and as a syndrome or complex adaptation to trauma that manifested symptoms beyond PTSD diagnostic criteria. Notably, all of the intervention studies examining interventions developed specifically for or in response to CT populations were in this group of studies. However, one problematic aspect of their conceptualization is that most of these authors appeared to see complex trauma as synonymous with residential youth. While it is likely that the majority of youth in treatment have had multiple traumatic experiences, they may not all have had these experiences. Further, even among those who have experienced multiple traumatization, not all will experience the same level or type of CT adaptation. This makes assessing symptom presentations pre and post intervention important when examining intervention change in these samples.

Additionally, despite fairly detailed CT conceptualizations, these studies assessed only four or five of the seven domains of impairment in their outcome measures, but all included some form of PTSD symptom assessment. Considering the population, interventions, and treatment settings, this may be because attachment, affective, and behavioral outcomes were of primary interest and functional importance. However, most of these CT-specific interventions also included some additional domain measure - typically dissociation, somatic complaints to assess biology, or some form of cognitive measure. This suggests there was a recognition that successful treatment would mean improvement in a variety of areas beyond PTSD symptoms.

Unfortunately, about half of the studies included vague conceptualizations and descriptions of CT in their samples. These studies included less severely impaired participants, in less restrictive settings, and tended to evaluate interventions designed originally for other populations or problems including PE, MDT, traditional TF-CBT, and risperidone. Unclear conceptualization poses numerous problems for adequately evaluating whether interventions have true efficacy with CT, or only related symptoms. It is particularly problematic in implementing comprehensive outcome assessments. Most of these studies primarily examined affective symptoms, specifically PTSD, and behavioral and cognitive domains. These studies were less likely to have attachment, dissociation, or other measures outside of what is assessed in typical PTSD treatment studies. Some attention was paid to attachment, which appears to be the most common impairment recognized in CT beyond the affective and behavioral elements. This may be due to the transdiagnostic nature of CT and the lack of a convenient diagnostic category to describe or measure this syndrome. A stronger consensus on CT terminology and symptom conceptualization must be adopted by

researchers in order to build a more rigorous and cohesive body of evidence for CT intervention.

The primary use of PTSD symptom measures and behavioral outcomes calls into question the validity of many of these interventions for comprehensively treating CT. Lack of attention to complex trauma-specific domains was problematic. Future research should better delineate interventions to target CT vs. PTSD symptoms in adolescents. No evidence exists to suggest that PTSD intervention is equally effective with polytraumatized and chronically maltreated adolescents. In fact, the one study reviewed by Madigan et al. (2014) suggests PTSD interventions may not be enough. New comprehensive interventions need to be developed and existing CT interventions need to be more rigorously tested for adolescents.

Limitations. A primary limitation of this study is that, due to the transdiagnostic and unstandardized nature of “complex trauma” and synonymous terminology, it is possible that studies of CT populations were not reviewed because they were not explicitly described with this terminology. For example, some studies of PTSD in adolescents may not have been identified by our search because they did not include “chronic” or “complex” specifiers. Another limitation is that, although we follow the expert consensus guidelines as to the domains of impairment inherent in complex trauma, there is a degree of subjectivity in the determination of which symptoms and measures fall within these established domains. While many are seemingly clear cut (IQ assesses cognitive impairment) there are some measures that could be debated as to which, if any, domains they may represent. We attempted to minimize this limitation by having two independent data collectors and discussing domain-related data to consensus among the research team. Finally, our systematic review protocol was never registered through Cochrane Collaboration or on other websites and so was not

subject to open peer review from the beginning of the project. The research team did consult with experts and follow standardized systematic review protocol guidelines from Cochrane Collaboration and PRISMA in order to minimize this limitation as much as possible.

Conclusion and implications. Our results underscore the need for more complex trauma interventions specifically designed to treat CT symptomology in adolescents. Interventions currently used to treat adolescents with CT are promising, but do not have strong empirical support in the literature for use specifically with this population. More rigorous evaluation studies of new adolescent CT interventions and developmental adaptations of existing CT interventions are sorely needed. Further, more research is needed to better assess and treat individual areas of impairment due to CT. Future intervention studies should use a broader range of outcome measures and methodology to assess the many aspects of complex traumatization in order to determine true treatment efficacy. Finally, the transdiagnostic and multifaceted nature of complex trauma itself suggests a transdisciplinary approach to this problem could be a highly effective way to study and treat this highly complex and vulnerable population.

CHAPTER 5: CONCLUSION

The overarching goal of this dissertation was to present a transdisciplinary model of childhood trauma and adolescent mental health and to begin foundational research on these problems from a transdisciplinary perspective. The studies presented illustrate the inherently transdisciplinary nature of childhood trauma and adolescent mental health, specifically adolescent perinatal depression and complex trauma. They also demonstrate how transdisciplinary principles can be integrated into the conceptualization, measurement, interpretation, and discussion of these problems. Within these studies, transdisciplinary principles inform study recommendations for future research and standards of care for transdisciplinary practice.

The specific goals of this dissertation were to: 1) present a transdisciplinary model of childhood trauma and adolescent mental health, 2) analyze and describe the transdisciplinary problem of childhood trauma in a vulnerable population (i.e. adolescent mothers), 3) begin to research associations between childhood trauma and transdisciplinary adolescent mental health outcomes, and 4) examine intervention approaches to a complex adolescent mental health outcome from a transdisciplinary perspective. The model presented in chapter one addresses the first aim of this paper through merging theoretical perspectives from many disciplines into a meta-framework for future transdisciplinary research efforts. This model can be used by social workers in collaboration with other transdisciplinary researchers and shared methods to address the Social Work Grand Challenge of ensuring healthy development for all youth.

The Papers presented in Chapters 2 and 3 meet the next two goals by closely examining childhood trauma subtypes, polytraumatization, and perinatal depression in a comprehensive way within a sample of adolescent mothers. The first paper confirms that childhood trauma is, in fact, a problem within a population of adolescent mothers, particularly those with perinatal depression. The second paper supports a general association between childhood trauma and adolescent perinatal depression. This research lays the foundation for future work using transdisciplinary methods to more closely examine the core risk process from the transdisciplinary model to more clearly understand adolescent perinatal depression and identify novel intervention targets. The second paper also begins to examine trauma risk within a developmental context which can be expanded in future research with the transdisciplinary model. Further, transdisciplinary risk and protective factors from the literature can be added to future transdisciplinary models in order to examine potential moderation of the model's core risk process.

The final paper addresses the fourth goal of evaluating an intervention for an adolescent mental health outcome (i.e. complex trauma) from a transdisciplinary perspective. Intervention studies from multiple disciplines were reviewed and complex trauma was examined as a transdiagnostic construct in order to analyze how these interventions may be (or may not be) addressing transdiagnostic processes. The transdiagnostic perspective builds on the transdisciplinary nature of the review by increasing the chance that perspectives from different disciplines may be included in the review. This perspective also establishes complex trauma as a transdisciplinary construct as its conceptualization was taken from an expert consensus of trauma experts from different disciplines (Cook, 2005). Future research on complex trauma could follow the transdisciplinary model presented to help clarify complex

trauma domain impairments and eventually develop empirically-supported intervention targets.

The primary implication of this dissertation is that there is much more work to be done. Shifting the way problems are conceptualized and researched is no small challenge. However, current movements among other disciplines, research topic areas, and funding sources make adoption of the transdisciplinary model more attractive. The model itself, and the core risk process in particular, needs to be tested with transdisciplinary methods to establish empirical support. Mediation and moderation studies need to be conducted to test the relationships hypothesized in a variety of adolescent mental health populations. Once model relationships are established (or adjusted as research results dictate) the framework will be flexible enough to guide research on a variety of trauma types, risk/protective factors, developmental stages, and adolescent mental health problems. It is also hoped that this model might also help to identify a greater variety of prevention and intervention targets and ultimately be used in transdisciplinary intervention research to guide treatment outcome studies. The clearer we are on the complexities of the problems we study, the better, and more quickly we can provide relief to all vulnerable children and adolescents suffering from trauma-related mental health problems.

APPENDIX A: 2016 COMPLEX TRAUMA SYSTEMATIC REVIEW PROTOCOL

Research Question: What evidence based interventions exist for the treatment of adolescent Complex Trauma and what are the quality of these interventions?

Variable Definition:

Conceptual Definition:

- 1) **Complex Trauma** refers to the clinical syndrome identified in research and practice which includes the presence of trauma symptoms which exceed a traditional PTSD diagnosis. This ‘syndrome’ results from frequent or chronic trauma exposure during childhood and result in impairment in the development of multiple psychological and physiological systems including emotion regulation, attachment, stress response, and brain structure and function.
- 2) **Intervention** – For the purpose of our study, all interventions must be developed and applied in order to treat impairments of complex trauma caused by exposure to chronic childhood stress and trauma. Secondary prevention efforts will be considered if they aim to remediate complex trauma symptoms or developmental impairments as well as prevent future negative outcomes.
- 3) **Adolescent** – A child who has reached the adolescent stage of development as reflected by age and physiological maturity.

Operational Definitions:

- 1) **Complex Trauma** - For the purpose of this review, complex trauma may also be identified in the literature as ‘complex PTSD’, ‘chronic PTSD’, ‘chronic trauma’, ‘Type 2 trauma’, ‘multiple event trauma’, ‘developmental trauma’ and ‘disorders of extreme stress (DESNOS)’. The NCTSN definition of ‘complex trauma’ developed by the 1995 Child and Adolescent Complex Trauma workgroup of experts in child and adolescent trauma practice and research is utilized in this study for the purpose of analysis. This definition includes seven distinct areas of developmental impairment.
- 2) **Intervention** – Any individual, family, or group treatment or program with the explicit purpose of treating complex trauma symptoms to improve adolescent outcomes.
- 3) **Adolescent** - This population refers to any child between the ages of 13-18. This age range was selected in order to focus on adolescence as a distinct developmental stage.

Data Review:

This study aims to review quantitative data from well-designed studies evaluating complex trauma intervention and conduct a meta-analysis of intervention effects. However, substantial qualitative data will be collected and evaluated for additional analysis. Qualitative review will be conducted in the absence of sufficient quantitative studies in the current literature.

Variable Relationships:

It is hoped that causal relationships between CT intervention and adolescent CT symptoms can be studied. However, in the absence of well-designed intervention studies, associative and descriptive relationships between existing interventions and CT symptom treatment will be explored.

Scope of Systematic Review:

We will use an amended Cochrane Collaboration protocol to search 9 databases for studies evaluating interventions for complex trauma in an adolescent (age 13-18) population. These databases include CENTRAL which include registered Systematic Reviews and clinical trials. The databases PubMed, PsychInfo, Cinahl, and Social Work Abstracts are included to enable review of studies from different disciplinary perspectives. PILOTS database will be searched for its content focus on trauma literature. Finally, Social Service Abstracts and Campbell Library to ensure intervention literature is searched thoroughly. Overall, this will provide a transdisciplinary review of Complex Trauma interventions.

Studies including any kind of adolescent population with study-defined complex trauma meeting our age limitation will be considered. Any complex trauma intervention evaluated which meets our operational definitions for a CT Intervention will be included. Any intervention study design will be considered in the initial abstract review. Case studies will be read for qualitative review and contextual analysis and discussion, but not included in data extraction. All other research quantitative designs will be included in data extraction although only experimental and quasi-experimental trials will be included in a final meta-analysis. Quantitative and qualitative comparisons will be made between intervention and control groups within matching intervention types. Qualitative comparisons will be made between intervention types and between different outcome types.

Intervention reviews will be pulled for reference review but not data extraction. Dissertations and conference papers will be included in the search to provide general information on the grey literature for qualitative synthesis and data interpretation. CT

Inclusion/Exclusion Criteria:

Inclusion Criteria: 1) adolescents aged 12-18 with, 2) reported 'Complex Trauma' or specified operational synonym (see operational definitions) , 3) any experimental design (case studies, pre/posttests, pilot studies, quasi-experimental design, experimental design, systematic reviews with meta-analysis 4) grey literature and peer-reviewed 6) all articles published since 1996

Exclusion Criteria: 1) non chronic or complex PTSD 2) descriptive articles 3) adolescent participants with concurrently diagnosed substance abuse, psychosis, or pervasive developmental disorders (ie. autism) 5) adult studies including 18 year old participants 7) grey literature and case studies excluded from data extraction but reviewed for context 7) articles published before 1996

Literature Sources:

- 1) **Databases** – CENTRAL, PubMed, PsychInfo, Cinahl, Social Work Abstracts, PILOTS, Social Service Abstracts and Campbell Library
- 2) **Grey Literature** – Dissertations and Conference abstracts will be included within the database search
- 3) **Reference Review** – Intervention reviews will be searched and retrieved for reference harvesting and contextual review, but will not be included in data extraction and final analyses

APPENDIX B: FINAL SEARCH STRINGS BY DATABASE

All search strings were developed with assistance of Angela Bardeen, UNC research librarian

CENTRAL = (“complex trauma” or “complex ptsd” or “chronic trauma” or “multiple event trauma” or “type ii trauma” or “chronic ptsd” or “developmental trauma” or “disorders of extreme stress”) AND (program or treatment or intervention or “clinical trial” or RCT or “feasibility study” or therapy) AND (child* or teen* or adolescen* or “young adult”)

Search settings: “All Text”, Limits: None

PUBMED = ("complex trauma" OR "complex ptsd" OR "chronic trauma" OR "multiple event trauma" OR "type ii trauma" OR "chronic ptsd" OR "developmental trauma" OR "disorder of extreme stress") AND (program OR treatment OR intervention OR "clinical trial" OR RCT OR "feasibility study" OR therapy) AND (child OR children OR childhood OR teen* OR adolescen* OR "young adult" OR youth)

Search settings: “All Fields”, Limits: Humans, Age: Adolescent

PILOTS = (“complex trauma” or “complex ptsd” or “chronic trauma” or “multiple event trauma” or “type ii trauma” or “chronic ptsd” or “developmental trauma” or “disorders or extreme stress”) AND (program or treatment or intervention or “clinical trial” or RCT or “feasibility study” or therapy) AND (child* or teen* or adolescen* or “young adult”)

Search settings: “Anywhere”, Limits: none

PSYCHINFO = (“complex trauma” or “complex ptsd” or “chronic trauma” or “multiple event trauma” or “type ii trauma” or “chronic ptsd” or “developmental trauma” or “disorders of extreme stress”) and (program or treatment or intervention or “clinical trial” or RCT or “feasibility study” or therapy) and (child or “young adult” or adolescent or teenager or youth)

Search settings: “All Text” Limits: Age Groups: Adolescence

CINAHL = (“complex trauma” or “complex ptsd” or “chronic trauma” or “multiple event trauma” or “type ii trauma” or “chronic ptsd” or “developmental trauma” or “disorders of extreme stress”) and (program or treatment or intervention or “clinical trial” or RCT or “feasibility study” or therapy) and (child or “young adult” or adolescent or teenager)

Search settings: “All Text”, Limits: Age: Adolescence

SOCIAL SERVICE ABSTRACTS = (“complex trauma” or “complex ptsd” or “chronic trauma” or “multiple event trauma” or “type ii trauma” or “chronic ptsd” or “developmental trauma” or “disorders of extreme stress”) and (program or treatment or intervention or “clinical trial” or RCT or “feasibility study” or therapy) and (child or “young adult” or adolescent or teenager)

Search settings: Advanced search ‘Anywhere’, Limits: none

SOCIAL WORK ABSTRACTS = (“complex trauma” or “complex ptsd” or “chronic trauma” or “multiple event trauma” or “type ii trauma” or “chronic ptsd” or “developmental trauma” or “disorders of extreme stress”) and (program or treatment or intervention or “clinical trial” or RCT or “feasibility study” or therapy) and (child or “young adult” or adolescent or teenager)

Search settings: Advanced Search “All Text”, Limits: none

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(“complex trauma” or “complex ptsd” or “chronic trauma” or “multiple event trauma” or “type ii trauma” or “chronic ptsd” or “developmental trauma” or “disorders of extreme stress”) AND (program or treatment or intervention or “clinical trial” or RCT or “feasibility study” or therapy) AND (child* or teen* or adolescen* or “young adult”)

Search settings: Advanced search “All Text” (only goes back to 2003), Limits: none

APPENDIX C: DATA EXTRACTION FORM

I. Article Reference

- 1) Study ID:
- 2) Author(s):
- 3) Title of Article:
- 4) Year:
- 5) Journal:
- 6) Objective/Aims:
- 7) The source is a:
 1. Peer-reviewed article
 2. Dissertation
 3. Grey Literature
 4. Other

II. Sample Description

- 1) Primary Sample (general description):
 - 2) Sample Size: N=
Total Sample Size of Treatment Group:
Total Sample Size of Control Group:
Total Sample Size of Other Group:
Time Point 1 Sample Size: N= Time b/w time points 0-1:
Participation Rate: % Attrition Rate: % No. due to Neg. Side Effects

Time Point 2 Sample Size: N= Time b/w time points 1-2:
Participation Rate: % Attrition Rate: % No. due to Neg. Side Effects
- 3) Number of Exclusions and Refusals (number and reasons for withdrawal by group):
 - A. Participants
- 4) Mean Age of Sample (by tx group):
- 5) Gender (% by group):
Results by gender : Y N
- 6) Race/Ethnicity (% by group):
Results by race/ethnicity: Y N

- 7) SES (% by group):
Results specified by SES: Y

B. Treatment Problem

- 9) Definition of Complex Trauma: Y or N
Definition of Complex Trauma (quote directly):

Complex Trauma:

Study Defined as Complex Trauma ____Y ____N

Type of Trauma Defined in Study:

Developmental Timing of Trauma:

Defined Severity of Trauma: Measure yes ____ no ____

Type: Investigator Defined ____ Patient Defined ____

Other ____

- 10) Previous treatment hx: Y N

- 11) Type of co-morbidities (describe):

III. Methodology

A. Research Design

- 1) Design Type:

1. Experimental 2. Quasi-Experimental 3. One group pretest-posttest
4. Case Study 5. Qualitative

- 2) Location of Study:

- 3) Type of Allocation:

Randomization 1. Yes 2. No Blinding 1. Yes 2. No

- 4) Type of Control /Comparison Group :

1. standard care 2. alternative tx
3. no treatment 5. wait-list group 6. no control

- 5) Power Calculation: 1. Yes ____ 2. No

- 6) Credentials and Experience of Assessor/Treatment Provider:

B. Sampling/Recruitment

- 1) Sampling strategy:

Random Select Random Assign Stratified Snowball Convenience

Other ____

2) Recruitment Process (describe):

3) Inclusion criteria: 1. _____ 2. _____

3. _____ 4. _____

4) Exclusion criteria: 1. _____ 2. _____

3. _____ 4. _____

C. Measures

1) Methods of Data Collection:

Questionnaire					Clinical Interview	Biological Measure
Type	Standardi zed	Self- Report	CG Report	Clinician Report	Type	Type

** If another measure was used and it does not fit any of the measures described in the above table, please describe it here: _____

2) Psychometric Properties of Measures

Variables: Continuous: Yes No Dichotomous: Yes No

Reliability Measures: Cronbach's Alpha _____

Test-Retest _____

Inter-rater Correlation _____

Other _____

Validity Measures: Concurrent _____

Sensitivity _____

Specificity _____

Other _____

D. Intervention

1) Level of Intervention

1. individual 2. family 3. group # _____ 4. Other

2) Type of Intervention: _____
Describe:

3) Any Adjunctive Treatment? Yes No
Describe:

4) Which of the following empirically supported areas of impairment does the intervention address? (Indicate all that apply)

Treatment Name	Affect Regulation		Attachment		Behavior Control		Biology		Cognition		Dissociation		Self Concept	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No

4) What other area(s) did the intervention target that is/are not empirically supported needs or problem areas?

5) When did intervention take place?

6) Length of Intervention (dosage and course)

7) Who Delivered Intervention?

8) Was Intervention Culturally Specific? Yes No

9) Describe Assessment of:

Treatment Exposure _____

Treatment Compliance _____

Treatment Fidelity _____

IV. Results

A. Outcome Measure

Name/type of outcome measure	Difference favors:				Tx group Mean (SD)		Control Group Mean (SD)		T-Value		F-Value for ANOVA	Pearson's Correlation	Chi-Squared	Effect Size (d)
	Neither	tx group	Control	unknown	Pre-Test	Post-Test	Pre-Test	Post-Test	Tx	Control				

***Please describe any other Outcomes not listed above:

11) Proportions or Frequencies:

Proportion of Treatment group that improved _____

Proportion of Control/Comparison group that improved _____

12) Effect Size for Outcome Measure: d =

B. Statistical analysis

1) Frequency counts for dichotomous variables:

2) Information on comparability and adjustment for differences in analysis:

3) Explanation and handling of missing data:

4) Side effects: Yes No

Describe:

V. Discussion

Conclusions:

Implications for Research/Practice/Policy:

VI. Review of article (Authors)

Strengths: Author:

Reviewer:

Limitations: Author:

Reviewer:

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