Adolescent and Adult Suicidality as Consequences of Maltreatment Experience and Low Socio-economic Status in Childhood

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A dissertation

submitted in partial fulfillment of

the requirements for the degree of

Doctor of Philosophy

University of Washington

2023

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Program Authorized to Offer Degree:

School of Social Work

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Abstract

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This doctoral dissertation aims to explore the intricate relationships between childhood maltreatment, low childhood socio-economic status (SES), and suicidal outcomes. The study draws on data from the Lehigh Longitudinal Study and utilizes logistic regression and path analysis models to examine the associations among these variables.

The research findings provide compelling evidence that individuals who have experienced childhood maltreatment and come from a low childhood SES background face a heightened risk of both suicidal ideation and suicide attempts compared to those without such experiences. Notably, the majority of these associations are found to be mediated by feelings of hopelessness, emphasizing the crucial role of this psychological factor in understanding suicidality. Specific types of childhood adversity, including physical abuse, sexual abuse, and low childhood SES, exhibit strong and direct links to either suicidal ideation or suicide attempts,

even after accounting for various confounding factors. This suggests that these particular forms of adversity carry distinct risks for suicidal outcomes and should be prioritized in prevention and intervention efforts. The findings indicate that both adolescence and adulthood show significant associations between childhood adversity and suicidality. However, adolescence emerges as a particularly vulnerable period, strongly influenced by childhood adversities, with a heightened risk of developing suicidal tendencies.

The identified significant relationships between specific forms of childhood adversity, hopelessness, and suicidality underscore the importance of addressing these factors in child maltreatment prevention and suicide prevention efforts. Interventions should focus on providing support and resources to individuals who have experienced maltreatment and low SES, aiming to mitigate the negative effects and promote resilience.

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ACKNOWLEDGEMENTS

I have undergone significant personal growth since embarking on the Doctoral Program at the University of Washington. I am immensely grateful to numerous individuals who have played a vital role in supporting me throughout this PhD journey.

I would like to begin by conveying my utmost gratitude to Dr. Peter J. Pecora, my committee chair and academic advisor. Your invaluable funding support, academic guidance, and patience have been instrumental in making this dissertation a reality. Your constant presence and unwavering support provided me with the strength and encouragement I needed. Under your mentorship, I not only persevered through challenges but also acquired a comprehensive skill set that will undoubtedly prove beneficial throughout my professional journey.

I am also indebted to my committee members, Dr. Todd I. Herrenkohl, Dr. Meghan Romanelli, and Dr. Kyle Crowder. To Dr. Herrenkohl, I extend my thanks for your years of academic support and for providing me with the invaluable Lehigh longitudinal data, as well as your insightful feedback. Dr. Romanelli, I am grateful for your valuable input in clarifying the direction of my study and addressing methodological concerns. Dr. Crowder, your role as a graduate school representative and your diverse perspectives enriched my work, and I appreciate your additional feedback. Collaborating with each of you has been a rewarding experience, and I appreciate the support and guidance you provided me during challenging moments in the dissertation process.

I want to acknowledge my doctoral colleagues, Dr. Rebecca Rebbe at the University of North Carolina, Dr. Erin Harrop at the University of Denver, and Dr. Young Jun Choi at the Ministry of Health and Welfare of South Korea. Your genuine emotional and practical support

played a significant role in helping me complete my academic journey. Furthermore, I extend heartfelt thanks to Dr. Taryn Lindhorst for her unwavering encouragement during my academic journey as the former PhD Program Director. Special thanks to Hoang Ngo and Shirley Chu-Torres, the former and current PhD Program Assistant Directors, for their support.

Furthermore, I would like to express my heartfelt gratitude to the individuals who provided invaluable support from South Korea. Dr. Sang Jung Lee at the Korea Institute for Health and Social Affairs (KIHASA) and Dr. Seok Ho Hong at Cheong Ju University deserve my deepest thanks for both their encouragement and financial assistance. I am also deeply appreciative of Dr. Young Kyu Shin, who is affiliated with KIHASA, for his invaluable support that encouraged and motivated me to persevere throughout my PhD studies. Moreover, I am profoundly grateful for the professors at the University of Seoul who offered inspiring support, igniting my determination to pursue doctoral education. Their guidance has been instrumental in shaping my academic journey.

Lastly, I want to express my deepest appreciation to my family in Korea for their unwavering and steadfast support. Their presence and encouragement have meant the world to me, and I sincerely cherish their constant backing.

DEDICATION

With heartfelt sincerity, I dedicate this dissertation to my beloved wife, Seung Ah Kim. Your boundless love, unwavering patience, constant presence, and profound understanding have been priceless throughout this journey. I am deeply grateful to have you as my lifelong companion, as you have not only been my best friend but also my teacher, guiding me towards a beautiful life. Your support has been the foundation upon which I have built this work, and I am forever grateful for your warmth and constant love.

Chapter 1. INTRODUCTION

1.1 INTRODUCTION

Child maltreatment and childhood poverty are pressing societal issues with profound implications for the well-being and development of individuals. Both factors have been extensively studied in isolation, uncovering their detrimental effects on children's physical, emotional, and cognitive development. However, their relationship to the heightened suicide rates among adolescents and adults remains a significant area of research that requires further exploration.

This dissertation delves into the intricate interplay between child maltreatment, childhood poverty, and suicidality, aiming to deepen our understanding of the complex mechanisms underlying these phenomena. The term “suicidality” was originally proposed by Shneidman (1993) to indicate the degree of risk that an individual poses to their own life, but its usage has expanded to encompass various aspects related to suicide, therefore requiring an explanation of its intended meaning (Bertolote & Wasserman, 2021). In this study, when the term “suicidality” is mentioned, it refers to a tendency to think about suicide and/or attempt suicide.

By examining the various theoretical frameworks, empirical evidence, and existing literature, this study seeks to shed light on the pathways and factors that contribute to the heightened risk of suicidal ideation and suicide attempts among individuals who have experienced a specific type of child maltreatment and endured childhood poverty. The investigation also includes a comprehensive review of relevant research studies, employing a

multidisciplinary approach to unravel the interconnectedness of child maltreatment, childhood poverty, and suicidality.

In addition to assessing the relationship between various forms of child maltreatment and suicidal ideation and attempts, this dissertation also aims to identify gaps in the current literature and propose avenues for future research and intervention strategies. Understanding the intricate dynamics between child maltreatment, childhood poverty, and suicidality is essential for informing evidence-based policies, prevention programs, and therapeutic interventions aimed at reducing suicide rates and promoting the well-being of vulnerable individuals.

Overall, this study seeks to contribute to the existing body of knowledge by providing a comprehensive analysis of the relationship between child maltreatment, childhood poverty, and suicidality, with the ultimate goal of fostering a safer, healthier, and more resilient environment for children.

1.2 Significance of Issues with Child Maltreatment, Childhood Socio-economic Status, and Suicide

Policymakers and researchers increasingly understand that child maltreatment is a public health issue. In 2021, child protection services screened-in an estimated 2 million referrals of child maltreatment for further investigation. (U.S. Department of Health and Human Services [DHHS], 2023). The number of child maltreatment reports has remained very high since the 1980s (Myers, 2008), and the number of unreported or hidden child maltreatment cases is unknown. In addition to the high level of prevalence, child maltreatment is a critical issue in that maltreatment experience may bring about negative health outcomes and developmental problems in childhood and children's later lives. Indeed, approximately 1,820 children died because of

abuse and neglect in 2021 (DHHS, 2023), and those who survived child maltreatment are very likely to experience a wide range of negative effects—including maladaptations and mental health disorders (Child Welfare Information Gateway, 2019; Cicchetti & Toth, 2005). In addition to child maltreatment, the presence of health and mental health inequalities persists across different societal contexts. These inequalities are characterized by a gradient across socioeconomic positions in childhood, where individuals with higher positions experience better mental health outcomes, as measured by various indicators such as income, education, and occupational class (Miech et al., 1999). When considering all children under 18 in the US, 38 percent are found in low-income households, and approximately one in six children fall into the impoverished category (Koball et al., 2021). These figures highlight the disproportionate representation of children among the impoverished population in the country; even though they comprise only 23 percent of the total population, they account for 32 percent of all individuals living in poverty (Koball et al., 2021).

Suicide is one of the most detrimental consequences associated with childhood adversity including maltreated experience and poverty. Similar to child maltreatment, suicide has also been recognized as a significant public health issue in the United States. For the past 20 years, spanning from 2000 through 2020, suicide rates—adjusted for age—increased by 30% (Gernett et al., 2022). While there has been a slight recent decrease in suicide rates of 5% between 2018 and 2020 (Gernett et al., 2022), according to preliminary data released by the US Center for Disease Control and Prevention (2023), there appears to have been a resurgence in rates from 2021 through 2022. The latest figures reveal a concerning trend, with approximately 49,500 individuals in the U.S. losing their lives to suicide within the past year. This marks the highest recorded number of suicides, which could potentially be attributed to the lingering effects of the

COVID-19 pandemic. In addition, it is one of major causes of death across various age groups, especially among adolescent and middle-aged adult population groups. In 2020, suicide emerged as the second leading cause of death among individuals aged 10-34 years, and the fifth leading cause of death for those between 35 and 54 years (Gernett et al., 2022). Tragically, the total number of people died by suicide in 2019 was 47,511, and the social and economic consequences (medical expenses and work productivity losses) due to suicidal behaviors and self-inflicted injuries in the same year cost approximately $490 billion (Peterson et al., 2021; Gernett et al., 2022).

When considering the high prevalence and costs of suicide, it is important to identify various risk and protective factors and related prevention strategies. Child maltreatment and childhood socio-economic status/poverty are well-identified risk factors for suicidal thoughts and behavior in adolescence and adulthood (Angelakis et al., 2020; Angelakis et al., 2019; Afifi et al., 2009; Rehkopf & Buka, 2006; Dube et al., 2001; Miller et al., 2013). However, most studies investigating the association between child maltreatment and suicidality or between childhood socio-economic status/poverty and suicidality do not have a clear theoretical basis. The field needs to better understand why and how child maltreatment and childhood poverty lead to suicide risk. Therefore, establishing and examining distinct trajectories connecting child maltreatment and suicidal behavior holds utmost importance, as it can significantly inform interventions targeting child maltreatment and strategies aimed at preventing suicide.

1.3 Outline of the Dissertation

This dissertation aims to develop and analyze theoretical pathway models that connect specific types of child maltreatment and childhood socio-economic status to later suicide risks. In

Chapter 2, a thorough review of existing theories on suicide risks will be conducted, highlighting their relevance to childhood maltreatment experiences. By integrating pertinent components from these theories, a theoretical framework will be constructed to elucidate the pathways that link specific types of child maltreatment and childhood socio-economic status to the development of hopelessness, which in some situations, can ultimately lead to suicidality. In Chapter 3, empirical evidence will be examined to shed light on the intricate interconnections between distinct forms of child maltreatment, childhood poverty, hopelessness, and suicidality. Based on the synthesized theoretical framework and the findings from empirical research, the research aims, questions, and hypotheses will be formulated in the same chapter. Chapter 4 will provide a detailed description of the quantitative data set and measures of constructs employed in the study, as well as an explanation of the analysis methods utilized to test the research questions. Subsequently, in Chapters 5 and 6, the results obtained from the data analyses will be presented and thoroughly discussed, exploring the relationships between specific types of child maltreatment, childhood poverty, hopelessness, and suicidality. The implications of these findings will be critically examined, taking into account their theoretical, practical, and policy implications.

Chapter 2. THEORETICAL FRAMEWORK

2.1 THE IDEATION TO ACTION FRAMEWORK OF SUICIDE RELEVANT TO CHILDHOOD ADVERSITIES

Traditional suicide theories have not provided distinct explanations for suicide attempts that significantly varied from explanations for having thoughts of suicide. About two decades ago, however, Thomas Joiner (2005) introduced a phenomenal theory that clearly differentiated two crucial factors for a potentially lethal suicide attempt: suicidal desire and the capability to act on that desire. The name of the theory is called Interpersonal Theory of Suicide. Following the introduction of this theory, a new wave of suicide theories known as the 'ideation-to-action framework' emphasizes both the origin of suicidal thoughts and the transition from having such thoughts to making actual suicide attempts (Klonsky et al., 2018). Among various theories within the ideation-to-action framework, two theories in particular help explain the pathway from various types of childhood adversity to suicidal behavior: the Interpersonal Theory of Suicide and the Three Step Theory.

Interpersonal Theory of Suicide

Joiner's Interpersonal theory of suicide (IPTS) has been one of the most widely used theories to explain how suicidal behavior develops. This theory underscores that people who actually die by suicide tend to develop two important factors: desire and capability. The central premise of this theory posits that merely having a desire to die (suicide ideation) is not enough to lead to a lethal suicide attempt. Instead, such attempts occur only when individuals have

developed the capability to hurt themselves seriously. In order to articulate his theoretical ideas, Joiner (2007, p. 540) used three main constructs to explain his theory: "(1) the acquired capability, through habituation to pain and fear, to enact lethal self-injury; (2) the sense that one is a burden on loved ones (perceived burdensomeness); and (3) the sense that one does not belong to or is not connected with a valued group or relationship (thwarted belongingness)." According to Joiner (2005), perceived burdensomeness and thwarted belongingness are the constructs that bring about suicide ideation while acquired capability for lethal self-injury is a key construct that leads to lethal suicidal attempts.

Among these three constructs, acquired capability for lethal self-injury is particularly associated with child maltreatment. Joiner posits that acquired capability for self-injury theory involves habituation of a "painful and/or fear inducing experience" (Van Orden, Witte, Cukrowicz, Braithwaite, Selby, & Joiner, 2010, p. 587). More specifically, through habitual experience of physical pain and/or fear, an individual may develop increased physical pain tolerance and reduced fear of lethal self-harm (Joiner, 2005). When it comes to child maltreatment, habituated experience of physical or sexual abuse (e.g., rape and other forms of sexual molestation), which can bring about physical pain and/or fear, may increase the risk of acquired capability for lethal self-injury (Joiner, 2007). As experiences of certain types of child maltreatment, such as physical abuse and sexual abuse, may represent physical pain- and fear-provoking events through which individuals acquire the capability for lethal self-injury, this study will examine the association of child maltreatment types (e.g., physical and sexual abuse vs. emotional abuse and neglect) and increased risk for suicide.

The other two core constructs, perceived burdensomeness and thwarted belongingness, may be also related to child maltreatment. Experience of child maltreatment can lead to

perceived burdensomeness and thwarted belongingness in that maltreated children may develop feelings that they are unwanted or expendable, as well as social isolation (Van Orden et al., 2010). While it is possible these constructs may result from child maltreatment and increase risk for suicide ideation, extant literature has identified more precise causes of perceived burdensomeness (i.e., family conflict, unemployment, and physical illness) and thwarted belongingness (i.e., social isolation and lack of social connectedness) (Van Orden et al., 2010).

Although Joiner's IPTS is well-conceptualized with multidimensional risk factors for both suicidal ideation and suicide attempts, this theory does not appear narrow enough to explain child maltreatment experience and its later effects in that the theory does not specifically reflect the trajectory from child maltreatment to suicide ideation. Particularly, the complexity surrounding child maltreatment and two of the three key constructs of Joiner's theory (perceived burdensomeness and thwarted belongingness) may not easily be articulated or tested. Indeed, there have also been critical responses to the popularity of IPTS as some critics believe that it has been used as a panacea to explain nearly all of the contexts of suicide-related phenomena with just these three parsimonious constructs (Hjelmeland & Knizek, 2020). This argument can be applied to the context of child maltreatment study as IPTS cannot account enough for child maltreatment and its later effects, which involve structural factors beyond the scope of the three constructs. Thus, among these three main constructs of IPTS, the proposed theoretical model in this study does not directly include perceived burdensomeness and thwarted belongingness. In contrast, the other key construct, acquired capability for lethal self-injury, is included in the proposed theoretical model for this dissertation study by conceptualizing child maltreatment as being associated with pain (sexual abuse and physical abuse) as unique pathways to suicidal attempt.

Three-Step Theory

As stated above, trajectories from child maltreatment to suicide attempt have been insufficiently theoretically framed and empirically examined. But the Three-step theory (3ST; Klonsky & May, 2015) can be applied to this area, at least partly. It is a recent framework that is built upon previous "ideation-to-action" theoretical frameworks, including Interpersonal Theory of Suicide (Joiner, 2005), and Integrated Motivational Volitional Theory (O'Connor, 2011). This theory divides the development of suicide behavior into three steps: (1) development of suicidal ideation, (2) strengthened degree of suicidal ideation, and (3) progression from ideation to attempts.

Based on this theory, as a first step, psychological pain and hopelessness contributes to the initiation of suicidal ideation (Klonsky & May, 2015). If the daily life of a person is full of pain, the person feels punished for living their life, and this may lead to thoughts about ending one's life. However, even with psychological pain, if the person can hope that their life can be enhanced, his or her suicidal desire may be diminished. In other words, if there is no hope to enhance one's life that is full of pain, the person may think about committing suicide. Thus, 3ST hypothesizes that suicidal ideation is developed only when pain and hopelessness is combined (Klonsky & May, 2015). More important, the concepts of psychological pain and hopelessness are closely related to child maltreatment in that they can be created by any type of child maltreatment, such as neglect from being left alone for long periods of time or traumatic experiences from physical, sexual, or emotional abuse.

In addition, as a second step, this theory further specifies that there are different degrees of suicidal ideation: moderate and strong ideation (Klonsky & May, 2015). Even if someone is

living with psychological pain and hopelessness, the individual who has sufficient reasons to feel connected to life may experience a moderate level of suicidal ideation. In contrast, another person who does not feel connected to life may experience strong suicidal ideation. Thus, the degree of suicidal ideation can be strengthened by the absence of or a disrupted connectedness to life. While the concept of disrupted connectedness appears to be similar to some aspects of thwarted belongingness in Joiner's theory, the key difference is that 3ST posits connectedness in a mechanism that is not necessarily linked to pain and/or hopelessness – and so it separately contributes to increasing the likelihood of suicidal ideation. This step may suggest that suicidal ideation, developed from child maltreatment experience that leads to pain and hopelessness, can be reinforced by the absence or low level of social connectedness.

The third step is when suicidal ideation progresses to an actual attempt of suicide. In this situation, a suicide attempt happens if someone with suicidal ideation is capable of attempting suicide (Klonsky & May, 2015). The concept of capacity for suicide in 3ST encompasses dispositional, acquired, and practical contributors to making a suicide attempt. Examples of these contributors are dispositional pain sensitivity, habituated painful or fearful experiences (same as Joiner's concept), and knowledge and access to lethal means. Thus, even though it is more broadly defined than Joiner's acquired capability – mainly focusing on habituated physical pain, the capacity for suicide in 3ST is very closely aligned with the acquired capability explained in IPTS.

2.2 HOPELESSNESS THEORY AND FLUID VULNERABILITY THEORY

Hopelessness theory

Beck's Hopelessness theory argues that suicidal behavior can be developed from a sense of persistent hopelessness that leads to suicidal ideation and impaired reasoning that results in suicide attempts that transition from suicidal ideation (Beck et al. 1975). Based on empirical findings of other suicide studies, Beck developed his theory by introducing the concept of suicidal modes, which are defined as networks of cognitive, physiological, affective, and behavioral schemas that are activated by relevant internal and/or external events (Beck, 1996; Rutter et al., 2020). The repeated activations of suicidal modes may lower the threshold of further activations, as cognitive control diminishes with each subsequent activation (Rutter et al., 2020). According to Beck's hopelessness theory, a pessimistic cognitive style is involved in the emergence of hopelessness and depressive symptoms, including suicidal thoughts (Beck, 1996). This cognitive style is characterized by interpreting stressful life events in a detrimental manner, encompassing their causes, outcomes, and personal implications.

With the notion of negative cognitive styles, Rose and Abramson (1992) extended the hopelessness theory to an etiological aspect; they hypothesized that with recurrence of negative life events, particularly repeated child maltreatment experience, people may develop negative inferential/cognitive styles. These developed negative cognitive styles make children feel hopeless, helpless, and depressed. The theory was also extended to suicidality as a consequential aspect beyond the development of hopelessness and depression (Abramson et al., 1998). This extension was originally discussed in Abramson et al.'s earlier work (1989) by considering hopelessness and depression – followed by negative inferential styles as a core risk factor for suicide ideation and suicide attempts. Abramson et al. (1998, p. 475) further developed their

hypothesis: “hopelessness would mediate any obtained link between cognitive vulnerability and suicidality.” While theories within the Ideation to Action Framework may not be specifically tailored to articulate the pathway between child maltreatment and suicide, the hopelessness theory by Rose and Abramson effectively establishes a connection between these two factors. Extended from Beck’s hopelessness theory, this theory specifies the trajectories between child maltreatment and hopelessness, and between hopelessness and suicide (Abramson et al., 1989; Abramson et al., 1998; Rose & Abramson, 1992).

Fluid vulnerability theory

Fluid Vulnerability Theory (FVT) shares similarities with Hopelessness Theory, as both theories give considerable importance to the cognitive aspects of the suicidal belief system. However, FVT goes beyond this by incorporating various factors associated with suicide, such as emotions, motivations, physiology, and behaviors (Rudd, 2006). Initially derived from Beck's Hopelessness theory, which focuses on the cognitive aspects of psychological functioning in understanding suicidal behavior, FVT highlights the critical role of developing hopelessness, characterized by negative expectations for the future. Beck proposed that hopelessness influences all components of the cognitive triad, encompassing one's beliefs about oneself, others, and the future.

An additional distinguishing feature of the Fluid Vulnerability Theory is its perspective on the transitory nature of suicidal crises and behavior, rather than considering them as permanent states. FVT proposes that these crises are time-limited and subject to change over time (Rudd, 2006). FVT suggests that factors triggering these crises and their severity can change over time. The suicidal mode can be switched on and off, and each episode increases the

likelihood of future episodes; and the different components of the suicidal mode (thoughts, feelings, physical reactions, and actions) are interconnected and influenced by the person's beliefs about suicide (Rudd, 2006). The theory specifically emphasizes the progression of suicide risk over time, addressing both the development of suicidal behavior and the resolution of acute suicidal crises (Rudd, 2006).

2.3 THEORETICAL FRAMEWORK

By incorporating key concepts from previously reviewed theories, a theoretical model is constructed (see Figure 1). The model firstly seeks to elucidate pathways through which specific types of childhood adversities, such as different subtypes of child maltreatment and low level of childhood socio-economic status, contribute to the development of suicide risks via hopelessness.

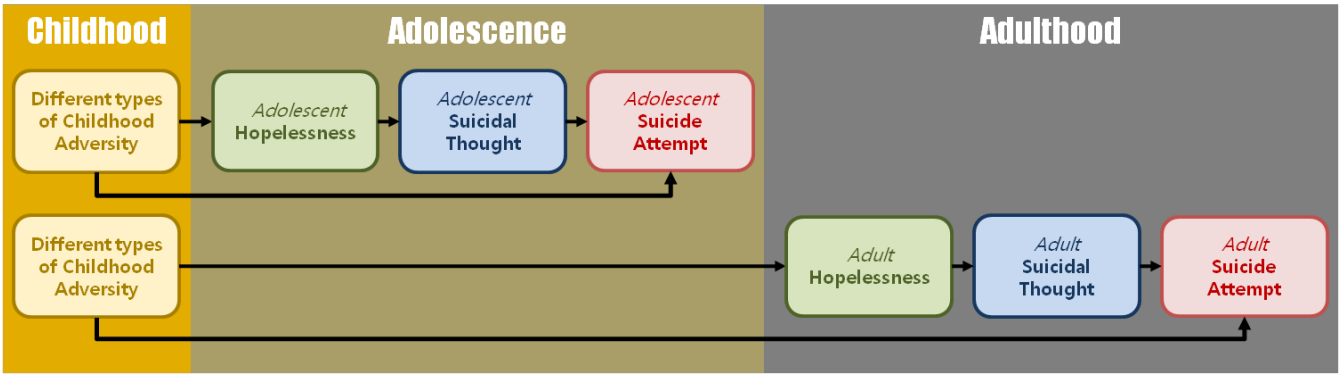


Figure 1. Theoretical Model of Suicidality

The hopelessness theory and FVT propose that negative childhood experiences, including various forms of adversity, can lead to the formation of a negative cognitive style. This negative cognitive style causes individuals to interpret stressful events more negatively, triggering a

suicidal mode. Consequently, the risk of experiencing feelings of hopelessness, suicidal ideation, and attempting suicide increases. Thus, exposure to child maltreatment and growing up in a socioeconomically disadvantaged environment contribute to the development of this negative cognitive style, elevating the risk of experiencing feelings of hopelessness, suicidal ideation, and suicide attempts.

The hypothesized pathway, at least partially, aligns with the principles of the 3ST, which suggests that an escalation in psychological pain and feelings of hopelessness may contribute to the emergence of suicidal ideation. In the theoretical model presented in this dissertation, child maltreatment and childhood socioeconomic disadvantages are believed to contribute to an increased level of psychological pain and feelings of hopelessness due to the development of a negative cognitive style. This, in turn, can lead to the development of suicidal ideation and eventual suicide attempts.

Furthermore, it is essential to acknowledge that certain types of child maltreatment may exhibit distinct direct pathways leading to suicide attempts, which cannot be fully accounted for by the hopelessness theory and FVT alone. Drawing upon the acquired capability concept from IPTS and 3ST, it is hypothesized that experiencing two specific subtypes of childhood maltreatment, namely sexual abuse and physical abuse, which are highly likely to be associated with habituated physical pain, can increase an individual's tolerance for pain and/or fear. This heightened pain tolerance may ultimately elevate the likelihood of engaging in actual suicide attempts, further contributing to the complexity of the relationship between childhood adversity and suicidal behaviors.

Lastly, the theoretical model recognizes the potential transitory nature of suicidal crises and behavior, as emphasized by FVT, suggesting that the activation of the suicidal mode can

occur at any point in an individual's life. This implies that the risk of transitioning from feelings of hopelessness to suicidal ideation and suicide attempts, or the risk of developing the capability to attempt suicide, remains relevant both during adolescence and throughout adulthood. Thus, the theoretical model will undergo comprehensive testing encompassing both adolescence and adulthood. It will be evaluated separately for each age group, addressing the distinct characteristics and challenges faced by both adolescents and adults.

Chapter 3. LITERATURE REVIEW

Considering the theoretical framework in the previous chapter, this chapter focuses on summarizing the empirical evidence that supports the proposed theoretical model depicting the relationship between child maltreatment, hopelessness, thoughts of suicide and suicide attempt.

3.1 Child Maltreatment and Suicidality

Numerous studies have consistently demonstrated a significant association between childhood maltreatment experience and suicidality in adolescence and adulthood. A recent meta-analysis examining studies involving individuals under the age of 24 found that all types of maltreatment (including sexual, physical, emotional abuse, and neglect) were robust predictors of both suicidal ideation and suicide attempts (Angelakis et al., 2020). Another meta-analysis focusing on studies with adults also yielded similar results, indicating that all forms of maltreatment were significant predictors of suicidal ideation, while nearly all forms, excluding physical neglect, were significant predictors of suicide attempts (Angelakis et al., 2019). In this meta-analysis, however, the insignificant result for physical neglect should be interpreted with caution due to the small number of studies available for analysis (Angelakis et al., 2019). I.e., the limited quantity of high-quality studies exploring physical neglect as a predictor of suicidality may contribute to the uncertainty surrounding these findings. Thus, the findings from the two meta-analyses provide compelling evidence that almost any form of child maltreatment (with the possible exception of child neglect) contributes to an elevated risk of suicidality across the lifespan.

However, it is important to note that the effect sizes for each form of child maltreatment in the meta-analytic studies were not examined independently. To properly assess the individual contributions of various forms of child maltreatment to the risk of suicidality, it is crucial to employ multivariate models that simultaneously account for different types of maltreatment. This approach allows for a more accurate estimation of the specific effects of each form of child maltreatment on suicidal outcomes. Studies employing such models consistently identify childhood sexual, physical, and emotional abuse as significant risk factors for suicidal ideation (Fergusson et al., 1996; Molnar et al., 2001; Gibb et al., 2001; Miller et al., 2013; Thompson et al., 2012). But the relationship between child neglect and suicide ideation remains unclear due to conflicting findings from a limited number of studies. For example, one US longitudinal study found no association between neglect and suicide ideation after accounting for demographic factors, mental health, and other forms of maltreatment (Thompson et al., 2012), but another study reported significantly higher levels of suicide proneness (thoughts about death/suicide-related behaviors) in the neglect-only group compared to the maltreatment group without neglect and the non-maltreated group (Arata et al., 2007). Taken together, while there is consistent evidence linking sexual, physical, and emotional abuse to suicidal ideation even when other types of child maltreatment are adjusted for, the relationship between neglect and suicidal ideation remains uncertain.

Regarding the association between specific subtypes of child maltreatment and suicide attempts after controlling for the other subtypes of child maltreatment, research consistently indicates that sexual and physical abuse are particularly strong predictors. Multiple studies have shown that physical and/or sexual abuse are more strongly associated with suicide attempts than other forms of child maltreatment across various populations (Brent et al., 1994; Brown et al.,

1999; Fergusson et al., 1996; Glowinski et al., 2001; Roy, 2003; Soloff et al., 2002). Interestingly in another study, individuals who have experienced severe sexual abuse (involving invasive acts) and severe physical abuse (resulting in physical injury) demonstrate higher rates of lifetime suicide behaviors compared to those who have experienced less severe maltreatment (Bryant & Range, 1997). Furthermore, Joiner (2007) found that physical abuse and violent sexual abuse (such as rape) had a greater impact on the number of lifetime suicide attempts compared to sexual molestation and verbal abuse. This may indicate that maltreatment types involving severe physical violence, which may increase pain tolerance and fear of self-harm, contribute to an elevated risk of suicide attempts through the acquired capability for self-injury.

3.2 Childhood Socio-economic Status and Suicidality

Extensive research has shown that individuals in adolescence and adulthood who originate from socially disadvantaged childhood backgrounds, encompassing factors such as poverty, low parental education level, and socio-economic adversity, face a heightened vulnerability to suicidal ideation and engagement in suicide attempts (Chen et al., 2022; Fergusson & Lynskey, 1995; Fergusson et al., 2000; Lindström & Rosvall, 2018). Moreover, in a 21-year-long longitudinal study, a significant association was found between low childhood socio-economic status and an increased risk of suicide attempts (Fergusson et al., 2000). This association persisted even after controlling for various individual and familial factors, including childhood sexual abuse experience, parental alcohol use, personality, and self-esteem. This indicates that individuals from socially disadvantaged backgrounds may have a higher likelihood of attempting suicide compared to those from different socio-economic groups, regardless of social, family, and individual factors. Nevertheless, the association between childhood

socioeconomic disadvantage and suicidal ideation or behavior is not uniformly supported in all studies, as some research has been unable to establish a clear connection between the two variables (Reinherz et al., 1995; Pelkonen et al., 1997; Barzilay, 2021).

3.3 Childhood Adversities, Hopelessness, and Suicidality

Research evidence shows significant association between childhood adversity and hopelessness as well as hopelessness and suicidality. Courtney et al. (2008) found that childhood physical abuse and emotional abuse were linked to increased levels of hopelessness and depressive symptoms in adolescents receiving primary care. Similarly, Gambaro et al. (2020) demonstrated that childhood maltreatment experiences were associated with higher levels of hopelessness and depressive symptoms in adulthood. Furthermore, a number of longitudinal studies and a meta-analysis (Kuo et al., 2018; Klonsky et al., 2012; Franklin et al., 2017) have consistently identified hopelessness as one of the strongest risk factors for suicidality.

The theoretical pathway from child maltreatment and low socio-economic status through hopelessness to suicide ideation and attempt, which is proposed in the previous chapter, explains how childhood adversity leads to suicidality. Based on the theoretical model, hopelessness may play a mediating role between any forms of childhood adversity and suicidal ideation. Meadows and Kaslow (2002) discovered that hopelessness served as a partial mediator between physical and emotional abuse and suicide attempts, as well as a full mediator between sexual abuse and suicide attempts. Similarly, another study by Spokas et al. (2009) revealed that hopelessness mediated the relationship between sexual abuse and suicidal ideation in both males and females. However, these two studies did not control for the overlap between different types of child

maltreatment, that is, a single type of maltreatment was tested in a path analysis model. But in a recent path analysis study that tested multiple types of child maltreatment in one model, the mediating role of hopelessness shows a different pattern. Berardelli et al., (2022) found that only emotional neglect was mediated by hopelessness in predicting suicidal ideation, while emotional abuse was mediated by dissociation – which is a mental process of separating oneself from their thoughts, emotions, recollections, or personal identity. In the same study, sexual abuse directly influenced suicidal ideation, and there was no direct or indirect association between physical abuse/neglect and suicidal ideation.

3.4 Research Aims, Questions, and (Visualized) Hypothetical Models

Based on the theoretical background and empirical evidence, the research aims are outlined in the following paragraphs. To achieve the research aims in a more targeted manner, the research questions that aligned with each objective were formulated. Once the research questions were crafted, corresponding data analysis techniques were used to address each research question, and ultimately to achieve the overall research aims. Therefore, the analyses were designed to focus on each question separately, and then subsequently the results were incorporated to help achieve the overall research aims.

Research Aim 1: To examine the association between each childhood adversity type (physical abuse, emotional abuse, sexual abuse, neglect, and low SES) and different types and timings of suicidality (suicidal ideation and suicide attempt).

Research Question 1.1. Which childhood adversity types (physical abuse, emotional abuse, sexual abuse, neglect, and low SES) are associated with lifetime suicidal ideation and suicide attempt?

Research Question 1.2. Which childhood adversity types (physical abuse, emotional abuse, sexual abuse, neglect, and low SES) are associated with adolescent suicidal ideation and suicide attempt?

Research Question 1.3. Which childhood adversity types (physical abuse, emotional abuse, sexual abuse, neglect, and low SES) are associated with adult suicidal ideation and suicide attempt?

Research Aim 2: To compare people who experienced suicidal ideation only and who experienced suicide attempt in terms of their experience of different childhood adversity types (see Figure 2).

Research Question 2.1. What is the association between different types of childhood adversity (physical abuse, emotional abuse, sexual abuse, neglect, and low SES) and various categories of lifetime suicidality (no suicidality, suicidal ideation without attempt, and suicide attempt)?

Research Question 2.2. What is the association between different types of childhood adversity (physical abuse, emotional abuse, sexual abuse, neglect, and low SES) and various categories of adolescent suicidality (no suicidality, suicidal ideation without attempt, and suicide attempt)?

Research Question 2.3. What is the association between different types of childhood adversity (physical abuse, emotional abuse, sexual abuse, neglect,

and low SES) and various categories of adult suicidality (no suicidality, suicidal ideation without attempt, and suicide attempt)?

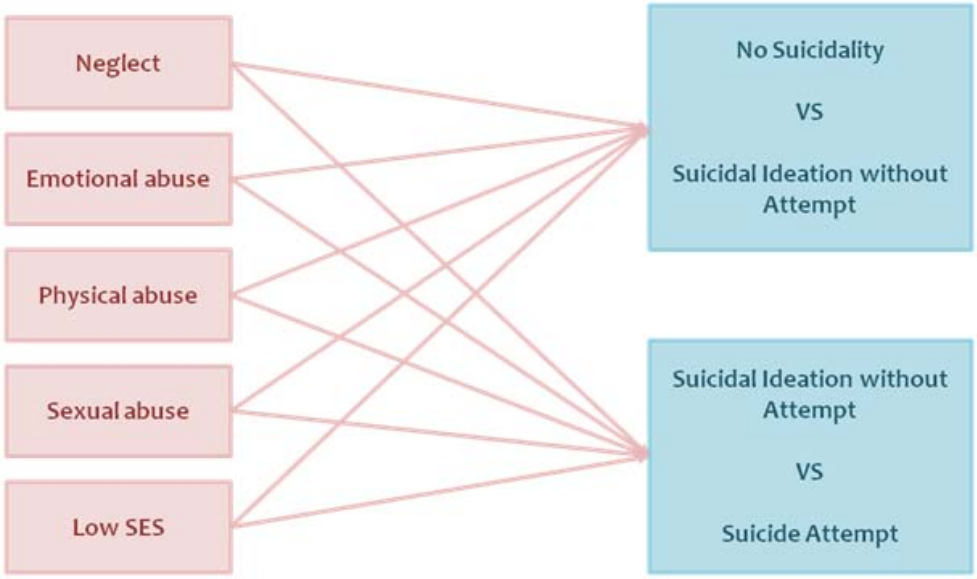


Figure 2. Visualized Model for Research Aim 2

Research Aim 3: To explore whether physical abuse and sexual abuse directly predict suicide attempt and the trajectories between each childhood adversity type and suicide attempt are mediated by hopelessness and suicidal ideation in adolescence and adulthood. (See Figure 3)

Research Question 3.1. Do trajectories between each childhood adversity type and adolescent suicidality fit the hypothetical model?

Research Question 3.2. Do trajectories between each childhood adversity type and adult suicidality fit the hypothetical model?

As explained in chapter 2 and earlier in this chapter, all the five forms of childhood adversity have been associated with the emergence of undesirable emotions and social isolation. These adverse experiences significantly heighten the susceptibility to feelings of hopelessness and then contemplation of suicide, ultimately culminating in actual suicide attempts.

Furthermore, specific categories of childhood adversity, such as physical abuse and sexual abuse, have been theorized to significantly amplify the likelihood of suicide attempts. This heightened risk can be attributed to the direct involvement of these adversities in inflicting physical pain, which may, in turn, engender desensitization to painful experiences. Or as shown in Figure 3, the relationship between physical abuse and sexual abuse and suicidal ideation and suicide attempts may also be mediated by hopelessness. Drawing upon the theoretical foundations and empirical evidence, a visualized model for research aim 3 is presented as below.

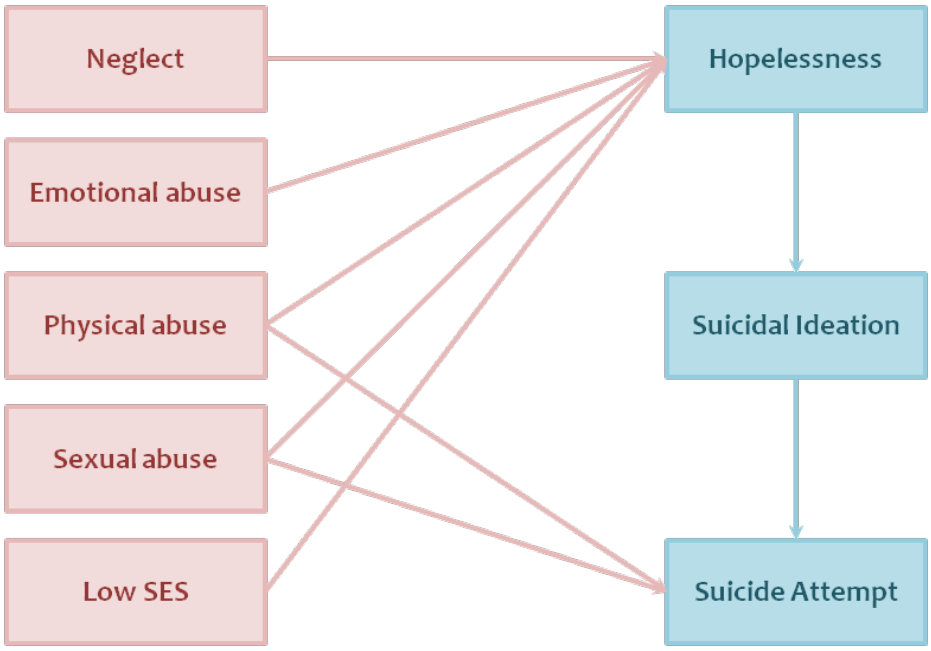


Figure 3. Visualized Model for Research Aim 3

Overall, the research aims are seeking to examine the complex relationship between childhood adversity, suicidality, and the timing of suicidality. By exploring these factors, the study aims to deepen our understanding of childhood adversity as risk factors for suicide and potentially inform interventions and prevention strategies.

Chapter 4. METHODS

4.1 DATA: LEHIGH LONGITUDINAL STUDY

The Lehigh Longitudinal study originally started in 1973 as an evaluation of child abuse and neglect interventions in two counties of Pennsylvania. Through the collaboration of two child welfare agencies in the counties, the initial sample for the evaluation was collected between 1973 and 1974. The study participants in the sample comprised new cases that were involved in the child welfare system and ongoing cases with child abuse and/or child neglect within the 2 years. The initial evaluation sample of cases with child welfare involvement was expanded by adding non-child welfare cases within the same geographical area from various child care programs such as Head Start, day care, and middle-income nursery (Herrenkohl et al., 2013).

In 1976-1977, the recruited children (n=457) and their families were initially assessed as the original sample for the Lehigh Longitudinal Study. The sample was nearly binary gender-balanced (male=54.3%; female=45.7%), and was characterized by a notable White ethnic/racial majority (White=80.7%; More than one race=11.2%; Black or African American=5.3%; American Indian/Alaska Native=1.3%; Native Hawaiian or Other Pacific Islander=0.2%; Unknown=1.3%; Hispanic or Latino=7.0%), which was equivalent to the ethnic/racial characteristics of the geographical areas for the sampling. Around 63% of families had an income of less than $700 per month during that period, whereas the remaining families had incomes that varied and extended beyond $3000 per month (Herrenkohl et al., 2013).

Afterwards, follow-ups took place in 1980-82 (wave 2: school-age children), 1990-92 (wave 3: adolescent), 2008-2010 (wave 4: adult I), and 2019-2020 (wave 5: adult II). Among 457

cases of the original sample, 303 cases were retained in the most recent wave (adult II). Below are the simplified descriptions of the age range and samples sizes for each wave:

1. Pre-school age wave (age range: 18 month - 6 yrs; n=457);
2. School age wave (age mean = 8 yrs; age range = 8-11 yrs; n=374);
3. Adolescence wave (age mean = 18; age range: 14-23 yrs, n=416);
4. Adulthood wave I (age mean =36, age range: 31-41 years; n=357);
5. Adulthood wave II (age mean=46, age range: 40-51, n=303).

4.2 MEASURES

The data from the Lehigh Longitudinal Study include a wide variety of items measuring study participants' experience including psycho-social and physical outcomes throughout the 5 waves of the study. Variables created and used for the final analyses from the Lehigh data are listed below.

Adverse experiences in childhood:

- **Physical abuse** (a weighted composite score variable from the Adolescent wave)

The measure of physical abuse was created by summing the severity weight scores of different types of harsh physical discipline practices in the Adolescent wave. In the Adolescent wave, study participants self-reported their lifetime childhood physical abuse experiences, including which caregivers (mother, father, and/or other caregivers) were physically abusive and how many of the following 12 physically abusive practices were used by each caregiver:

1) putting pepper in the child‘s mouth,

2) shaking child,

3) slapping child in the face,

4) pulling child‘s hair,

5) biting a child as way of disciplining,

6) hitting a child with a stick or paddle,

7) hitting a child with a strap/rope/belt,

8) biting a child as to leave a bruise,

9) slap/spank a child as to leave a bruise,

10) hit/paddle a child as to leave a bruise,

11) burning child, and

12) burning a child as to leave a mark.

Each abusive method above was scored differently and arranged in order of its severity (severity score range: 4.48-5.00), and the final composite score for physical abuse was calculated by adding up the number of physically abusive methods used by each of three types of caregivers (mother, father, and others). The physical abuse measure ranges from 0.00 to 119.72.

- **Emotional abuse** (a weighted composite score variable from the Adolescent wave)

The measure of emotional abuse was created through the comparable procedures of physical abuse variable. However, instead of 12 physical abuse methods, participants reported about 7 emotionally abusive methods they experienced in the Adolescent wave (severity score range for each emotional abusive practice: 4.49-4.83):

1) take meals away,

2) threaten to leave the child,

3) embarrass child in front of others,

4) threaten to send child away,

5) isolate child in a dark room,

6) ridicule or make fun of child, and

7) lock child out of the house.

The emotional abuse measure ranges from 0.00 to 96.42.

- **Neglect** (a binary variable from the Adolescent wave)

Childhood Neglect experience from the Adolescent wave was assessed by asking a single question: "Were you neglected as a child?" The variable for neglect was assigned a code of "0" to indicate the absence of neglect and "1" to indicate the presence of neglect.

- **Sexual abuse** (a binary variable combining items from multiple waves)

Childhood sexual abuse was assessed by combining all the available sources and measures across the Lehigh Longitudinal data, primarily based on the Adolescent wave and Adult wave I. In the Adolescent wave, youth were asked a question about whether they had experienced sexual abuse, and two other questions about sexual assault and rape. To get a more complete indication of sexual abuse experience in the sample, the Lehigh study research team used multiple sources, including interviewer notes and child welfare case records from the preschool wave, and retrospective reports from adults wave I. From all these measures and sources, any indications of sexual abuse before age 18 were coded as a binary variable (0= no sexual abuse, 1=sexual abuse).

- **Low family socio-economic status** (a composite score variable from the Preschool Wave)

It is a standardized composite score of four standardized measures of parents' occupational status, educational level, and family income from the preschool wave. This variable was created for earlier studies by the Lehigh study research team (Herrenkohl et al., 2013, 2016).

Suicidal ideation and suicide attempt:

- **Lifetime suicidal ideation** (a binary variable combining items from multiple waves)

The measure of lifetime suicidal ideation was created from 8 items across the different waves, by combining four items from the adolescence wave and four items from the Adult wave I and II. The 8 items below were combined into a binary variable (0=no suicidal ideation, 1=suicidal ideation).

1) I think about killing myself (self report in the Adolescent wave)

2) Suicidality, Beck's Depression Inventory (self report in the Adolescent wave)

3) Talking about killing self (Parent report in the Adolescent wave)

4) Talking about killing self (Interviewer report in the Adolescent wave)

5) Suicidality, Beck's Depression Inventory (self report in the Adult wave 1)

6) Have you seriously thought about committing suicide at any time in the past 12 months? (self report in the Adult wave 1)

7) Have you ever made a plan for committing suicide? (self report in the Adult wave 1)

8) Have you ever made a plan for committing suicide? (self report in the Adult wave 2)

A more comprehensive explanation of the lifetime suicidal ideation variable is presented in Appendix A.

- **Adolescent suicidal ideation** (a binary variable combining items from multiple waves)

This measure was created from 9 items across the different waves, by combining four items from the Adolescent wave, three items from the Adult wave 1, and two items from the Adult wave 2. Below are items that were combined into a binary variable (0=no suicidal ideation, 1=suicidal ideation).

1) I think about killing myself (Adolescent wave; Self report)

2) Suicidality, Beck's Depression Inventory (Adolescent wave; Self report)

3) Talking about killing self (Adolescent wave; Parent report)

4) Talking about killing self (Adolescent wave; Interviewer report)

5) Age of the last time seriously thought about suicide (Adult wave 1)

6) Age of the first time made plan for committing suicide (Adult wave 1)

7) Age of the last time made plan for committing suicide (Adult wave 1)

8) Age of the first time made plan for committing suicide (Adult wave 2)

9) Age of the last time made plan for committing suicide (Adult wave 2)

If any participant cases indicated suicidal ideation experience started before age 25 among any of these items, those cases were treated as a valid case for suicidal ideation experience before age 25. If participant cases indicated no experiences of suicidal ideation or initial suicidal ideation experience at age 25 or later, their cases were treated as no experience of suicidal ideation before age 25. Thus, the variable includes any indicated signs of suicidal ideation before age 25 across the entire waves of the Lehigh Longitudinal Study. Two reasons led to the choice of age 25 as the cutoff point for defining “Adolescent Suicidal Ideation.” First, since the Lehigh Longitudinal Study includes cases up to age 23 in the Adolescent wave, the defined cutoff for the

adolescent years in the study was set to be at least under age 24. Second, age 25 is a widely recognized cutoff point for distinguishing a youth from an adult for statistical purposes, particularly by the United Nations and its affiliated organizations (United Nations, 1981, p.15). Hence, this study chose to adopt the conventional age cutoff. A more comprehensive explanation of the adolescent suicidal ideation variable is presented in Appendix A.

- **Adulthood suicidal ideation** (a binary variable)

The measure of adult suicidal ideation encompasses any indications of suicidal ideation after the age of 25 throughout all waves of the Lehigh Longitudinal Study. This variable was created from a total of 7 items as described below: 2 items indicating recent suicidal ideation in the Adult wave 1, and 5 items indicating the age of suicidal ideation in the Adult waves 1 and 2.

1) Suicidality, Beck's Depression Inventory (Adult wave 1)

2) Have you seriously thought about committing suicide at any time in the past 12 months? (Adult wave 1)

3) Age of the last time seriously thought about suicide (Adult wave 1)

4) Age of the first time made plan for committing suicide (Adult wave 1)

5) Age of the last time made plan for committing suicide (Adult wave 1)

6) Age of the first time made plan for committing suicide (Adult wave 2)

7) Age of the last time made plan for committing suicide (Adult wave 2)

For participants who reported experiencing suicidal ideation or making a plan after the age 25, their cases were considered as valid for the experience of suicidal ideation after age 25. Conversely, for participants who reported no experience of suicidal ideation, or who reported suicidal ideation before the age 25 but reported no experience of suicidal ideation after age 25,

their cases were treated as having no experience of suicidal ideation after age 25. The decision to use age 25 as the cutoff point was based on the same criteria used to define the variable "Adolescent Suicidal Ideation." A more comprehensive explanation of the adulthood suicidal ideation variable is presented in Appendix A.

- **Lifetime suicide attempt** (a binary variable combining items from multiple waves)

Lifetime suicide attempt was assessed by combining two items from the two Adult waves. The two items asked the same question of "Have you ever attempted suicide?" If a participant indicated "yes" in either of the two items, the new variable was coded as 1. If a participant indicated "no" in both of the two items without any "yes", the new variable was coded as 0.

- **Adolescent suicide attempt** (a binary variable combining items from multiple waves)

This variable was created from 4 items in the Adult waves 1 and 2, as follows.

1) Age of the first time suicide attempt (Adult 1)

2) Age of the last time suicide attempt (Adult 1)

3) Age of the first time suicide attempt (Adult 2)

4) Age of the last time suicide attempt (Adult 2)

The four items indicating the timing of suicidal ideation/plan from the Adult waves 1 and 2 were combined into a binary variable (0= no evidence of initial suicide attempt before age 25; 1=suicide attempt before age 25). These items specifically asked participants about the age of first and last suicide attempt across the Adult waves 1 & 2. If any of the items indicated that a participants initially attempted suicide before age 25, those cases were treated as the initial experience of suicide attempt before age 25. On the other hand, for cases indicating no

experience of suicide attempt or for cases indicating initial suicide attempt after age 25, they were treated as no initial suicide attempt before age 25. It is worth noting that even though this variable was named as "adolescent suicide attempt," a total of 4 participants who attempted suicide before age 12 was also included as valid cases of suicide attempts as minor.

- **Adulthood suicide attempt** (a binary variable combining items from multiple waves)

The variable was created from the four items as below, and combined into another binary variable (0=no evidence of suicide attempt after age 25; 1=any suicide attempt after age 25).

1) Age of the first time suicide attempt (Adult 1)

2) Age of the last time suicide attempt (Adult 1)

3) Age of the first time suicide attempt (Adult 2)

4) Age of the last time suicide attempt (Adult 2)

In cases where any of the four items indicated that a participant had attempted suicide after age 25, it was treated as their experience of a suicide attempt after that age.

- **Lifetime suicidality** (a 3-category variable; no suicidality-ideation only-attempt)

The variable was created from the two variables below, and combined into 3-category variable (0=no evidence of suicidality; 1=suicide attempt; 2=suicidal ideation only).

**Lifetime suicide attempt* (a binary variable combining items from multiple waves)

**Lifetime suicidal ideation* (a binary variable combining items from multiple waves)

From the two variables, any indications of suicide attempt were coded as 1, any indications of suicidal ideation without any reports of suicide attempt were coded as 2, and all the rest of the valid cases were coded as 0. As the main analysis program, Mplus, treats the

highest number in a categorical variable as a reference group for conducting a multinomial logistic regression, the 'suicidal ideation only' category was coded as 2, which is the reference group, in order to compare the group with the 'no suicidality' group and the 'suicide attempt' group.

- **Adolescence suicidality** (a 3-category variable; no suicidality-ideation only-attempt)

The variable was created from the two variables below, and combined into a 3-category variable (0=no evidence of suicidality; 1=suicide attempt; 2=suicidal ideation only).

**Adolescence suicide attempt* (a binary variable combining items from multiple waves)

**Adolescence suicidal ideation* (a binary variable combining items from multiple waves)

Categorization procedures were the same as the "Lifetime suicidality."

- **Adulthood suicidality** (a 3-category variable; no suicidality-ideation only-attempt)

The variable was created from the two variables below, and combined into a 3-category variable (0=no evidence of suicidality; 1=suicide attempt; 2=suicidal ideation only).

**Adulthood suicide attempt* (a binary variable combining items from multiple waves)

**Adulthood suicidal ideation* (a binary variable combining items from multiple waves)

Categorization procedures were the same as the "Lifetime suicidality."

Hopelessness:

- **Adolescence hopelessness** (a composite score variable from the Adolescent wave)

The variable was created by summing 20 binary items of the Beck's Hopelessness Scale, measured in the Adolescent wave (BHS; Beck et al., 1974). BHS consists of 20 true-false items that evaluate the extent of negative expectations regarding the future. The list of the item statements is described below. Because the set of items include both positive and negative statements about the future, participant responses in the 9 items with positive statements (item #1, #3, #5, #6, #8, #10, #13, #15, #19) were reverse-coded. Afterwards, the 20 items were summed to create a hopelessness score. The adolescence hopelessness measure ranges from 0 to 18. BHS items are as shown in Appendix A.

- **Adult hopelessness** (a sum score variable from the Adult wave I)

Adult hopelessness was assessed by summing 20 BHS items measured in the Adult wave I. These items were the same set of BHS items used in the Adolescent wave, and the final sum score was created through the same process for creating the "Adolescent Hopelessness." The adult hopelessness measure ranges from 0 to 19. BHS items are as shown in Appendix A.

Demographic variables:

- **Gender** (a binary variable; 0=female; 1=male)

- **Minority race/ethnicity** (a binary variable; 0=non-White; 1=White)

A summary of all the measures used for this study and the descriptive statistics for the variables are summarized in Table 1 and Table 2, respectively.

Table 1. Summary of all the variables used in the analyses

Measures	Timing of measurement (Rater/Reporter)	Way(s) of measurement	Level of measurement	Total Valid Cases
Demographic characteristics				
Gender (male vs female)	Preschool	A questionnaire with binary options	Categorical (Dichotomous)	457
Race (White vs non-White)	Preschool	A binary measure from an open-ended questionnaire	Categorical (Dichotomous)	386
Adversity in Childhood				
Physical abuse	Adolescence	A Weighted severity score composite from self report	Continuous	457
Emotional abuse	Adolescence	A Weighted severity score composite from self report	Continuous	457
Sexual abuse	Child welfare records Adolescence Adulthood I	A binary measure that was combined multiple indicators	Categorical (Dichotomous)	417
Neglect	Adolescence	A Yes/No survey question	Continuous	410
Low family SES in childhood	Preschool	A composite score of four standardized measures regarding SES	Continuous	457
Suicidality				
Lifetime suicidal ideation	School-age Adolescence Adulthood I Adulthood II	Combined multiple questionnaires into a binary measure	Categorical (Dichotomous)	441
Adolescence suicidal ideation	School-age Adolescence Adulthood I Adulthood II	Combined multiple questionnaires into a binary measure	Categorical (Dichotomous)	424
Adulthood suicidal ideation	Adolescence Adulthood I Adulthood II	Combined multiple questionnaires into a binary measure	Categorical (Dichotomous)	358

Lifetime suicide attempt	Adolescence Adulthood I Adulthood II	Combined multiple questionnaires into a binary measure	Categorical (Dichotomous)	386
Adolescence suicide attempt	Adolescence Adulthood I Adulthood II	Combined multiple questionnaires into a binary measure	Categorical (Dichotomous)	385
Adulthood suicide attempt	Adolescence Adulthood I Adulthood II	Combined multiple questionnaires into a binary measure	Categorical (Dichotomous)	385
Lifetime suicidality	School-age Adolescence Adulthood I Adulthood II	Combined multiple questionnaires into a binary measure	Categorical (Three-category)	386
Adolescence suicidality	School-age Adolescence Adulthood I Adulthood II	Combined multiple questionnaires into a binary measure	Categorical (Three-category)	368
Adulthood suicidality	Adolescence Adulthood I Adulthood II	Combined multiple questionnaires into a binary measure	Categorical (Three-category)	357
Hopelessness				
Adolescence hopelessness	Adolescence	A composite score of 20 items of Beck's Hopelessness Scale	Continuous	412
Adulthood hopelessness	Adulthood I	A composite score of 20 items of Beck's Hopelessness Scale	Continuous	356

Table 2. Descriptive Statistics for all the variables used in the analyses

Measures (total valid n)	***M***	***SD***	***Range***	***Frequency***	***%***
Demographic characteristics					
Gender; Female (457)				209	45.7%
Race; White (386)				325	84.2%
Adversity in Childhood					
Physical abuse (411)	32.31	26.32	0.00 to 119.72		
emotional abuse (411)	21.14	18.28	0.00 to 96.42		
Neglect (410)				108	26.3%
Sexual abuse (417)				140	33.6%
Low family SES in childhood (457)	.00	3.29	-9.18 to 5.43		
Suicidality					
Lifetime suicidal ideation (441)				158	35.8%
Adolescence suicidal ideation (419)				129	30.8%
Adulthood suicidal ideation (358)				66	18.4%
Lifetime suicide attempt (386)				85	22.0%
Adolescence suicide attempt (385)				65	16.9%
Adulthood suicide attempt (385)				41	10.6%
Lifetime suicidality (386)					
No suicidality				232	60.1%
Suicide ideation only				69	17.9%
Suicide attempt				85	22.0%
Adolescence suicidality (368)					
No suicidality				240	65.2%
Suicide ideation only				63	17.1%
Suicide attempt				65	17.7%
Adulthood suicidality (357)					
No suicidality				284	79.6%
Suicide ideation only				32	9.0%
Suicide attempt				41	11.5%
Hopelessness					
Adolescence hopelessness (412)	3.85	3.56	0 to 18		
Adulthood hopelessness (356)	3.47	3.92	0 to 19		

4.3 Data Analysis Procedures

Before conducting the main analyses, the data extracted from the Lehigh Longitudinal Study were cleaned, and descriptive analyses were conducted to investigate the sample characteristics and the data structure. The data preparation and the descriptive analyses were conducted in SPSS version 28. Among all the variables used for the main analyses, the mean and standard deviation, along with minimum and maximum values, were calculated for continuous variables, and frequencies and relative frequencies in the form of percentage were calculated for categorical variables. In addition, as preliminary analyses for descriptive purposes, each risk factor variable was grouped into no suicidality, suicidal ideation only, and suicide attempt; and the differences among these groups were compared using Pearson's Chi-squared test (for binary variable) and one-way ANOVA (for continuous variable).

After the descriptive analyses, a series of bivariate and multivariate analyses (logistic regression and multinomial logistic regression) were conducted to examine the effect of the different types of childhood adversity (mainly focusing on child maltreatment subtypes) on the different types and timing of suicidality (suicidal ideation and suicide attempt). These analyses were designed to focus on the corresponding research questions separately and subsequently incorporate the findings to achieve the overall research aims. To address research question 1.1 to 1.3 (under research aim 1), a series of logistic regression analyses were carried out. Similarly, a set of multinomial logistic regression analyses were performed to test research question 2.1 to 2.3 (under research aim 2).

Each set of analyses began with exploring unadjusted bivariate associations between each type of childhood adversity (physical abuse, sexual abuse, and emotional abuse, neglect, and Low SES) as an independent variable and each suicidality outcome as a dependent variable (for

logistic regressions: lifetime suicidal ideation, lifetime suicide attempt, adolescence suicidal ideation, adolescence suicide attempt, adulthood suicidal ideation, and adulthood suicide attempt; for multinomial logistic regressions: lifetime suicidality, adolescence suicidality, and adulthood suicidality). In the next step, demographic variables (gender and race) were added into the same sets of analyses as control variables in order to account for the potential influence of these variables on the relationship between childhood adversity and suicidality outcomes. Early childhood socioeconomic status (Low SES) was held constant in the subsequent sets of analyses to control for the influence of socioeconomic status on the relationship between childhood adversity and suicidality outcomes.

To estimate the hypothetical model (which corresponds to research aim 3 and research question 3.1 to 3.3) suggested in the previous chapter, a set of path analyses were performed using structural equation modeling (SEM): i.e. do all types of childhood adversity predict suicide attempt via hopelessness and suicidal ideation? And do only physical abuse and sexual abuse that are related to physical pain directly increase the risk of suicide attempt? All the path analyses were performed in Mplus version 8.9. For estimation of SEM model parameters, a robust version of the Diagonally Weighted Least Square (DWLS) method was used, which is based on a polychoric correlation matrix (correlation between discrete variables).

Whereas the Maximum Likelihood Estimation (MLE) method is the most widely used parameter estimation method for SEM, the data should ideally meet specific distributional assumptions of the endogenous variables (mediators and outcome variables) such as there should be multivariate normality for joint distribution of the endogenous variables; that is, these variables needs to be normally distributed individually and that their relationships should be linear (Flora & Curran, 2004; Kline, 2012). Many data sets do not have these characteristics.

Therefore, a growing number of researchers are in agreement that the robust DWLS approach is an efficient and effective method for analyzing categorical variables with only a small number of categories and a mixture of categorical and continuous variables, if the sample size is greater than 200 (Bandalos, 2014; Flora & Curran, 2004; Li, 2021; Muthén et al., 1997). Because this study uses a mix of continuous and rare-case dichotomous variables (such as hopelessness and suicidality-related variables), the robust DWLS estimation method is preferred than MLE. Consequently, the study utilized the robust DWLS estimation method, specifically the weighted least squares—mean and variance adjusted (WLSMV) option available in Mplus.

To determine whether a path analysis model's implied covariance matrix fit the data, five goodness-of-fit indices were used: chi-square test, root mean error of approximation (RMSEA), Tucker-Lewis index (TLI), comparative fit index (CFI), and standardized root mean squared residual (SRMR). For a good fit of a path analysis model, the chi-square test should be insignificant; RMSEA should be below 0.050 (or below 0.100 for an acceptable fit); both TLI and CFI should be above 0.950 (or at least above 0.900 for an acceptable fit); and the SRMR below 0.070 (Bagozzi & Yi, 2012; Fan & Sivo, 2005; Hu & Bentler, 1998; Kline, 2005). Collectively, these goodness-of-fit indices indicate that the theoretical model and the data are in agreement.

The original hypothetical trajectory model included all childhood adversity types in one model in order to examine the unique contribution of each adversity type in the trajectory model. Based on the different patterns of direct associations between childhood adversity and suicidality that were found in the logistic and multinomial logistic regressions, two separate trajectory models were tested: the adolescent model and the adult model (See Figure 3).

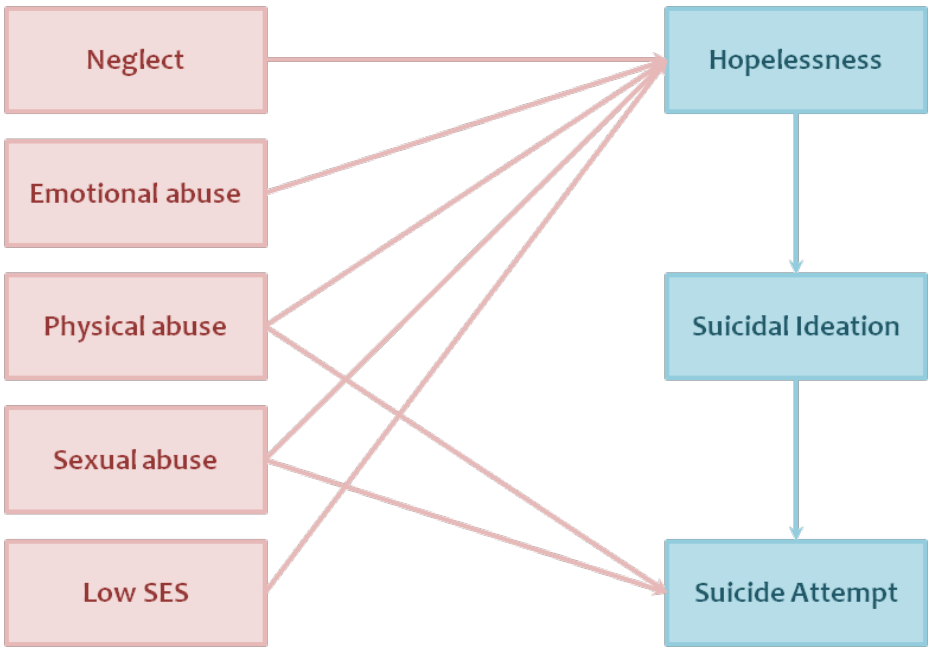


Figure 3. Visualized Model for Research Aim 3

However, the original models did not sufficiently fit the data, so a number of potential pathways based on the direct associations examined for research aim 2 were added, as shown in Figure 4 below.

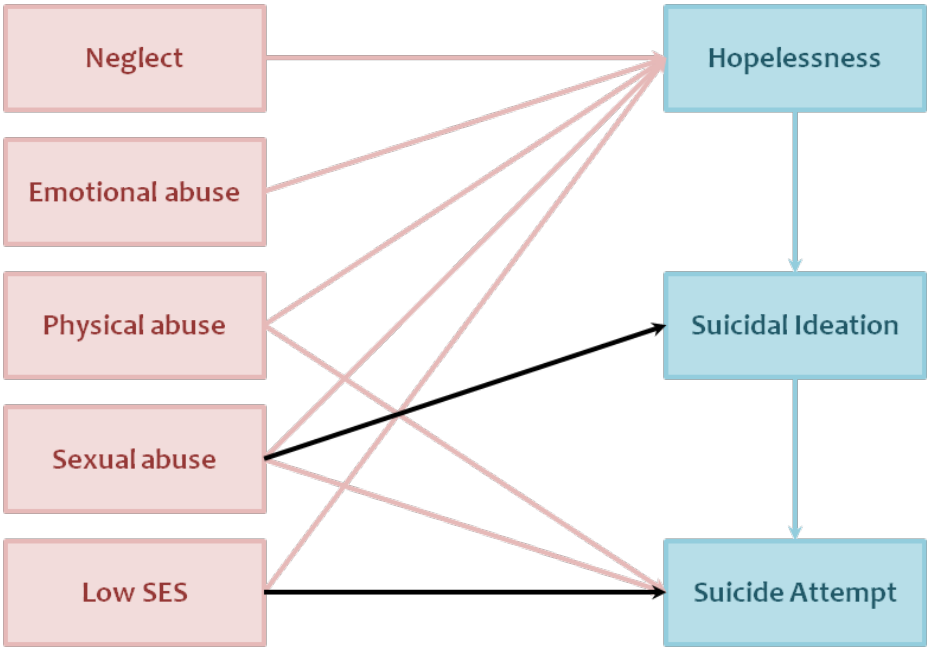


Figure 4. Visualization of the Revised Model for Research Aim 3

In addition, the tests of the original model resulted in nonsignificant coefficients of the physical and emotional abuse variables with hopelessness and suicide attempt because of a potential multicollinearity issue between the variables in that the two types of abuse co-occur in many cases and thus they are highly correlated in general (Pearson's correlation coefficient = .64). Consequently, additional subsequent models that exclude either the physical abuse or the emotional abuse variable were also tested.

Lastly, in all the main analysis models, such as binary logistic regression, multinomial regression, and path analysis models, all continuous measures were standardized, while categorical measures remained unstandardized. This decision was made primarily because certain child maltreatment variables (e.g., physical abuse and emotional abuse) had wide ranges on their original scales. Consequently, if left unstandardized, the resulting odds ratios or path coefficients would have been exceedingly small, making interpretation of the results difficult.

Chapter 5. RESULTS

5.1 A SUMMARY OF DESCRIPTIVE ANALYSIS BY SUICIDALITY TYPES

As shown in Tables 3, 4 and 5, among study participants who reported experiencing suicidal ideation without suicide attempt, a larger proportion consisted of males[1]. Among the participants who did attempt suicide, a larger proportion were females. The Race variable, categorized by Whites and non-Whites, did not show significant differences in proportions of Whites among the three suicidality categories. In the descriptive analysis, different types of childhood adversity and different timing of hopelessness were considered as potential risk factors for suicidality.

The trends among physical, emotional, and sexual abuse were consistent and manifest across the different timing of suicidality. As the categories of suicidality changed from (a) no suicidality to (b) ideation only, and further (c) to attempt, higher mean scores or proportions were observed for physical, emotional, and sexual abuse. However, neglect and low socioeconomic status (SES) yielded somewhat ambiguous results.

When comparing the categories of lifetime and adulthood suicidality, the proportions of people with a history of neglect were higher in the no suicidality group than in the ideation only group. In contrast, as the category of adolescent suicidality shifted from no suicidality to ideation only and further to attempt, higher proportions of neglect were observed. Additionally, when examining the lifetime suicidality categories, the mean score for low SES was higher in the no suicidality group than in the ideation only group. Conversely, as the categories of adolescent and

[1] The preliminary descriptive analysis revealed that the prevalence of suicidal ideation, including any suicide attempts between male and female participants was not significantly different. Suicidal ideation prevalence for females and males is as follows: 36.5% and 35.3% (lifetime); 31.2% and 30.4% (Adolescent); 20.5% and 16.6% (adult).

adult suicidality changed from no suicidality to ideation only and further to attempt, higher mean scores for low SES were observed.

Table 3. Descriptive analysis for all the variables by lifetime suicidality types (n=386)

Demographic/Risk Factors	No Suicidality (n=232)		Ideation only (n=69)		Attempt (n=85)		P-value
Demographic Factors							
Female gender, n (%)	102	(44.0%)	24	(34.8%)	53	(62.4%)	.002
White race, n (%)	192	(82.8%)	62	(89.9%)	71	(83.5%)	.359
Risk Factors							
Physical abuse [a], *M* (*SD*)	28.04	(24.77)	34.12	(24.67)	43.23	(27.43)	<.001
Emotional abuse [a], *M* (*SD*)	18.57	(17.10)	22.72	(16.83)	28.64	(20.19)	<.001
Neglect [b], *M* (*SD*)	47	(21.8%)	33	(19.4%)	13	(44.0%)	<.001
Sexual abuse [c], n (%)	51	(23.4%)	28	(41.2%)	51	(64.6%)	<.001
Low SES, *M* (*SD*)	-.48	(3.40)	-.75	(3.79)	1.31	(2.06)	<.001
Adol. Hopelessness [a], *M* (*SD*)	2.99	(2.63)	5.36	(4.04)	4.95	(4.77)	<.001
Adult Hopelessness [d], *M* (*SD*)	2.57	(2.88)	4.51	(4.25)	4.96	(5.19)	<.001

Note. One-way ANOVAs were conducted for the continuous variables, and Chi-square tests were used for binary variables. Total valid cases: [a]n=359; [b]n=358; [c]n=365; [d]n=356

Table 4. Descriptive statistics for all the variables by adolescence suicidality types (n=368)

Demographic/Risk Factors	No Suicidality (n=240)		Ideation only (n=63)		Attempt (n=65)		P-value
Demographic Factors							
Female gender, n (%)	107	(44.6%)	24	(38.1%)	42	(64.6%)	.005
White race, n (%)	202	(84.2%)	56	(88.9%)	54	(83.1%)	.594
Risk Factors							
Physical abuse [a], *M* (*SD*)	28.65	(24.87)	33.12	(24.01)	47.40	(27.75)	<.001
Emotional abuse [a], *M* (*SD*)	18.76	(17.10)	23.58	(16.96)	30.89	(20.41)	<.001
Neglect [a], *M* (*SD*)	49	(20.6%)	17	(27.0%)	27	(47.4%)	<.001
Sexual abuse [b], n (%)	59	(24.8%)	28	(44.4%)	40	(65.6%)	<.001
Low SES, *M* (*SD*)	-.55	(3.44)	-.14	(3.48)	1.34	(2.14)	<.001
Adol. Hopelessness [c], *M* (*SD*)	2.95	(2.58)	5.67	(4.35)	5.53	(4.89)	<.001
Adult Hopelessness [d], *M* (*SD*)	2.81	(3.18)	4.30	(4.14)	5.18	(5.51)	<.001

Note. One-way ANOVAs were conducted for the continuous variables, and Chi-square tests were used for binary variables. Total valid cases: [a]n=358; [b]n=362; [c]n=359; [d]n=341

Table 5. Descriptive statistics for all the variables by adulthood suicidality types (n=357)

Demographic/Risk Factors	No Suicidality (n=284)		Ideation only (n=32)		Attempt (n=41)		P-value
Demographic Factors							
Female gender, n (%)	130	(45.8%)	14	(43.8%)	27	(65.9%)	.049
White race, n (%)	238	(83.8%)	28	(87.5%)	35	(85.4%)	.845
Risk Factors							
Physical abuse [a], *M* (*SD*)	29.66	(25.35)	36.00	(27.15)	42.73	(26.12)	.011
Emotional abuse [a], *M* (*SD*)	19.57	(17.43)	23.65	(17.20)	31.25	(21.84)	.001
Neglect [a], *M* (*SD*)	65	(24.2%)	5	(17.9%)	14	(38.9%)	.104
Sexual abuse [b], n (%)	83	(30.5%)	16	(53.3%)	26	(68.4%)	<.001
Low SES, *M* (*SD*)	-.37	(3.43)	-.15	(3.83)	1.26	(2.03)	.015
Adol. Hopelessness [c], *M* (*SD*)	3.55	(3.26)	6.75	(5.14)	3.97	(4.30)	<.001
Adult Hopelessness [d], *M* (*SD*)	2.80	(3.17)	5.74	(4.53)	6.10	(5.74)	<.001

Note. One-way ANOVAs were conducted for the continuous variables, and Chi-square tests were used for binary variables. Total valid cases: [a]n=333; [b]n=340; [c]n=334; [d]n=354

5.2 Findings from the Logistics and Multinomial Logistic Regression Models

With adult suicidality models, some clear trends are found regardless of adjusting for confounding factors. Neglect, which was significantly associated with both suicidal ideation and suicide attempt in the adolescent models, did not significantly predict suicidal ideation and suicide attempt in adulthood (See Tables 6 and 7). In addition, while it was significantly associated with adult suicide attempts, low SES was not significantly associated with adult suicidal ideation (See Table 8). Still, the logistic regression results show that most of the adversity measures are predictive of suicidal ideation and suicide attempts regardless of the timing of the suicidality. This may be because the two binary measures of suicidality (suicidal ideation and suicide attempt) share a large proportion of a common characteristic; that is, among the participants who thought of suicide in the sample, about a half of them also attempted suicide. Thus, to clearly distinguish suicidal ideation and suicide attempt, study participants were categorized into three mutually exclusive groups: no suicidality group, suicidal ideation without suicide attempt (suicidal ideation only) group, and a suicide attempt group.

Table 6. Logistic regression between childhood adversity types and lifetime suicidal ideation and attempt

Lifetime suicidal ideation as an outcome

Adverse Experience in Childhood	**OR (95% CI),** Unadjusted	**P-value**	**OR (95% CI),** Adjusted for sex and race	**P-value**	**OR (95% CI),** Adjusted for sex, race & low SES	**P-value**
Physical abuse[a]	1.37 (1.12, 1.68)	0.002*	1.50 (1.20, 1.88)	<.001*	1.46 (1.16, 1.84)	0.001*
Emotional abuse[a]	1.39 (1.13, 1.71)	0.002*	1.48 (1.18, 1.86)	0.001*	1.46 (1.17, 1.83)	0.001*
Neglect[b]	1.64 (1.05, 2.57)	0.031*	1.85 (1.15, 3.00)	0.012*	1.69 (1.03, 2.78)	0.039*
Sexual abuse[b]	3.11 (2.03, 4.75)	<.001*	3.64 (2.27, 5.83)	<.001*	3.48 (2.15, 5.64)	<.001*
Low SES[a]	1.19 (0.97, 1.45)	0.099	1.26 (1.01, 1.57)	0.040*	-	-

Lifetime suicide attempt as an outcome

Adverse Experience in Childhood	**OR (95% CI),** Unadjusted	**P-value**	**OR (95% CI),** Adjusted for sex and race	**P-value**	**OR (95% CI),** Adjusted for sex, race & low SES	**P-value**
Physical abuse[a]	1.66 (1.29, 2.13)	<.001*	1.72 (1.22, 2.22)	<.001*	1.59 (1.22, 2.06)	0.001*
Emotional abuse[a]	1.60 (1.25, 2.06)	<.001*	1.64 (1.27, 2.12)	<.001*	1.59 (1.24, 2.04)	<.001*
Neglect[b]	2.92 (1.71, 5.00)	<.001*	2.90 (1.68, 5.00)	<.001*	2.15 (1.20, 3.85)	0.010*
Sexual abuse[b]	4.77 (2.81, 8.10)	<.001*	4.27 (2.49, 7.32)	<.001*	3.68 (2.11, 6.41)	<.001*
Low SES[a]	2.04 (1.55, 2.69)	<.001*	2.10 (1.59, 2.78)	<.001*	-	-

Note. *p<.05 (the table contains exact p-values); [a]Standardized continuous measures. [b]Binary measures

Table 7. Logistic regression between childhood adversity types and adolescent suicidal ideation and attempt

Adolescent suicidal ideation as an outcome

Adverse Experience in Childhood	**OR (95% CI),** Unadjusted	**P-value**	**OR (95% CI),** Adjusted for sex and race	**P-value**	**OR (95% CI),** Adjusted for sex, race & low SES	**P-value**
Physical abuse[a]	1.34 (1.09, 1.65)	0.005*	1.47 (1.17, 1.84)	0.001*	1.40 (1.12, 1.76)	0.003*
Emotional abuse[a]	1.38 (1.12, 1.70)	0.002*	1.48 (1.18, 1.86)	0.001*	1.45 (1.15, 1.82)	0.001*
Neglect[b]	2.02 (1.27, 3.20)	0.003*	2.34 (1.43, 3.83)	0.001*	2.06 (1.23, 1.56)	0.006*
Sexual abuse[b]	3.19 (2.05, 4.97)	<.001*	3.82 (2.33, 6.26)	<.001*	3.55 (2.15, 5.85)	<.001*
Low SES[a]	1.28 (1.03, 1.60)	0.027*	1.37 (1.08, 1.74)	0.011*	-	-

Adolescent suicide attempt as an outcome

Adverse Experience in Childhood	**OR (95% CI),** Unadjusted	**P-value**	**OR (95% CI),** Adjusted for sex and race	**P-value**	**OR (95% CI),** Adjusted for sex, race & low SES	**P-value**
Physical abuse[a]	1.89 (1.43, 2.48)	<.001*	1.95 (1.48, 2.58)	<.001*	1.84 (1.38, 2.44)	<.001*
Emotional abuse[a]	1.75 (1.33, 2.29)	<.001*	1.78 (1.35, 2.36)	<.001*	1.74 (1.33, 2.27)	<.001*
Neglect[b]	3.21 (1.78, 5.77)	<.001*	3.17 (1.74, 5.77)	<.001*	2.44 (1.30, 4.59)	0.006*
Sexual abuse[b]	4.53 (2.53, 8.11)	<.001*	4.05 (2.22, 7.40)	<.001*	3.48 (1.89, 6.44)	<.001*
Low SES[a]	2.00 (1.45, 2.75)	<.001*	2.05 (1.48, 2.84)	<.001*	-	-

Note. *p<.05 (the table contains exact p-values); [a]Standardized continuous measures. [b]Binary measures

Table 8. Logistic regression between childhood adversity types and adult suicidal ideation and attempt

Adult suicidal ideation as an outcome

Adverse Experience in Childhood	**OR (95% CI),** Unadjusted	**P-value**	**OR (95% CI),** Adjusted for sex and race	**P-value**	**OR (95% CI),** Adjusted for sex, race & low SES	**P-value**
Physical abuse[a]	1.38 (1.05, 1.79)	0.019*	1.39 (1.07, 1.81)	0.015*	1.35 (1.02, 1.78)	0.037*
Emotional abuse[a]	1.44 (1.11, 1.88)	0.007*	1.44 (1.11, 1.87)	0.006*	1.42 (1.10, 1.84)	0.008*
Neglect[b]	1.29 (0.69, 2.41)	0.431	1.28 (0.68, 2.41)	0.440	1.12 (0.59, 2.16)	0.726
Sexual abuse[b]	3.07 (1.74, 5.43)	<.001*	3.11 (1.74, 5.58)	<.001*	2.94 (1.60, 5.41)	<.001*
Low SES[a]	1.29 (0.96, 1.72)	0.087	1.31 (0.98, 1.75)	0.069	-	-

Adult suicide attempt as an outcome

Adverse Experience in Childhood	**OR (95% CI),** Unadjusted	**P-value**	**OR (95% CI),** Adjusted for sex and race	**P-value**	**OR (95% CI),** Adjusted for sex, race & low SES	**P-value**
Physical abuse[a]	1.50 (1.11, 2.01)	0.008*	1.53 (1.14, 2.07)	0.005*	1.42 (1.04, 1.95)	0.029*
Emotional abuse[a]	1.68 (1.22, 2.30)	0.001*	1.70 (1.24, 2.33)	0.001*	1.66 (1.21, 2.26)	0.001*
Neglect[b]	1.96 (0.96, 4.01)	0.066	1.91 (0.93, 3.96)	0.079	1.40 (0.66, 2.99)	0.379
Sexual abuse[b]	4.65 (2.26, 9.57)	<.001*	4.09 (1.95, 8.60)	<.001*	3.50 (1.65, 7.43)	0.001*
Low SES[a]	1.82 (1.28, 2.58)	0.001*	1.86 (1.31, 2.65)	0.001*	-	-

Note. *p<.05 (the table contains exact p-values); [a] Continuous measure. [b]Binary measures

After suicidal ideation and suicide attempt were treated as mutually exclusive and their relationships explored through multinomial logistic regression analyses, differences among the adversity types in predicting suicidal ideation and suicide attempt became clearer. As shown in Table 9, physical abuse was identified as a predictive risk factor that differentiates participants who have experienced suicidal ideation only from those who have attempted suicide in the lifetime and adolescent models. In contrast, when the no suicidality group and the suicidal ideation only group were compared in any models, physical abuse experience did not significantly predict any differences.

These results suggest that physical abuse is more likely to be associated with an increased probability of suicide attempt rather than suicidal ideation—particularly in adolescence. However, this association was not observed in the lifetime model after controlling for low SES: the presence of low SES eliminated the predictive power of physical abuse in distinguishing between the suicidal ideation only group and the suicide attempt group. Furthermore, there was no significant difference in childhood physical abuse between participants with suicidal ideation only and those with suicide attempt in adulthood. The results indicate that the association between childhood physical abuse and an elevated risk of suicide attempts in adolescence may diminish during adulthood.

Most adolescent models testing the effect of emotional abuse, regardless of adjusting for confounding factors, significantly predicted the differences between no suicidality group and suicidal ideation only group, and the differences between suicidal ideation only group and suicide attempt group. However, in the adolescent model holding low SES constant, emotional abuse did not significantly differentiate between the no suicidality group and the suicidal ideation only group. In the lifetime and the adulthood models for emotional abuse, the

differences between the suicidal ideation only group and each of the other tested groups (the no suicidality group and suicide attempt group) were not significant, except the model holding gender and race constant that compared lifetime suicidal ideation only group and suicide attempt group. The results imply that the links between childhood emotional abuse and an increased likelihood of adolescent suicidal ideation and adolescent suicide attempts appear to weaken as individuals enter adulthood.

Neglect did not significantly predict the difference between no suicidality and suicide ideation only, regardless of the inclusion of confounding factors or the timing of suicidality. In contrast, the difference between suicidal ideation only and suicide attempt was significantly predicted in most of the lifetime and adolescence models. These results suggest that neglect may increase the probability of suicide attempt during adolescence, but not in adulthood.

Sexual abuse showed the most distinctive patterns from the other childhood adversities; that is, the difference between the no suicidality group and the suicidal ideation only group was significantly predicted by childhood experience of sexual abuse in all of the models (See Tables 9, 10 and 11). In comparison, sexual abuse experience was associated with the differences between suicidal attempt and suicidal ideation in only a few lifetime and adolescent models (See Tables 9 and 10). The trends for sexual abuse are unique from the other adversities' in that the others showed stronger association with suicidal attempt than with suicidal ideation only.

Unlike other types of child maltreatment adversity, there were no significant differences in the associations between low socioeconomic status (SES) and either suicidal ideation only or no suicidality whereas the associations between low SES and suicide attempt were significantly stronger than suicidal ideation only in most of the models. This pattern resembles that of physical abuse and neglect, as they also exhibit stronger associations with suicide attempts compared to

suicidal ideation only. However, the difference in the strength of associations between no suicidality and suicidal ideation only was not significant in most lifetime and adolescence models. However, in contrast to the effects of physical abuse and neglect on suicide attempts that became insignificant in adulthood, the effect of low SES on suicide attempt remained significant during adulthood despite some attenuation of the effect.

Table 9. Multinomial logistic regression between adverse experience in childhood and lifetime suicidality types

No suicidality vs. Ideation only (Lifetime)

Adverse Experience in Childhood	**OR (95% CI),** Unadjusted	**P-value**	**OR (95% CI),** Adjusted for sex and race	**P-value**	**OR (95% CI),** Adjusted for sex, race & low SES	**P-value**
Physical abuse	0.77 (0.59, 1.02)	0.070	0.78 (0.59, 1.03)	0.082	0.76 (0.58, 1.00)	0.052
Emotional abuse	0.79 (0.59, 1.02)	0.072	0.79 (0.60, 1.04)	0.096	0.78 (0.59, 1.03)	0.083
Neglect[a]	1.16 (0.58, 3.00)	0.680	1.13 (0.57, 2.24)	0.735	1.08 (0.53, 2.18)	0.836
Sexual abuse[a]	0.44 (0.25, 0.78)	0.005*	0.39 (0.21, 0.71)	0.002*	0.36 (0.19, 0.67)	0.001*
Low SES	1.08 (0.82, 1.42)	0.585	1.05 (0.80, 1.38)	0.707	-	-

Attempt vs. Ideation only (Lifetime)

Adverse Experience in Childhood	**OR (95% CI),** Unadjusted	**P-value**	**OR (95% CI),** Adjusted for sex and race	**P-value**	**OR (95% CI),** Adjusted for sex, race & Low SES	**P-value**
Physical abuse	1.37 (1.01, 1.84)	0.041*	1.42 (1.04, 1.93)	0.026*	1.28 (0.94, 1.75)	0.121
Emotional abuse	1.33 (0.99, 1.78)	0.057	1.37 (1.01, 1.85)	0.041*	1.32 (0.98, 1.78)	0.071
Neglect[a]	3.26 (1.53, 6.97)	0.002*	3.19 (1.48, 6.85)	0.003*	2.28 (1.02, 5.11)	0.045*
Sexual abuse[a]	2.60 (1.34, 5.07)	0.005*	2.10 (1.05, 4.22)	0.037*	1.70 (0.81, 3.53)	0.158
Low SES	2.18 (1.54, 3.08)	<.001*	2.20 (1.55, 3.12)	<.001*	-	-

Note. *p<.05 (the table contains exact p-values); [a]Binary measures. All the other adversity types are continuous and standardized for easier interpretation of the results

Table 10. Multinomial logistic regression between adverse experience in childhood and adolescence suicidality types

No suicidality vs. Ideation only (Adolescence)

Adverse Experience in Childhood	**OR (95% CI),** Unadjusted	**P-value**	**OR (95% CI),** Adjusted for sex and race	**P-value**	**OR (95% CI),** Adjusted for sex, race & low SES	**P-value**
Physical abuse	0.83 (0.63, 1.09)	0.178	0.84 (0.63, 1.10)	0.200	0.86 (0.65, 1.12)	0.261
Emotional abuse	0.75 (0.57, 0.99)	0.039*	0.76 (0.57, 1.00)	0.050*	0.76 (0.58, 1.01)	0.056
Neglect[a]	0.70 (0.37, 1.33)	0.277	0.69 (0.36, 1.30)	0.249	0.73 (0.38, 1.42)	0.353
Sexual abuse[a]	0.41 (0.23, 0.73)	0.003*	0.37 (0.20, 0.68)	0.001*	0.38 (0.21, 0.70)	0.002*
Low SES	0.89 (0.66, 1.19)	0.425	0.87 (0.65, 1.17)	0.361	-	-

Attempt vs. Ideation only (Adolescence)

Adverse Experience in Childhood	**OR (95% CI),** Unadjusted	**P-value**	**OR (95% CI),** Adjusted for sex and race	**P-value**	**OR (95% CI),** Adjusted for sex, race & Low SES	**P-value**
Physical abuse	1.62 (1.17, 2.24)	0.004*	1.68 (1.21, 2.34)	0.002*	1.61 (1.15, 2.26)	0.005*
Emotional abuse	1.40 (1.03, 1.91)	0.034*	1.43 (1.04, 1.98)	0.028*	1.41 (1.03, 1.93)	0.033*
Neglect[a]	2.44 (1.14, 5.22)	0.022*	2.37 (1.09, 5.13)	0.029*	1.91 (0.85, 4.31)	0.116
Sexual abuse[a]	2.38 (1.15, 4.92)	0.019*	1.96 (0.92, 4.19)	0.083	1.73 (0.80, 3.77)	0.165
Low SES	1.86 (1.24, 2.78)	0.003*	1.86 (1.24, 2.79)	0.003*	-	-

Note. *p<.05 (the table contains exact p-values); [a]Binary measure. All the other adversity types are continuous and standardized for easier interpretation of the results

Table 11. Multinomial logistic regression between adverse experience in childhood and adulthood suicidality types

No suicidality vs. Ideation only (Adulthood)

Adverse Experience in Childhood	**OR (95% CI),** Unadjusted	**P-value**	**OR (95% CI),** Adjusted for sex and race	**P-value**	**OR (95% CI),** Adjusted for sex, race & low SES	**P-value**
Physical abuse	0.79 (0.54, 1.14)	0.203	0.78 (0.53, 1.14)	0.199	0.76 (0.50, 1.13)	0.173
Emotional abuse	0.80 (0.56, 1.13)	0.198	0.80 (0.56, 1.14)	0.219	0.79 (0.55, 1.13)	0.202
Neglect[a]	1.47 (0.54, 4.01)	0.457	1.43 (0.52, 3.94)	0.486	1.41 (0.50, 3.97)	0.521
Sexual abuse[a]	0.38 (0.18, 0.82)	0.014*	0.36 (0.16, 0.78)	0.010*	0.34 (0.14, 0.80)	0.013*
Low SES	0.94 (0.62, 1.42)	0.761	0.92 (0.62, 1.39)	0.704	-	-

Attempt vs. Ideation only (Adulthood)

Adverse Experience in Childhood	**OR (95% CI),** Unadjusted	**P-value**	**OR (95% CI),** Adjusted for sex and race	**P-value**	**OR (95% CI),** Adjusted for sex, race & Low SES	**P-value**
Physical abuse	1.24 (0.81, 1.90)	0.320	1.25 (0.80, 1.95)	0.325	1.13 (0.71, 1.81)	0.606
Emotional abuse	1.39 (0.92, 2.10)	0.119	1.39 (0.91, 2.13)	0.126	1.35 (0.89, 2.06)	0.164
Neglect[a]	2.93 (0.90, 9.49)	0.074	2.74 (0.84, 8.95)	0.096	1.92 (0.56, 6.54)	0.297
Sexual abuse[a]	1.90 (0.70, 5.11)	0.206	1.58 (0.57, 4.36)	0.378	1.25 (0.42, 3.73)	0.688
Low SES	1.74 (1.04, 2.93)	0.036*	1.78 (1.06, 3.00)	0.029*	-	-

Note. *p<.05 (the table contains exact p-values); [a]Binary measure. All the other adversity types are continuous and standardized for easier interpretation of the results

5.3 Findings from the Path Analysis Models

The original adolescent (Chi-square=26.49, df=9, p=0.002; RMSEA=0.069; CFI/TLI= 0.913/0.825; SRMR=0.102) and adult (Chi-square=22.19, df=9, p=0.008; RMSEA=0.064; CFI/TLI=0.965/0.929; SRMR=0.102) path analysis models were marginally acceptable based on common SEM goodness-of-fit cutoff points. However, these cutoff values are typically suitable for models estimated through maximum likelihood techniques. So, when employing the WLSMV method instead of Maximum Likelihood methods, stricter cutoffs may be necessary (Xia & Yang, 2019). Thus, additional hypothetical (and theoretically plausible) paths suggested by multinomial logistic regression results were added. The results from multinomial regression revealed significant associations between sexual abuse and suicidal ideation, as well as between low SES and suicide attempts. Consequently, these explicit associations were incorporated into the new hypothetical models by introducing two extra paths: one from sexual abuse to suicidal ideation, and another from low SES to suicide attempts (see the Adolescent path model 1 and the Adult path model 1 in Figure 5). However, in the new hypothetical models, several path coefficients for physical and emotional abuse lost their significance due to possible multicollinearity among the variables (Pearson's r =.64). As a result, four additional models were also examined, each excluding either physical abuse or emotional abuse (see the Adolescent path model 2 and 3 as well as the Adult path model 2 and 3 in Figure 6 and Figure 7). Particularly for adolescent path model 3, because the path coefficient from emotional abuse to adolescent hopelessness was not significant, a new path was added from emotional abuse to suicidal ideation. All six path analysis models (Adolescent path model 1 to 3 as well as Adult path model 1 to 3) demonstrated a satisfactory fit with the data (see the notes under Tables 12 to 17).

Physical abuse was included in Adolescent Models 1 and 2, as well as in Adult Models 1 and 2. In the Adolescent Models 1 and 2, physical abuse showed a significant prediction of increased risk for suicide attempt through the mediating factors of hopelessness and suicidal ideation. However, in Adult Model 1, physical abuse did not exhibit a significant indirect prediction of suicide attempt through hopelessness and suicidal ideation (p=.105; see Table 12). But, after removing the path coefficient of emotional abuse, the indirect pathway from physical abuse through hopelessness and suicidal ideation to suicide attempt became significant (p=.017; see Table 14). In Adolescent Model 2, the direct effect from physical abuse to suicide attempt was significant only after eliminating the emotional abuse path included in Adolescent Model 1 (see Figure 6). This suggests that by combining the unexplained shared variance between physical and emotional abuse into the physical abuse variable, the predictive power of physical abuse on the risk of suicide attempts increased. None of the adult models demonstrated significant path coefficients between physical abuse and suicide attempt.

Emotional abuse was included in Adolescent Models 1 and 3, as well as in Adult Models 1 and 3. Whereas the Adolescent Model 1 and the Adult Model 1, which included both physical and emotional abuse, did not show any significant paths from emotional abuse, the Adolescent Model 3 and the Adult Model 3 which eliminate the paths from physical abuse, demonstrated significant paths from emotional abuse to hopelessness or suicidal ideation (see Figure 5 and Figure 7).

No adolescent models showed significant pathways from emotional abuse via hopelessness and suicidal ideation to suicide attempt. Instead, a newly added pathway was significant in Adolescent Model 3: emotional abuse through suicidal ideation to suicide attempt (see Figure 7 and Table 5.17). This finding may suggest that either a different unique mediator

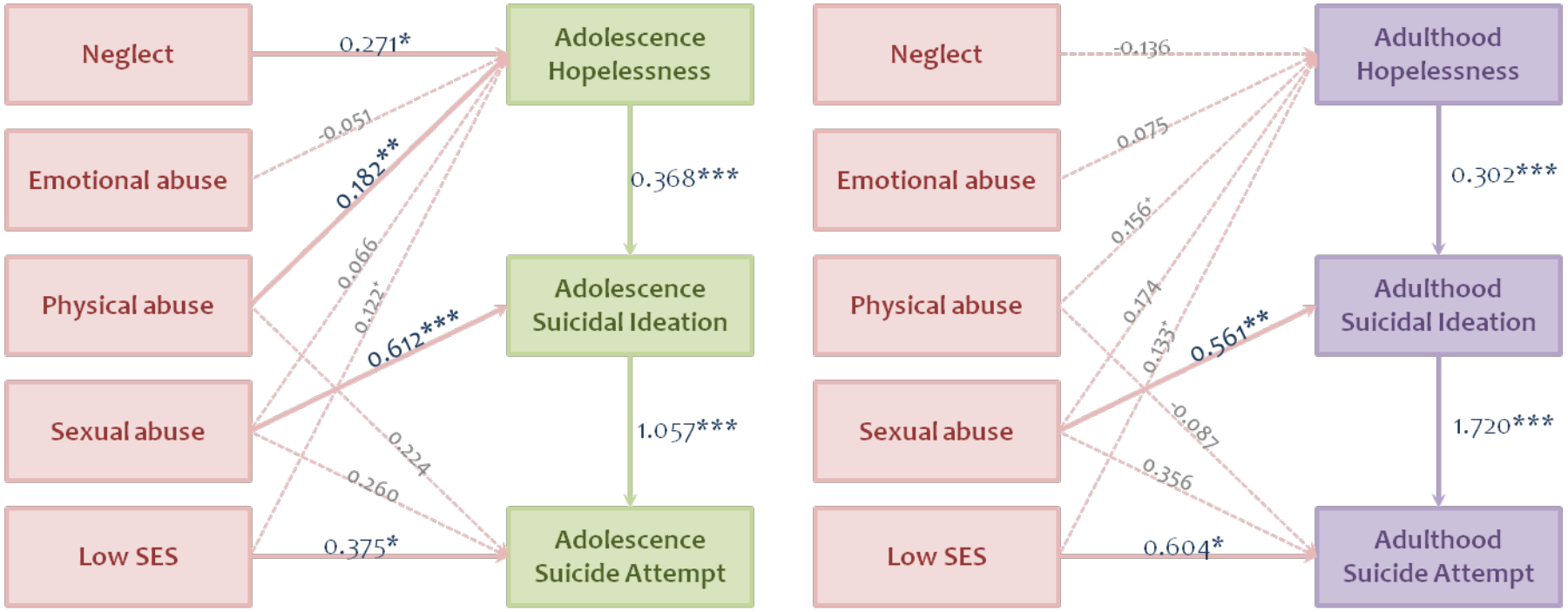
between emotional abuse and suicidal ideation exists (e.g., impulsivity or aggression) or constructs that are similar to hopelessness but conceptually different (e.g., rumination, defeat, or entrapment) need to be tested along with emotional abuse.

In accordance with the results from the multinomial regression analyses, sexual abuse demonstrated a most unique and unexpected pathway among childhood adversity types. Sexual abuse consistently predicted the increased risk of suicidal ideation in both adolescent and adulthood models. No other pathways from sexual abuse were significant in any models: such as pathways to hopelessness and direct pathways to suicide attempt. This finding implies the existence of a distinctive connection between sexual abuse and suicidal ideation.

Neglect exhibited significant predictive patterns exclusively in Adolescent Models, rather than Adult Models. In all the three Adolescent Models, the indirect effects from neglect via hopeless to suicidal ideation were significant, and the pathways between neglect and suicide attempt mediated by hopelessness and suicidal ideation were at least marginally significant. In contrast, no significant pathways for neglect were found in any Adult Models. This may suggest that the long-term effects of neglect on suicidality are more likely to be attenuated than other adversity types.

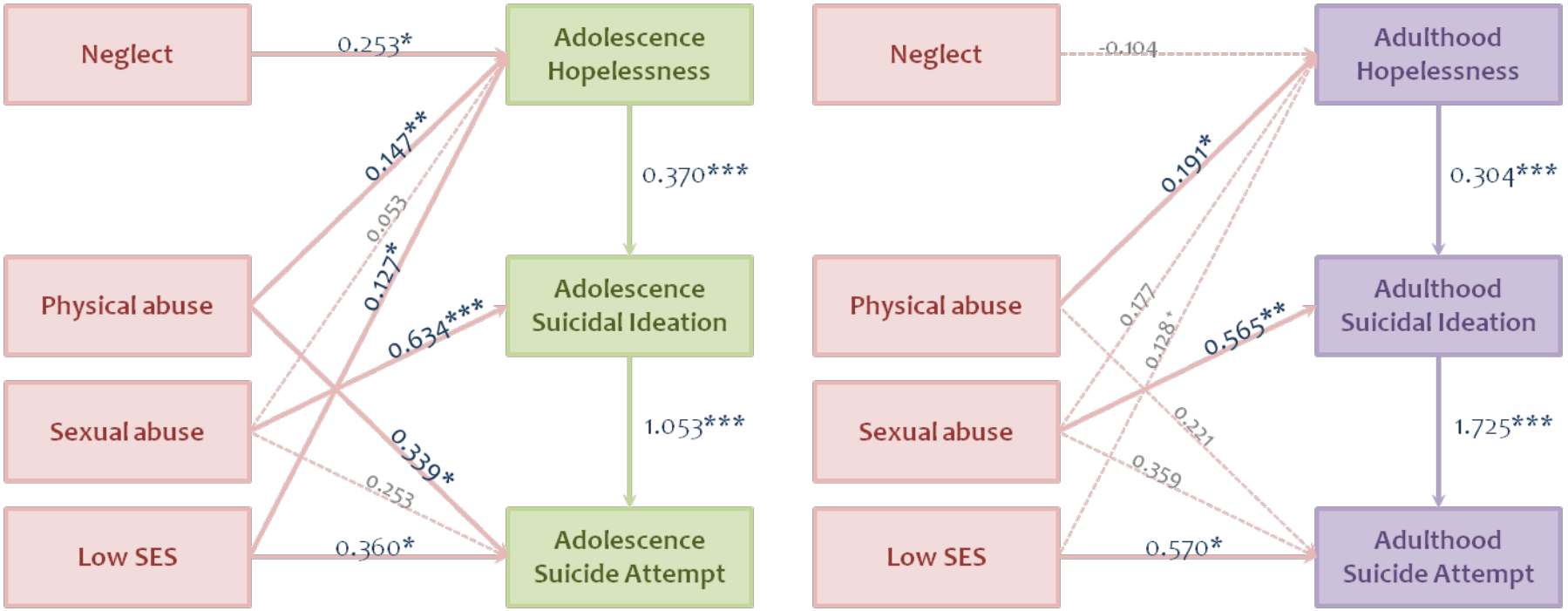
Similar to sexual abuse, low SES showed an unexpected but evident pathway that was not assumed in the original path model. In all the adolescent and adult models, the direct pathways between low SES and suicide attempt were significant above and beyond the pathways for the other adversity types. This finding suggests that individuals with low SES may have a higher enduring likelihood of engaging in suicidal actions than the other types of adversity. The indirect paths from low SES through hopelessness to suicidal ideation were mostly marginally and consistently significant ($p<.10$) in adolescent and adult models.

Figure 5. Adolescent Model 1 & Adult Model 1



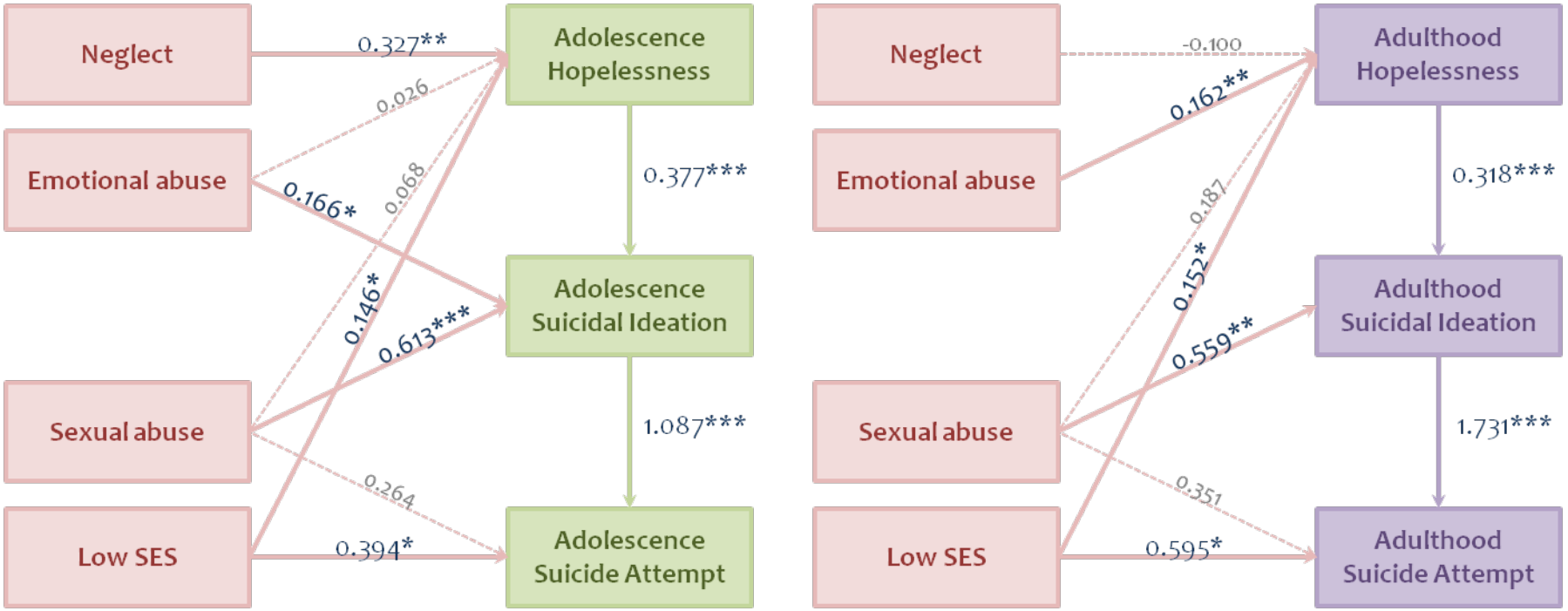
Note. Continuous measures (physical abuse, emotional abuse, low SES, and hopelessness) are standardized. All the other measures are binary and are not standardized. $^{+}p<.10$, $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$

Figure 6. Adolescent Model 2 & Adult Model 2



Note. Continuous measures (physical abuse, emotional abuse, low SES, and hopelessness) are standardized. All the other measures are binary and are not standardized. $^{+}p<.10$, $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$

Figure 7. Adolescent Model 3 & Adult Model 3



Note. Continuous measures (physical abuse, emotional abuse, low SES, and hopelessness) are standardized. All the other measures are binary and are not standardized. $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$

Table 12. Direct and indirect effects from the adolescent model 1

Effect	Predictor	Mediator(s)	Outcome	β	SE	P
Direct	Neglect	-	Hopelessness	.271	.119	.022*
	Emotional abuse	-	Hopelessness	-.051	.065	.435
	Physical abuse	-	Hopelessness	.182	.067	.007**
	Sexual abuse	-	Hopelessness	.066	.108	.540
	Low SES	-	Hopelessness	.122	.063	.051+
	Sexual abuse	-	Sui. ideation	.612	.147	.000***
	Physical abuse	-	Sui. Attempt	.224	.168	.182
	Sexual abuse	-	Sui. Attempt	.260	.247	.293
	Low SES	-	Sui. Attempt	.375	.167	.025*
Indirect	Neglect	Hopelessness	Sui. ideation	.100	.047	.034*
	Emotional abuse	Hopelessness	Sui. ideation	-.019	.024	.442
	Physical abuse	Hopelessness	Sui. ideation	.067	.028	.016*
	Sexual abuse	Hopelessness	Sui. ideation	.024	.040	.544
	Low SES	Hopelessness	Sui. ideation	.045	.025	.067+
	Sexual abuse	Sui. ideation	Sui.Attempt	.647	.197	.001**
	Neglect	Hopelessness–Sui. ideation	Sui.Attempt	.105	.054	.050+
	Emotional abuse	Hopelessness–Sui. ideation	Sui.Attempt	-.020	.026	.443
	Physical abuse	Hopelessness–Sui. ideation	Sui.Attempt	.071	.031	.024*
	Sexual abuse	Hopelessness–Sui. ideation	Sui.Attempt	.026	.042	.542
	Low SES	Hopelessness–Sui. ideation	Sui.Attempt	.048	.027	.025*

Note. Model fit indices: $\chi^2(7) = 6.344$, p = .5115; RMSEA = .000, 90% CI (.000, .057); CFI = 1.000; TLI = 1.000; SRMR = 0.043. Continuous measures (physical abuse, emotional abuse, low SES, and hopelessness) are standardized. All the other measures are binary and are not standardized. $^{+}p<.10$, $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$

Table 13. Direct and indirect effects from adult model 1

Effect	Predictor	Mediator(s)	Outcome	β	SE	*p*
Direct	Neglect	-	Hopelessness	-.136	.150	.366
	Emotional abuse	-	Hopelessness	.075	.079	.339
	Physical abuse	-	Hopelessness	.156	.085	.068^{+}
	Sexual abuse	-	Hopelessness	.174	.113	.123
	Low SES	-	Hopelessness	.133	.073	.069^{+}
	Sexual abuse	-	Sui. ideation	.561	.175	.001**
	Physical abuse	-	Sui. Attempt	-.087	.287	.762
	Sexual abuse	-	Sui. Attempt	.356	.350	.310
	Low SES	-	Sui. Attempt	.604	.272	.026*
Indirect	Neglect	Hopelessness	Sui. ideation	-.041	.046	.376
	Emotional abuse	Hopelessness	Sui. ideation	.023	.024	.348
	Physical abuse	Hopelessness	Sui. ideation	.047	.027	.087^{+}
	Sexual abuse	Hopelessness	Sui. ideation	.053	.036	.145
	Low SES	Hopelessness	Sui. ideation	.040	.024	.091^{+}
	Sexual abuse	Sui. ideation	Sui. Attempt	.964	.358	.007**
	Neglect	Hopelessness–Sui. Ideation	Sui. Attempt	-.070	.080	.376
	Emotional abuse	Hopelessness–Sui. ideation	Sui. Attempt	.039	.041	.345
	Physical abuse	Hopelessness–Sui. ideation	Sui. Attempt	.081	.050	.105
	Sexual abuse	Hopelessness–Sui. ideation	Sui. Attempt	.090	.064	.154
	Low SES	Hopelessness–Sui. ideation	Sui. Attempt	.069	.042	.103

Note. Model fit indices: $\chi^2(7) = 8.313$, p = .3058; RMSEA = .023, 90% CI (.000, .072); CFI = .996; TLI = .991; SRMR = 0.049. Continuous measures (physical abuse, emotional abuse, low SES, and hopelessness) are standardized. All the other measures are binary and are not standardized. $^{+}p<.10$, $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$

Table 14. Direct and indirect effects from the adolescent model 2

Effect	Predictor	Mediator(s)	Outcome	β	SE	P
Direct	Neglect	-	Hopelessness	.253	.118	.032*
	Physical abuse	-	Hopelessness	.147	.052	.004**
	Sexual abuse	-	Hopelessness	.053	.109	.628
	Low SES	-	Hopelessness	.127	.062	.040*
	Sexual abuse	-	Sui. ideation	.634	.147	.000***
	Physical abuse	-	Sui. Attempt	.339	.136	.013*
	Sexual abuse	-	Sui. Attempt	.253	.245	.302
	Low SES	-	Sui. Attempt	.360	.168	.032*
Indirect	Neglect	Hopelessness	Sui. ideation	.094	.047	.045*
	Physical abuse	Hopelessness	Sui. ideation	.054	.025	.011*
	Sexual abuse	Hopelessness	Sui. ideation	.019	.040	.630
	Low SES	Hopelessness	Sui. ideation	.047	.024	.054+
	Sexual abuse	Sui. ideation	Sui. Attempt	.668	.198	.001**
	Neglect	Hopelessness–Sui. ideation	Sui. Attempt	.099	.053	.062+
	Physical abuse	Hopelessness–Sui. ideation	Sui. Attempt	.057	.025	.019*
	Sexual abuse	Hopelessness–Sui. ideation	Sui. Attempt	.020	.042	.628
	Low SES	Hopelessness–Sui. ideation	Sui. Attempt	.049	.027	.067+

Note. Model fit indices: $\chi^2(5) = 3.648$, p = .6011; RMSEA = .000, 90% CI (.000, .058); CFI = 1.000; TLI = 1.000; SRMR = 0.027. Continuous measures (physical abuse, low SES, and hopelessness) are standardized. All the other measures are binary and are not standardized.
$^{+}p<.10$, $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$

Table 15. Direct and indirect effects from adult model 2

Effect	Predictor	Mediator(s)	Outcome	β	SE	*p*
Direct	Neglect	-	Hopelessness	-.104	.137	.448
	Physical abuse	-	Hopelessness	.191	.063	.002**
	Sexual abuse	-	Hopelessness	.117	.110	.109
	Low SES	-	Hopelessness	.128	.073	.081+
	Sexual abuse	-	Sui. ideation	.565	.174	.001**
	Physical abuse	-	Sui. Attempt	.221	.208	.228
	Sexual abuse	-	Sui. Attempt	.359	.345	.297
	Low SES	-	Sui. Attempt	.570	.274	.038*
Indirect	Neglect	Hopelessness	Sui. ideation	-.032	.042	.455
	Physical abuse	Hopelessness	Sui. ideation	.058	.023	.011*
	Sexual abuse	Hopelessness	Sui. ideation	.054	.036	.131
	Low SES	Hopelessness	Sui. ideation	.040	.024	.091+
	Sexual abuse	Sui. ideation	Sui. Attempt	.975	.357	.006**
	Neglect	Hopelessness–Sui. Ideation	Sui. Attempt	-.055	.073	.455
	Physical abuse	Hopelessness–Sui. ideation	Sui. Attempt	.100	.042	.017*
	Sexual abuse	Hopelessness–Sui. ideation	Sui. Attempt	.093	.063	.139
	Low SES	Hopelessness–Sui. ideation	Sui. Attempt	.067	.043	.116

Note. Model fit indices: $\chi^2(5) = 3.611$, p = .6066; RMSEA = .000, 90% CI (.000, .062); CFI = 1.000; TLI = 1.000; SRMR = 0.022. Continuous measures (physical abuse, low SES, and hopelessness) are standardized. All the other measures are binary and are not standardized.
$^{+}p<.10$, $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$

Table 16. Direct and indirect effects from the adolescent model 3

Effect	Predictor	Mediator(s)	Outcome	β	SE	P
Direct	Neglect	-	Hopelessness	.327	.121	.007**
	Emotional abuse	-	Hopelessness	.026	.049	.595
	Sexual abuse	-	Hopelessness	.068	.109	.535
	Low SES	-	Hopelessness	.146	.062	.020*
	Emotional abuse	-	Sui. ideation	.166	.077	.030*
	Sexual abuse	-	Sui. ideation	.613	.147	.000***
	Sexual abuse	-	Sui. Attempt	.264	.250	.292
	Low SES	-	Sui. Attempt	.394	.174	.023*
Indirect	Neglect	Hopelessness	Sui. ideation	.123	.050	.015*
	Emotional abuse	Hopelessness	Sui. ideation	.010	.019	.597
	Sexual abuse	Hopelessness	Sui. ideation	.026	.041	.538
	Low SES	Hopelessness	Sui. ideation	.055	.026	.032*
	Emotional abuse	Sui. ideation	Sui. Attempt	.181	.089	.043*
	Sexual abuse	Sui. ideation	Sui. Attempt	.666	.203	.001**
	Neglect	Hopelessness–Sui. ideation	Sui. Attempt	.134	.060	.026*
	Emotional abuse	Hopelessness–Sui. ideation	Sui. Attempt	.011	.020	.599
	Sexual abuse	Hopelessness–Sui. ideation	Sui. Attempt	.028	.045	.537
	Low SES	Hopelessness–Sui. ideation	Sui. Attempt	.060	.029	.042*

Note. Model fit indices: $\chi^2(5) = 4.281$, p = .5097; RMSEA = .000, 90% CI (.000, .063); CFI = 1.000; TLI = 1.000; SRMR = 0.033. Continuous measures (physical abuse, emotional abuse, low SES, and hopelessness) are standardized. All the other measures are binary and are not standardized. $^{+}p<.10$, $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$

Table 17. Direct and Indirect effects from adult model 3

Effect	Predictor	Mediator(s)	Outcome	β	SE	*p*
Direct	Neglect	-	Hopelessness	-.100	.150	.505
	Emotional abuse	-	Hopelessness	.162	.058	.005**
	Sexual abuse	-	Hopelessness	.187	.111	.091+
	Low SES	-	Hopelessness	.152	.072	.034*
	Sexual abuse	-	Sui. ideation	.559	.176	.001**
	Sexual abuse	-	Sui. Attempt	.351	.353	.319
	Low SES	-	Sui. Attempt	.595	.270	.027*
Indirect	Neglect	Hopelessness	Sui. ideation	-.032	.048	.511
	Emotional abuse	Hopelessness	Sui. ideation	.052	.022	.017*
	Sexual abuse	Hopelessness	Sui. ideation	.059	.038	.114
	Low SES	Hopelessness	Sui. ideation	.048	.025	.054+
	Sexual abuse	Sui. ideation	Sui. Attempt	.968	.365	.008**
	Neglect	Hopelessness–Sui. Ideation	Sui. Attempt	-.055	.084	.510
	Emotional abuse	Hopelessness–Sui. ideation	Sui. Attempt	.089	.039	.022*
	Sexual abuse	Hopelessness–Sui. ideation	Sui. Attempt	.103	.067	.125
	Low SES	Hopelessness–Sui. ideation	Sui. Attempt	.084	.046	.067+

Note. Model fit indices: $\chi^2(6) = 11.400$, p = .0768; RMSEA = .050, 90% CI (.000, .094); CFI = .986; TLI = .966; SRMR = 0.042. Continuous measures (physical abuse, emotional abuse, low SES, and hopelessness) are standardized. All the other measures are binary and are not standardized. $^{+}p<.10$, $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$

Chapter 6. DISCUSSION AND CONCLUSION

6.1 Summary and Discussion of Findings

This dissertation aimed to explore the intricate relationship between various forms of childhood adversity and suicidality by utilizing a longitudinal dataset and employing three sets of models: (1) binary logistic regression models, (2) multinomial logistic regression models, and (3) path analysis models.

The binary logistic regression models were employed to investigate the direct association between different types of childhood adversity and suicidality, specifically focusing on suicidal ideation and suicide attempts. However, due to significant overlap between individuals experiencing suicidal thoughts and those attempting suicide, the binary logistic regression models did not reveal substantial distinctions between the two outcomes. To address this, multinomial logistic regression models were employed to specifically examine the differences between suicidal ideation and suicide attempts as separate outcomes. Furthermore, path analysis models were utilized to gain a deeper understanding of the underlying mechanisms through which specific types of childhood adversity contribute to the occurrence of suicidal ideation and/or suicide attempts. Through the implementation of these diverse models, the study yielded valuable insights regarding the relationship between specific forms of childhood adversity and suicidality. This subchapter presents a comprehensive summary and interpretation of the findings pertaining to the associations between distinct categories of childhood adversity and the manifestation of suicidality.

Gender differences in suicidal ideation prevalence

Before the discussion about the main findings, unique characteristics from the Lehigh Longitudinal data revealed that male participants demonstrated a higher prevalence of suicidal ideation without suicide attempts while prevalence of suicide attempt was higher in the female group. This finding challenges the gender paradox of suicide (Canetto & Sakinofsky, 1998), which is supported by numerous empirical studies suggesting that women are more likely to contemplate and attempt suicide, while men are more likely to commit suicide (Borges et al., 2010; Ivey-Stephenson et al., 2020; Gaylor et al., 2023).

The seemingly contradictory finding can be attributed to the higher prevalence of suicide attempts among females compared to males. Specifically, the cases of suicidal ideation without actual suicide attempts were excluded, which resulted in a higher prevalence of suicidal ideation among males. However, when cases having suicidal ideation experience with actual suicide attempt history were included in the suicidal ideation group, the female group demonstrated a slightly higher, though statistically insignificant, prevalence of suicidal ideation. Comparable prevalence rates of suicidal ideation between male and female are also found in other population-level data, such as the National Survey on Drug Use and Health (2016). This survey reported similar prevalence rates between manes and females in the year 2015, with 3.9 percent for male ideators and 4.2 percent for female ideators.

In addition, since cultural attitudes about masculinity and suicide may lead males to be more concerned about social disapproval regarding their thoughts and behavior, males tend to underreport suicidal ideation (Canetto, 1997; Canetto & Sakinofsky, 1998). Thus asking about their suicidal ideation experience with a single survey item may result in fewer reports of actual suicidal ideation experience among males. In our study, suicidal ideation was measured using

multiple items in different waves, providing participants with more opportunities to contemplate their past experiences with suicidal ideation. This methodology may have resulted in higher reporting rates of suicidal ideation in the male group, potentially contributing to the observed comparability in prevalence rates of suicidal ideation between males and females.

Whereas this dissertation did not focus on further analyzing gender differences in suicidal ideation and attempt, the preliminary findings underscore the complexities involved in understanding the gender paradox of suicidality. The observed variations may be influenced by measurement methods, and our study emphasizes the importance of considering such factors when investigating suicidal ideation across genders. Further research is warranted to explore the underlying factors contributing to these differences and to develop targeted interventions for vulnerable populations.

Physical abuse

Across the all binary logistic regression models, physical abuse emerged as a significant risk factor for both suicidal ideation and suicide attempt. This finding is consistent with two recent meta-analysis studies that examined adolescent and adult populations, respectively (Angelakis et al., 2019, 2020). However, when differentiating between suicidal ideation and suicide attempts more strictly, the patterns became more complex. In multinomial regression models conducted during adolescence, individuals who had experienced childhood physical abuse showed a higher severity of abuse in those who attempted suicide compared to those who experienced suicidal ideation only, while the difference between individuals with suicidal ideation only and those with suicide attempts in adolescence was not significant. Moreover, there was no significant difference in childhood physical abuse between individuals with suicidal

ideation only and those with suicide attempts in adulthood. Similar trends were also observed in path analysis models; a significant direct path from physical abuse to suicide attempts was observed in adolescent models, whereas this direct path was not significant in adult models.

The results obtained from multinomial logistic regression models and path analysis models provide partial support for the theoretical models positing a direct association between physical abuse and suicide attempts. The theoretical model posited that experiencing childhood physical abuse would lead to an increased tolerance for pain and fear, consequently elevating the risk of suicide attempts in later life. However, while a clear direct association between physical abuse and suicide attempts was observed during adolescence, this link appeared to diminish in adulthood. This suggests that the acquired capability for suicide, characterized by heightened pain and fear tolerance, is a dynamic construct that can vary over time. Existing evidence indicates that acquired capability for suicide may not be a fixed trait. Although research on the long-term fluctuation of acquired capability is limited, a study by Spangenberg et al. (2019) demonstrated daily variations in its level. If individuals who acquired the capability for suicide through exposure to physical pain during childhood no longer experience such pain in adulthood, their tolerance for pain and fear may decrease over an extended period.

Emotional abuse

Similar to physical abuse, emotional abuse consistently predicted an elevated risk of both suicidal ideation and suicide attempts in the binary logistic regression models. This finding is also in line with the findings of the aforementioned meta-analyses, which examined adolescent and adult populations (Angelakis et al., 2019, 2020). Still, when examining the distinction between suicidal ideation and suicide attempts more rigorously by multinomial logistic

regression models, distinct patterns emerged. Adolescents who attempted suicide experienced more severe emotional abuse than those with suicidal ideation only, while individuals with suicidal ideation had higher emotional abuse severity than those without suicidality. None of these patterns were significant in most of the adulthood models. These findings suggest that during adolescence but not during adulthood, individuals who have experienced childhood emotional abuse are more likely to experience both suicidal ideation without actual suicide attempts and engage in suicide attempts. Nevertheless, it is important to note that the significance of overall suicidal risk in adolescence does not imply its insignificance in adulthood. In fact, the binary logistic regression analysis of the adult models revealed significant odds ratios for both suicidal ideation and suicide attempts.

More interestingly, the inclusion of emotional abuse in different path analysis models showed varying results. In the models that included both physical and emotional abuse, no significant paths from emotional abuse were observed. However, in the models that removed physical abuse, significant paths from emotional abuse to hopelessness or suicidal ideation were found. This suggests that excluding the physical abuse variable in the model due to multicollinearity increased the predictive power of emotional abuse on the risk of suicide attempts, as it accounted for the unexplained shared variance between physical and emotional abuse. None of the adolescent models demonstrated significant pathways from emotional abuse through hopelessness and suicidal ideation to suicide attempt, except in one model where a significant pathway from emotional abuse through suicidal ideation to suicide attempt was identified. These findings may suggest that either a different unique mediator between emotional abuse and suicidal ideation exists (e.g., impulsivity or aggression) or constructs that are similar

to hopelessness but are conceptually different (e.g., rumination, defeat, or entrapment) need to be tested along with emotional abuse.

Sexual abuse

Sexual abuse displayed unique patterns compared to the other forms of child maltreatment. In all binary logistic regression models, sexual abuse was no different from other maltreatment types as it consistently indicated a higher likelihood of both suicidal ideation and suicide attempts. However, across multinomial logistic regression models, sexual abuse consistently differentiated the no suicidality group from the suicidal ideation only group, but not the suicidal ideation only group from the suicide attempt group. The findings suggest that sexual abuse may be a manifest risk factor for suicidal ideation only but not directly increase the likelihood of suicide attempt. Path analysis models also revealed similar patterns. Among hopelessness, suicidal ideation, and suicide attempt, suicidal ideation was the only outcome that exhibited a significant direct path coefficient from sexual abuse. This finding is consistent with a recent path analysis study that examine the intricate relationships between childhood maltreatment subtypes (emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect), hopelessness, dissociation, and suicidal ideation (Berardelli et al., 2022).

In addition, the finding that sexual abuse does not directly predict suicide attempt, challenges the theoretical assumption in this study that sexual abuse, often involving physical pain like rape, would directly contribute to suicide attempts through increased pain and fear tolerance. One possible explanation for this could be that individuals who reported sexual abuse may not have necessarily experienced severe or recurring physical pain that lead to increased

pain and fear tolerance. For example, sexual abuse can be non-violent or take a less severe form, such as sexual physical contact or exposure to sexual content.

Neglect

Neglect was mostly a significant but relatively weak risk factor for suicidal ideation and suicide attempt, comparing to the other forms of childhood adversity. In binary logistic regression models, neglect significantly predicted increased risk of both suicidal ideation and suicide attempt in adolescence, but not in adulthood. Among multinomial logistic regression models, neglect was not significant in distinguishing between no suicidality and suicidal ideation only, but it predicted the differences between suicidal ideation only and suicide attempts in adolescence models, suggesting an increased risk of suicide attempts during adolescence but not in adulthood. In the adolescent path analysis models, neglect showed significant predictive patterns, with indirect effects through hopelessness to suicidal ideation. However, no significant pathways were found in the adult models.

These findings potentially indicate that the long-term impact of neglect on suicidality may be less pronounced compared to other forms of adversity. However, it should also be noted that the neglect-related variables in the Lehigh Longitudinal Study have shown a relatively weaker predictive power for adulthood negative outcomes compared to findings from other studies (T. I. Herrenkohl, personal communication, May 9, 2023). Nevertheless, neglect may affect children's development in a distinctive way compared to other forms of childhood adversities including child abuse (McLaughlin et al., 2020). A major feature of child neglect is the chronic environmental deprivation (e.g., insensitive and unsupportive caregiving) that can occur at an early age. This deprivation can lead to children's poor cognitive ability because of

less interaction with and fewer learning opportunities from caregivers (McLaughlin et al., 2017). Defective cognitive ability may result in increased suicidal risk due to incapacity to exercise appropriate problem-solving skills, and maladaptive cognitions such as rumination (Miranda et al., 2013).

Low socioeconomic status (SES)

Low socioeconomic status (SES) stood out as a distinctive factor among other forms of childhood adversity, as it was more strongly associated with suicide attempts rather than suicidal ideation during both adolescence and adulthood. While this trend was not clearly evident in the binary logistic regression models, it became apparent in the multinomial logistic regression and path analysis models, particularly in the adult models. Low SES was found to be significantly linked to suicide attempts, rather than suicidal ideation only. This distinctiveness was further supported by the results of the multinomial logistic regression models, which showed that low SES had a significant association with suicide attempts across most of the adolescent and adult analyses. Additionally, all of the path analysis models, both for adolescence and adulthood, demonstrated significant direct pathways connecting low SES to suicide attempts, indicating a higher likelihood of engaging in suicidal actions among individuals with low SES when compared to other forms of adversity.

The observed direct relationship between low socioeconomic status (SES) and suicide attempts challenges the theoretical assumption that low SES would primarily be associated with suicidal ideation, mediated by hopelessness. The understanding of this relationship in the field remains incomplete, and further research is needed to elucidate the underlying mechanisms explaining why low SES is more closely linked to suicide attempts rather than suicide ideation.

This complexity arises due to the multifaceted nature of the low SES construct. The association between social disadvantage and suicidality can be attributed to various factors, including limited access to mental health services, increased exposure to chronic stressors, and limited social support networks.

Additionally, the cumulative or additive effect of multiple adversities experienced within socially disadvantaged contexts may further exacerbate the risk of suicidal behaviors. Although this study did not examine interactions between maltreatment types and low SES, incorporating the interaction terms into the binary or multinomial logistic regression models could have potentially improved the model fit. Understanding the complex interplay between socio-economic factors and suicidality is essential for developing targeted interventions and public health strategies aimed at reducing the burden of suicide among marginalized populations.

6.2 Limitations of the Study

This dissertation is subject to several important limitations that warrant consideration. Firstly, it is essential to acknowledge that the study design is observational, precluding the establishment of causal relationships between child adversity, hopelessness, suicidal ideation, and suicide attempts. While the findings provide valuable insights into the associations between these variables, caution must be exercised in interpreting them as causal in nature.

Despite the utilization of a longitudinal design, the temporal sequencing of measures is not fully assured. Although the measures capturing child maltreatment experiences are centered on the period of childhood, it is important to note that some of the mediators and outcome measures largely encompass the adolescent phase. Consequently, potential temporal overlap and

ambiguity arise when attempting to establish the sequencing between specific child maltreatment subtypes, adolescent hopelessness, suicidal ideation, and suicide attempts.

It is also crucial to acknowledge that most of the measures, with the exception of childhood low SES, rely on retrospective self-report data. While efforts were made to minimize biases and enhance accuracy, retrospective recall introduces the possibility of memory distortions or subjective interpretations of past experiences, particularly regarding maltreatment and suicidality. Still, it is important to note that retrospective measures related to childhood adversity or suicidality are not inherently less valid than prospective measures based on previous studies that compared reliability or validity of these research methods (Baldwin et al., 2019; Mazza et al., 2011).

Moreover, ideally, various forms of suicidal ideation, such as passive ideation, active ideation, or plans, as well as different types of suicide attempts, including less lethal versus more lethal attempts, would have offered a deeper understanding of the development of suicidal thoughts and behavior (Van Orden et al., 2010). However, due to data limitations, the dissertation focused solely on the dichotomy of ideation and attempts. Based on the two suicidal outcomes, the dissertation also derived two mutually exclusive categories: individuals with suicidal ideation only (without suicide attempts) and those who attempted suicide. In future studies it might be beneficial to include additional categories beyond this dichotomy to capture a more comprehensive picture. For example, in the sample, approximately 11% (9 out of 85 cases) of lifetime suicide attempters reported no prior suicidal ideation. With a larger sample size, it would have been possible to test suicidal attempts without prior contemplation of suicide as a distinct group, separate from the groups of suicidal ideation only and suicide attempt with ideation. Individuals may attempt suicide even without experiencing suicidal ideation or making

plans for suicide (Bertolote et al., 2005). A recent US population-based study among adolescents also highlighted that Black and male youth were more likely to attempt suicide without prior thoughts or plans than to attempt suicide with ideation or experience suicidal ideation without attempting suicide (Romanelli et al., 2022). This underscores the importance of studying suicide attempts without thoughts or plans to gain a more complete understanding of suicidal behavior.

Another limitation of this study is the lack of information within the dataset for study participants who died during the study period. The Lehigh Longitudinal Study data did not contain information about suicidal deaths, preventing their inclusion in the analysis. Although there were no significant demographic differences between the participants who dropped out and those in the final follow-up sample, it remains unknown how many dropouts may have been involved in suicidal deaths within the final follow-up sample. Efforts were made by the principal investigator and researchers of the Lehigh Longitudinal Study to document information about deceased dropouts—approximately 3% of the original sample—by the 2010 wave (Adult wave 1). However, the researchers were unable to identify suicidal death cases despite conducting searches of online sources, newspaper articles, and other relevant records to ascertain the cause of death (T. I. Herrenkohl, personal communication, July 28, 2023). Given that this study utilized a combined follow-up sample from both adult wave 1 (ended in 2010) and adult wave 2 (ended in 2020), it is plausible that there may be cases of individuals who died between the adult waves 1 and 2, potentially due to suicide. Unfortunately, due to the unavailability of data on suicidal deaths, the study was unable to consider and analyze such cases, presenting a limitation in the comprehensiveness of the findings.

Lastly, it is worth noting that the study sample was derived from a specific population and setting, which may restrict the generalizability of the findings to broader contexts. For

example, the predominant representation of individuals from White ethnic backgrounds within the study sample restricts the generalizability of the findings, cautioning against extrapolating the results to other racial and ethnic groups. It is crucial to recognize that cultural variations in the relationship between child maltreatment, childhood socioeconomic status (SES), suicidal ideation, and suicide attempts may exist across diverse populations. Additionally, the data were sampled from a high-risk population, originally comprising several subsets: families with child welfare involvement and matched groups. Subsequent analyses of the complete sample from the school-age wave revealed that over 65% of children in the total sample experienced being hit so as to bruise according to parent reports (Herrenkohl et al., 1991). Therefore, caution should be exercised when applying the results to populations outside of this specific context.

6.3 Implications for Practice, Policy, and Future Research

Despite the limitations, the findings of this dissertation have significant implications for practice, policy, and future research. By providing valuable insights into the intricate connections among childhood adversity, hopelessness, suicidal ideation, and suicide attempts, this study sheds light on previously unexplored aspects of these phenomena. The unique contribution of this research lies in its pioneering nature, being one of the first to examine the effects of multiple forms of child maltreatment and low childhood socioeconomic status on suicide risk in both adolescence and adulthood using a single longitudinal sample. These insights offer a foundation for developing targeted interventions, informing policy changes, and guiding future research endeavors to better understand and address the complexities of suicidality in individuals who have experienced childhood adversity.

Implications for practice

Increasing awareness and knowledge among mental health and child welfare professionals regarding the impact of childhood traumatic events on suicidal ideation and suicide attempts, particularly during adolescence and early adulthood, has significant implications for practice and intervention. The data from the current study revealed that around 75% of participants who attempted suicide reported their first suicidal attempt occurring before adulthood. This finding underscores the significance of early intervention and support for at-risk individuals. By recognizing the potential link between any type of childhood trauma and suicidality, mental health and child welfare professionals can implement more targeted and comprehensive screening protocols to identify young individuals who may require immediate intervention and support, and inform the development and implementation of evidence-based interventions.

For child welfare professionals, it is crucial to understand that the timeliness of professional intervention in the aftermath of childhood maltreatment is correlated with a decrease in the occurrence of lifetime suicide attempts among young individuals (Plunkett et al., 2001). Initiating intervention efforts with maltreated youth at the earliest opportunity is of utmost importance. By intervening early, we have the opportunity to positively shape their trajectory towards improved well-being and resilience (Cui et al., 2020; Russotti et al., 2021). Early interventions can provide crucial support and resources to help these youth heal from the trauma of maltreatment, develop coping mechanisms, and build a strong foundation for their future mental health and suicide prevention. By addressing the underlying factors associated with maltreatment and providing appropriate interventions, we can empower children to overcome adversity and thrive.

While interventions that effectively help youth recover from child maltreatment exist, such home visiting programs, trauma-focused cognitive-behavioral therapies, and mindfulness therapies (Chaffin & Friedrich, 2004; Joss & Teicher, 2021), specific clinical techniques for preventing suicidal behavior are not emphasized and practice science for suicide prevention appears to be under-developed (Miller et al., 2013). Fortunately, there are a few existing interventions that have demonstrated efficacy in treating childhood abuse and suicidal behavior such as therapies with cognitive-behavioral intervention approaches (Barbe et al., 2004; Spirito et al. 2012; Miller et al., 2013). These interventions, primarily cognitive-behavioral in nature, offer a promising treatment approach for young individuals who have experienced childhood trauma and concurrently exhibit suicidal behavior by targeting distorted cognitive processes and maladaptive behaviors resulting from childhood trauma, thereby addressing the underlying factors contributing to the onset of suicidal behavior (Miller et al., 2013).

Moreover, while the findings of mechanisms between a specific maltreatment type and suicidality type in this study are preliminary and further evidence is required to establish their associations, they can still inform practitioners' awareness and intervention approaches. For instance, if practitioners are informed about the specific link between physical abuse and suicidal attempt, they can be more vigilant in recognizing signs of suicidal risk when working closely with clients who have experienced this form of childhood trauma. This knowledge can guide practitioners in implementing practices aimed at mitigating the risk of suicidal ideation (not only suicide attempt) and promoting the well-being of individuals primarily affected by childhood physical abuse. This may involve trauma-focused therapies, such as trauma-focused cognitive-behavioral therapy (TF-CBP), or eye movement desensitization and reprocessing (EMDR), which have demonstrated effectiveness in reducing trauma-related symptoms originated from

physical abuse (Lewey et al., 2018). At the same time, the practitioner may also prepare for reducing the risk of suicide attempt by implementing safety planning, crisis intervention, and emotion regulation techniques.

Lastly, incorporating the assessment of hopelessness as a potential mediator in suicide risk assessment and intervention planning holds significant implications for child welfare and mental health services working with individuals struggling with childhood trauma. Hopelessness is widely recognized as a prominent psychological risk factor for suicide, and its significance in clinical practice and assessment has been emphasized among practicing psychologists, where hopelessness was consistently identified as the primary psychological risk factor and deemed critically important (Brown et al., 2004; Peruzzi & Bongar, 1999). By systematically assessing and monitoring levels of hopelessness, mental health and child welfare professionals can identify individuals who may be at higher risk and tailor intervention strategies accordingly. Additionally, the incorporation of hopelessness assessment can aid in treatment planning by identifying individuals who may benefit from interventions focused on fostering hope, resilience, and the development of coping strategies.

Implications for policy

On a very fundamental level, efforts should focus on upstream suicide prevention by eliminating or decreasing risk factors for child maltreatment in the first place: policies targeting the prevention of child maltreatment are crucial for reducing suicide rates among young individuals (Duprey et al., 2022). There is a need for greater funding to support research on evidence-based child maltreatment prevention services, as championed by EndCAN, the National Research Agenda for a 21st Century Child and Family Well-being System, Prevent

Child Abuse America, the Kempe Center, and other groups. A wide range of possibilities in multiple prevention levels exist from primary/universal (e.g. early childhood education, school-based, and community-based programs) through secondary/selective (e.g. home visitation and parent education/management programs) to tertiary/indicated prevention (e.g. direct practices from mental health and child welfare services) approaches (Jones Harden et al., 2020).

Furthermore, policies should be developed to ensure accessible and affordable mental health care, including suicide prevention services, for underserved populations, including families and youth involved with child welfare services (Duprey et al., 2022). Specific attention should be given to socioeconomically vulnerable populations. Evidence suggests that young adults with a low educational level are less likely to obtain mental health treatment (Tang et al., 2022). Because many of the reasons for not seeking mental health services during adolescence are linked to socio-economic resources, it is important to investigate the socioeconomic disparities in healthcare and medication usage among adolescents and young adults who are at risk of suicide at a population level (Reardon et al., 2017).

It is also crucial to improve culturally sensitive community-based services and enact legislation that facilitates easier access to behavioral healthcare for these vulnerable populations. When it comes to preventing youth suicide, schools can play a vital role in community-level prevention efforts. Although schools are not typically tasked with being the main providers of mental health services (Brock & Louvar Reeves, 2018), it is crucial to dedicate resources to establish preventive measures within educational institutions. These measures may involve school-based risk assessment and mental health screening, fostering collaborative partnerships with families and community resources, and implementing trauma-informed training and interventions (O'Neill et al., 2021). There have been many successful cases of school-based

suicide prevention programs that reduced adolescent suicidal thoughts and behaviors (Walsh et al., 2022). However, it is also essential to acknowledge that youth who have experienced abuse and neglect face an increased risk of dropping out of school, necessitating community-based interventions and supports that are not school-based. Ultimately, collaboration between different sectors is necessary to integrate preventative mental health services for youth with maltreatment histories, including those involved with CPS and the foster care system. Public and private organizations both have a role to play in strengthening services and resources available to youth and families with maltreatment histories in order to prevent suicidal thoughts and behaviors.

Implications for Future Research

Using a longitudinal sample spanning several decades, this study explored how various types of child maltreatment and low socioeconomic status in childhood impact the risk of suicide during both adolescence and adulthood. Given that this approach allows for an examination of the influence of childhood adversity on suicidality through a life course perspective, it is necessary to replicate or adopt similar methodologies to validate and reinforce the findings obtained from this dissertation, particularly in more diverse populations. It is also crucial to investigate the disparities in suicidality and their connection to childhood adversity within minority racial/ethnic groups, including Black and American Indian/Alaskan Native populations, as well as sexual/gender minority groups. These populations have long suffered social and systemic marginalization, which may contribute to increased risk factors for suicidality. By examining the specific experiences and challenges faced by these minority groups, we can gain a deeper understanding of the complex interplay between childhood adversity, societal factors, and suicidality. Such investigations can inform the development of culturally sensitive interventions

and support systems that address the unique needs of these populations, ultimately reducing disparities in suicidality and promoting mental well-being for all individuals. Additionally, exploring the intersectionality of identities within these groups, such as being both a racial/ethnic minority and a sexual/gender minority, is essential for a comprehensive understanding of the factors influencing suicidality and tailoring prevention strategies accordingly.

Further investigation is warranted to explore other mediators or moderators that can provide a more comprehensive understanding of the relationship between child maltreatment, low socioeconomic status, hopelessness, and suicidality. In the present dissertation, certain constructs that may have a close relationship with child maltreatment and suicidality were not included in order to maintain parsimonious and testable models although these constructs are considered as potential psychosocial mediators or moderators. Examples of these constructs include attachment style, rumination, emotional regulation, impulsivity, aggression, substance dependency, internalizing and/or externalizing symptoms, and social engagement or social support (Borges et al., 2000; Brodsky et al., 2001; Cui, et al., 2019; Duprey et al., 2020; Hatkevich et al., 2021; Stagaki et al., 2022; Wilson et al., 2021)

It is also imperative to expand the investigation beyond the realm of psychosocial evidence and explore factors from multidisciplinary domains. For example, despite both empirical and theoretical evidence supporting the investigation of biological mechanisms and moderators in the context of child maltreatment, very few studies have explored these aspects (Cicchetti et al., 2010; Miller & Prinstein, 2019). Similarly, there is a lack of research examining contextual processes, such as involvement with child welfare services and neighborhood factors, in relation to the association between child maltreatment and youth suicidal thoughts and behaviors (Duprey et al., 2022). Therefore, future studies would need to explore concurrent or

interacting multi-level mechanisms, encompassing interpersonal, psychological, and biological factors, in the link between child maltreatment and suicidality (Duprey et al., 2022).

Moreover, while this dissertation primarily examined the impact of individual adversity types on suicidality, a deeper exploration of adversity patterns could enhance our understanding of the relationship between childhood adversity and suicidality. For instance, it is essential to recognize that various forms of childhood maltreatment often co-occur (Finkelhor, Ormrod, & Turner, 2007; Herrenkohl & Herrenkohl, 2009), leading to overlapping effects that cannot be easily captured through manifest variable methods. To address this, different methodological approaches such as latent class analysis or latent profile analysis would be valuable in analyzing data related to child abuse and neglect. These methods can effectively identify and group individuals who exhibit similar responses to a set of observed variables, allowing for a more comprehensive examination of the complex interplay between childhood adversity and its impact on suicidal tendencies.

In addition, a more in-depth analysis is required to investigate factors that distinguish suicidal ideation from suicide attempts. Differentiating between suicidal ideation and suicide attempts is crucial as the majority of individuals with suicidal thoughts do not go on to make suicide attempts (Nock et al., 2008; Klonsky et al., 2018). Accordingly, the findings from this dissertation underscore the significance of distinguishing between groups experiencing suicidal ideation only and those with suicide attempts. Prior research suggests that well-known risk factors commonly associated with suicide may primarily relate to suicidal ideation rather than the progression to suicide attempts (Klonsky et al., 2018). Therefore, further studies with larger samples and larger diversity are required to explore factors that help distinguish between suicidal ideation and attempts.

Finally, it is also important to investigate factors that suggest shared, unobserved attributes between suicidal ideation and suicide attempts. Statistical methods capable of capturing these common unobserved attributes, such as the nested logit model, might be more suitable for this purpose. While the current dissertation utilized multinomial logistic regression as one of its primary analyses, this approach may not fully account for potential correlations or clustering patterns between suicidal ideation and attempt groups. For this purpose, the nested logit model proves beneficial in creating sets of correlated alternatives, known as nests, which exhibit underlying similarities and are more likely to be chosen together (Wen & Koppelman, 2001). This modeling approach would allow for a more comprehensive understanding of the intricate relationships between various facets of suicidal behavior.

6.4 CONCLUSION

In conclusion, this study examined the associations between childhood maltreatment, parental socio-economic status, and suicidal ideation. The findings indicate that individuals who have experienced child maltreatment and come from a low childhood socioeconomic status face an elevated risk of both suicidal ideation and suicide attempts compared to those without such experiences, and most of these associations are mediated by hopelessness. Besides, certain types of childhood adversity, specifically physical abuse, sexual abuse, and low childhood socioeconomic status, show strong evidence of their direct associations with either suicidal ideation or suicide attempts, even after accounting for various other factors. Although there is substantial evidence indicating that adolescence is a particularly vulnerable period affected by childhood adversities, it is important to note that adulthood also exhibits many forms of significant childhood adversity associated with either suicidal ideation or suicide attempt.

The identified significant links between child maltreatment, hopelessness, and suicidality, highlights the importance of addressing these factors in child maltreatment and suicide prevention efforts. The limitations of the study were acknowledged, and recommendations for future research, policy, and practice were provided. Overall, the findings and limitations discussed in this study highlight the complexity of suicidal behavior and emphasize the need for a comprehensive approach to suicide research and prevention. Suicide is a multifaceted issue influenced by numerous factors, such as mental health, social support, and coping mechanisms. Understanding the nuances of suicidal ideation and behavior is essential for developing effective strategies to identify and support at-risk individuals and ultimately reduce the incidence of suicide. Further research is crucial to gain a more comprehensive understanding of these complex phenomena and guide evidence-based interventions.

REFERENCES

Abramson, L. Y., Alloy, L. B., Hogan, M. E., Whitehouse, W. G., Cornette, M., Akhavan, S., & Chiara, A. (1998). Suicidality and cognitive vulnerability to depression among college students: A prospective study. *Journal of Adolescence*, *21*(4), 473-487.

Abramson, L. Y., Metalsky, G. I., & Alloy, L. B. (1989). Hopelessness depression: A theory-based subtype of depression. *Psychological review*, *96*(2), 358.

Allin, H., Wathen, C. N., & MacMillan, H. (2005). Treatment of child neglect: A systematic review. The Canadian Journal of Psychiatry, 50(8), 497-504.

Andrews, J. A., & Lewinsohn, P. M. (1992). Suicidal attempts among older adolescents: prevalence and co-occurrence with psychiatric disorders. *Journal of the American Academy of Child & Adolescent Psychiatry*, *31*(4), 655-662.

Angelakis, I., Austin, J. L., & Gooding, P. (2020). Association of childhood maltreatment with suicide behaviors among young people: a systematic review and meta-analysis. *JAMA network open*, *3*(8), e2012563-e2012563.

Angelakis, I., Gillespie, E. L., & Panagioti, M. (2019). Childhood maltreatment and adult suicidality: a comprehensive systematic review with meta-analysis. *Psychological medicine*, *49*(7), 1057-1078.

Afifi, T. O., Boman, J., Fleisher, W., & Sareen, J. (2009). The relationship between child abuse, parental divorce, and lifetime mental disorders and suicidality in a nationally representative adult sample. Child Abuse & Neglect, 33(3), 139-147.

Arata, C. M., Langhinrichsen-Rohling, J., Bowers, D., & O'Brien, N. (2007). Differential correlates of multi-type maltreatment among urban youth. *Child abuse & neglect*, *31*(4), 393-415.

Bagozzi, R. P., & Yi, Y. (2012). Specification, evaluation, and interpretation of structural equation models. *Journal of the academy of marketing science, 40*, 8-34.

Baldwin, J. R., Reuben, A., Newbury, J. B., & Danese, A. (2019). Agreement between prospective and retrospective measures of childhood maltreatment: a systematic review and meta-analysis. *JAMA psychiatry*, *76*(6), 584-593.

Bandalos, D. L. (2014). Relative performance of categorical diagonally weighted least squares and robust maximum likelihood estimation. *Structural Equation Modeling: a multidisciplinary journal*, *21*(1), 102-116.

Barbe, R. P., Bridge, J., Birmaher, B., Kolko, D., & Brent, D. A. (2004). Suicidality and its relationship to treatment outcome in depressed adolescents. *Suicide and Life-Threatening Behavior*, *34*(1), 44-55.

Barzilay, R., Moore, T. M., Calkins, M. E., Maliackel, L., Jones, J. D., Boyd, R. C., ... & Gur, R. E. (2021). Deconstructing the role of the exposome in youth suicidal ideation: Trauma, neighborhood environment, developmental and gender effects. *Neurobiology of stress*, *14*, 100314.

Beck, A. T., Kovacs, M., & Weissman, A. (1975). Hopelessness and suicidal behavior: An overview. *Journal of the American Medical Association*, *234*(11), 1146-1149.

Beck, A. T. (1996). Beyond belief: A theory of modes, personality, and psychopathology. In P. M. Salkovskis (Ed.), *Frontiers of cognitive therapy* (pp. 1–25). The Guilford Press.

Beck, A. T., Weissman, A., Lester, D., & Trexler, L. (1974). The measurement of pessimism: The Hopelessness Scale. *Journal of Consulting and Clinical Psychology*, *42*(6), 861–865. https://doi.org/10.1037/h0037562

Bertolote, J. & Wasserman. (2021). *Development of definitions of suicidal behaviours*. In Wasser

man, D. (Ed.) Oxford textbook of suicidology and suicide prevention, (2nd ed., pp. 87-91). Oxford University Press.

Berardelli, I., Sarubbi, S., Rogante, E., Erbuto, D., Giuliani, C., Lamis, D. A., ... & Pompili, M. (2022). Association between childhood maltreatment and suicidal ideation: a path analysis study. *Journal of clinical medicine*, *11*(8), 2179.

Borges, G., Nock, M. K., Abad, J. M. H., Hwang, I., Sampson, N. A., Alonso, J., ... & Kessler, R. C. (2010). Twelve-month prevalence of and risk factors for suicide attempts in the World Health Organization World Mental Health Surveys. *The Journal of clinical psychiatry*, *71*(12), 21777.

Borges, G., Walters, E. E., & Kessler, R. C. (2000). Associations of substance use, abuse, and dependence with subsequent suicidal behavior. *American journal of epidemiology*, *151*(8), 781-789.

Brent, D. A., Perper, J. A., Moritz, G., Liotus, L., Schweers, J., Balach, L., & Roth, C. (1994). Familial risk factors for adolescent suicide: a case-control study. Acta *Psychiatrica Scandinavica*, 89(1), 52-58.

Brodsky, B. S., Oquendo, M., Ellis, S. P., Haas, G. L., Malone, K. M., & Mann, J. J. (2001). The relationship of childhood abuse to impulsivity and suicidal behavior in adults with major depression. *American Journal of Psychiatry*, *158*(11), 1871-1877.

Brock, S. E., & Louvar Reeves, M. A. (2018). School suicide risk assessment. *Contemporary School Psychology*, *22*, 174-185.

Brown, L. M., Bongar, B., & Cleary, K. M. (2004). A Profile of Psychologists' Views of Critical Risk Factors for Completed Suicide in Older Adults. *Professional Psychology: Research and Practice*, *35*(1), 90.

Brown, J., Cohen, P., Johnson, J. G., & Smailes, E. M. (1999). Childhood abuse and neglect: Specificity and effects on adolescent and young adult depression and suicidality. *Journal of the American Academy of Child & Adolescent Psychiatry*, 38, 1490–1496.

Bryant, S. L., & Range, L. M. (1997). Type and severity of child abuse and college students' lifetime suicidality. Child Abuse & Neglect, 21(12), 1169-1176.

Canetto, S. S. (1997). Meanings of gender and suicidal behavior during adolescence. *Suicide and Life-Threatening Behavior*, *27*(4), 339-351.

Canetto, S. S., & Sakinofsky, I. (1998). The gender paradox in suicide. Suicide and *Life-Threatening Behavior*, *28*(1), 1-23.

Chaffin, M., & Friedrich, B. (2004). Evidence-based treatments in child abuse and neglect. *Children and youth services review*, *26*(11), 1097-1113.

Chen, P. J., Mackes, N., Sacchi, C., Lawrence, A. J., Ma, X., Pollard, R., ... & Dazzan, P. (2022). Parental education and youth suicidal behaviours: a systematic review and meta-analysis. *Epidemiology and psychiatric sciences*, *31*, e19.

Center for Disease Control and Prevention. (August 14, 2023). Fatal injury trends [Provisional and Final Fatal Injury Data by Month, United States]. Retrieved from https://www.cdc.gov/injury/wisqars/fatal/trends.html

Child Welfare Information Gateway. (2019). *Long-term consequences of child abuse and neglect.* Retrieved from https://www.childwelfare.gov/pubPDFs/long_term_consequences.pdf

Cicchetti, Dante, & Toth, S. L. (2005). Child maltreatment. Annual Review of Clinical Psychology, 1(1), 409-438.

Cicchetti, D., Rogosch, F. A., Sturge-Apple, M., & Toth, S. L. (2010). Interaction of child maltreatment and 5-HTT polymorphisms: Suicidal ideation among children from low-SES backgrounds. *Journal of pediatric psychology*, *35*(5), 536-546.

Courtney, E. A., Johnson, J. G., & Alloy, L. B. (2008). Associations of childhood maltreatment with hopelessness and depression among adolescent primary care patients. *International Journal of Cognitive Therapy*, *1*(1), 4-17.

Cui, Y., Kim, S. W., Lee, B. J., Kim, J. J., Yu, J. C., Lee, K. Y., ... & Chung, Y. C. (2019). Negative schema and rumination as mediators of the relationship between childhood trauma and recent suicidal ideation in patients with early psychosis. *Journal of Clinical Psychiatry*, *80*(3), 11438.

Cui, Z., Oshri, A., Liu, S., Smith, E. P., & Kogan, S. M. (2020). Child maltreatment and resilience: The promotive and protective role of future orientation. *Journal of youth and adolescence*, *49*, 2075-2089.

Dube, S. R., Anda, R. F., Felitti, V. J., Chapman, D. P., Williamson, D. F., & Giles, W. H. (2001). Childhood abuse, household dysfunction, and the risk of attempted suicide throughout the life span: findings from the Adverse Childhood Experiences Study. Journal of American Medical Association, 286(24), 3089-3096.

Duprey, E. B., Handley, E. D., Wyman, P. A., Ross, A. J., Cerulli, C., & Oshri, A. (2022). Child maltreatment and youth suicide risk: A developmental conceptual model and implications for suicide prevention. *Development and psychopathology*, 1-24. doi:10.1017/S0954579422000414

Duprey, E. B., Oshri, A., & Liu, S. (2020). Developmental pathways from child maltreatment to adolescent suicide-related behaviors: The internalizing and externalizing comorbidity

hypothesis. *Development and psychopathology*, *32*(3), 945–959. https://doi.org/10.1017/S0954579419000919

Evans, E., Hawton, K., & Rodham, K. (2004). Factors associated with suicidal phenomena in adolescents: a systematic review of population-based studies. *Clinical psychology review*, *24*(8), 957-979.

Fan, X., & Sivo, S. A. (2005). Sensitivity of fit indexes to misspecified structural or measurement model components: Rationale of two-index strategy revisited. *Structural Equation Modeling*, *12*(3), 343-367.

Fergusson, D. M., & Lynskey, M. T. (1995). Suicide attempts and suicidal ideation in a birth cohort of 16-year-old New Zealanders. *Journal of the American Academy of Child & Adolescent Psychiatry*, *34*(10), 1308-1317.

Fergusson, D. M., Horwood, L., & Lynskey, M. T. (1996). Childhood sexual abuse and psychiatric disorder in young adulthood: II. Psychiatric outcomes of childhood sexual abuse. *Journal of the American Academy of Child and Adolescent Psychiatry*, 35(10), 1365–1374.

Fergusson, D. M., Woodward, L. J., & Horwood, L. J. (2000). Risk factors and life processes associated with the onset of suicidal behaviour during adolescence and early adulthood. *Psychological medicine*, *30*(1), 23-39.

Finkelhor, D., Ormrod, R. K., & Turner, H. A. (2007). Poly-victimization: A neglected component in child victimization. *Child abuse & neglect*, *31*(1), 7-26.

Flora, D. B., & Curran, P. J. (2004). An empirical evaluation of alternative methods of estimation for confirmatory factor analysis with ordinal data. *Psychological methods*, *9*(4), 466.

Franklin, J. C., Ribeiro, J. D., Fox, K. R., Bentley, K. H., Kleiman, E. M., Huang, X., ... & Nock, M. K. (2017). Risk factors for suicidal thoughts and behaviors: A meta-analysis of 50 years of research. Psychological bulletin, 143(2), 187.

Gambaro, E., Mastrangelo, M., Sarchiapone, M., Marangon, D., Gramaglia, C., Vecchi, C., ... & Zeppegno, P. (2020). Resilience, trauma, and hopelessness: protective or triggering factor for the development of psychopathology among migrants?. *BMC psychiatry*, *20*(1), 1-15.

Garnett, M. F., Curtin, S. C., & Stone, D. M. (2022). Suicide mortality in the United States, 2000–2020. NCHS Data Brief, No. 433. National Center for Health Statistics. Retrieved from https://stacks.cdc.gov/view/cdc/114217

Gaylor, E. M., Krause, K. H., Welder, L. E., Cooper, A. C., Ashley, C., Mack, K. A., Crosby, A. E., Trinh, E., Ivey-Stephenson, A. Z., & Whittle, L. (2023). Suicidal Thoughts and Behaviors Among High School Students - Youth Risk Behavior Survey, United States, 2021. *MMWR supplements*, *72*(1), 45–54. https://doi.org/10.15585/mmwr.su7201a6

Gibb, B. E., Alloy, L. B., Abramson, L. Y., Rose, D. T., Whitehouse, W. G., Donovan, P., ... & Tierney, S. (2001). History of childhood maltreatment, negative cognitive styles, and episodes of depression in adulthood. *Cognitive Therapy and Research, 25*, 425-446.

Glowinski, A. L., Bucholz, K. K., Nelson, E. C., Fu, Q., Madden, P., Reich, W., & Heath, A. C. (2001). Suicide attempts in an adolescent female twin sample. *Journal of the American Academy of Child & Adolescent Psychiatry*, 40, 1300–1307.

Hatkevich, C., Sumlin, E., & Sharp, C. (2021). Examining associations between child abuse and neglect experiences with emotion regulation difficulties indicative of adolescent suicidal ideation risk. *Frontiers in psychiatry, 12*, 630-697.

Herrenkohl, R. C., Herrenkohl, E. C., Egolf, B. P., & Wu, P. (1991). The developmental consequences of child abuse: The Lehigh longitudinal study. In *The Effects of child abuse and neglect: issues and research*. (pp. 57-81). Guilford.

Herrenkohl, R. C., & Herrenkohl, T. I. (2009). Assessing a child's experience of multiple maltreatment types: Some unfinished business. *Journal of family violence*, *24*(7), 485-496.

Herrenkohl, T. I., Hong, S., Klika, J. B., Herrenkohl, R. C., & Russo, M. J. (2013). Developmental impacts of child abuse and neglect related to adult mental health, substance use, and physical health. *Journal of family violence*, *28*(2), 191-199.

Herrenkohl, T. I., Jung, H., Klika, J. B., Mason, W. A., Brown, E. C., Leeb, R. T., & Herrenkohl, R. C. (2016). Mediating and moderating effects of social support in the study of child abuse and adult physical and mental health. *American journal of orthopsychiatry*, *86*(5), 573.

Hjelmeland, H., & Loa Knizek, B. (2020). The emperor's new clothes? A critical look at the interpersonal theory of suicide. *Death studies*, *44*(3), 168-178.

Hu, L. T., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological methods*, *3*(4), 424.

Ivey-Stephenson, A. Z., Demissie, Z., Crosby, A. E., Stone, D. M., Gaylor, E., Wilkins, N., Lowry, R., & Brown, M. (2020). Suicidal Ideation and Behaviors Among High School Students - Youth Risk Behavior Survey, United States, 2019. *MMWR supplements*, *69*(1), 47–55. https://doi.org/10.15585/mmwr.su6901a6

Joiner, T. E. (2005). *Why people die by suicide*. Cambridge, MA: Harvard University Press.

Joiner, T. E., Sahs-Ericsson, N. J., Wingate, L. R., Brown, J. S., Anestis, M. D., & Selby, E. A. (2007). Childhood physical and sexual abuse and lifetime number of suicide attempts: A persistent and theoretically important relationship. *Behaviour Research and Therapy*, *45*(3), 539-547.

Jones Harden, B., Simons, C., Johnson-Motoyama, M., & Barth, R. (2020). The child maltreatment prevention landscape: Where are we now, and where should we go?. *The ANNALS of the American Academy of Political and Social Science*, *692*(1), 97-118.

Joss, D., & Teicher, M. H. (2021). Clinical effects of mindfulness-based interventions for adults with a history of childhood maltreatment: a scoping review. *Current treatment options in psychiatry*, *8*(2), 31–46. https://doi.org/10.1007/s40501-021-00240-4

Kline, T. J. (2005). *Psychological testing: A practical approach to design and evaluation.* SAGE Publications, Inc., https://doi.org/10.4135/9781483385693

Kline, R. B. (2012). Assumptions in structural equation modeling. In R. H. Hoyle (Ed.), *Handbook of structural equation modeling* (pp. 111–125). The Guilford Press.

Klonsky, E. D., Kotov, R., Bakst, S., Rabinowitz, J., & Bromet, E. J. (2012). Hopelessness as a predictor of attempted suicide among first admission patients with psychosis: a 10-year cohort study. *Suicide and Life-Threatening Behavior*, *42*(1), 1-10.

Klonsky, E. D., & May, A. M. (2015). The three-step theory (3ST): A new theory of suicide rooted in the “ideation-to-action” framework. *International Journal of Cognitive Therapy*, *8*(2), 114-129.

Klonsky, E. D., Saffer, B. Y., & Bryan, C. J. (2018). Ideation-to-action theories of suicide: a conceptual and empirical update. *Current opinion in psychology*, *22*, 38-43.

Koball, H., Moore, A., & Hernandez, J. (2021). Basic Facts about Low-Income Children: Children under 9 Years, 2019. *National Center for Children in Poverty*.

Kuo, W. H., Gallo, J. J., & Eaton, W. W. (2004). Hopelessness, depression, substance disorder, and suicidality: A 13-year community-based study. *Social psychiatry and psychiatric epidemiology*, *39*, 497-501.

Lewey, J. H., Smith, C. L., Burcham, B., Saunders, N. L., Elfallal, D., & O'Toole, S. K. (2018). Comparing the Effectiveness of EMDR and TF-CBT for Children and Adolescents: a Meta-Analysis. *Journal of child & adolescent trauma*, *11*(4), 457–472. https://doi.org/10.1007/s40653-018-0212-1

Li, C. H. (2021). Statistical estimation of structural equation models with a mixture of continuous and categorical observed variables. *Behavior Research Methods*, *53*(5), 2191-2213.

Lindström, M., & Rosvall, M. (2018). Economic stress in childhood and suicide thoughts and suicide attempts: a population-based study among adults. *Public health*, *163*, 42-45.

Lorthridge, J., McCroskey, J., Pecora, P. J., Chambers, R., & Fatemi, M. (2011). Strategies for improving child welfare services for families of color: First findings of a community-based initiative in Los Angeles. *Children and Youth Services Review*. 34, 281-288.

Mars, B., Heron, J., Klonsky, E. D., Moran, P., O'Connor, R. C., Tilling, K., ... & Gunnell, D. (2019a). What distinguishes adolescents with suicidal thoughts from those who have attempted suicide? A population-based birth cohort study. *Journal of child psychology and psychiatry*, *60*(1), 91-99.

Mars, B., Heron, J., Klonsky, E. D., Moran, P., O'Connor, R. C., Tilling, K., ... & Gunnell, D. (2019b). Predictors of future suicide attempt among adolescents with suicidal thoughts

or non-suicidal self-harm: a population-based birth cohort study. *The Lancet Psychiatry*, *6*(4), 327-337.

Mazza, J. J., Catalano, R. F., Abbott, R. D., & Haggerty, K. P. (2011). An examination of the validity of retrospective measures of suicide attempts in youth. *Journal of adolescent health*, *49*(5), 532–537. https://doi.org/10.1016/j.jadohealth.2011.04.009

McLaughlin, K. A., Colich, N. L., Rodman, A. M., & Weissman, D. G. (2020). Mechanisms linking childhood trauma exposure and psychopathology: a transdiagnostic model of risk and resilience. *BMC medicine*, *18*, 1-11.

McLaughlin, K. A., Sheridan, M. A., & Nelson, C. A. (2017). Neglect as a violation of species-expectant experience: neurodevelopmental consequences. *Biological psychiatry*, *82*(7), 462-471.

Miech, R. A., Caspi, A., Moffitt, T. E., Wright, B. R. E., & Silva, P. A. (1999). Low socioeconomic status and mental disorders: A longitudinal study of selection and causation during young adulthood. *American journal of Sociology*, *104*(4), 1096-1131.

Miller, A. B., Esposito-Smythers, C., & Leichtweis, R. N. (2015). Role of social support in adolescent suicidal ideation and suicide attempts. *Journal of Adolescent Health*, 56(3), 286-292.

Miller, A. B., Esposito-Smythers, C., Weismoore, J. T., & Renshaw, K. D. (2013). The relation between child maltreatment and adolescent suicidal behavior: a systematic review and critical examination of the literature. *Clinical child and family psychology review*, *16*(2), 146-172.

Miller, A. B., & Prinstein, M. J. (2019). Adolescent suicide as a failure of acute stress-response systems. *Annual review of clinical psychology*, *15*, 425-450.

Miranda, R., Valderrama, J., Tsypes, A., Gadol, E., & Gallagher, M. (2013). Cognitive inflexibility and suicidal ideation: Mediating role of brooding and hopelessness. *Psychiatry research, 210*(1), 174-181.

Meadows, L. A., & Kaslow, N. J. (2002). Hopelessness as mediator of the link between reports of a history of child maltreatment and suicidality in African American women. *Cognitive Therapy and Research, 26*(5), 657-674.

Molnar, B. E., Berkman, L. F., & Buka, S. L. (2001). Psychopathology, childhood sexual abuse and other childhood adversities: relative links to subsequent suicidal behaviour in the US. *Psychological medicine*, *31*(6), 965-977.

Muthén, B. (1997). 10. Latent variable modeling of longitudinal and multilevel data. *Sociological methodology*, *27*(1), 453-480.

Myers, J. E. (2008). A short history of child protection in America. Family law quarterly, 42(3), 449-463.

Nock, M. K., Borges, G., Bromet, E. J., Alonso, J., Angermeyer, M., Beautrais, A., ... & Williams, D. (2008). Cross-national prevalence and risk factors for suicidal ideation, plans and attempts. *The British journal of psychiatry*, *192*(2), 98-105.

O'Connor, R. C. (2011). Towards an integrated motivational–volitional model of suicidal behaviour. *International handbook of suicide prevention: Research, policy and practice*, 1, 181-98.

O'Neill, J. C., Goldston, D. B., Kodish, T., Yu, S. H., Lau, A. S., & Asarnow, J. R. (2021). Implementing trauma informed suicide prevention care in schools: Responding to acute suicide risk. *Evidence-Based Practice in Child and Adolescent Mental Health*, *6*(3), 379-392.

Pelkonen, M., Marttunen, M., Pulkkinen, E., Laippala, P., & Aro, H. (1997). Characteristics of out-patient adolescents with suicidal tendencies. *Acta Psychiatrica Scandinavica*, *95*(2), 100-107.

Peruzzi, N., & Bongar, B. (1999). Assessing risk for completed suicide in patients with major depression: Psychologists' views of critical factors. *Professional Psychology: Research and Practice*, *30*(6), 576.

Peterson, C., Miller, G. F., Barnett, S. B., & Florence, C. (2021). Economic Cost of Injury—United States, 2019. MMWR Morb Mortal Wkly Rep; 70:1655–1659. DOI: http://dx.doi.org/10.15585/mmwr.mm7048a1

Piscopo, K., Lipari, R. N., Cooney, J., & Glasheen, C. (2016). Suicidal thoughts and behavior among adults: Results from the 2015 National Survey on Drug Use and Health. *NSDUH data review*, *9*, 1-15.

Plunkett, A., O'Toole, B., Swanston, H., Oates, R. K., Shrimpton, S., & Parkinson, P. (2001). Suicide risk following child sexual abuse. *Ambulatory Pediatrics*, *1*(5), 262-266.

Reardon, T., Harvey, K., Baranowska, M., O'brien, D., Smith, L., & Creswell, C. (2017). What do parents perceive are the barriers and facilitators to accessing psychological treatment for mental health problems in children and adolescents? A systematic review of qualitative and quantitative studies. *European child & adolescent psychiatry*, *26*, 623-647.

Reinherz, H. Z., Giaconia, R. M., Silverman, A. B., Friedman, A., Pakiz, B., Frost, A. K., & Cohen, E. (1995). Early psychosocial risks for adolescent suicidal ideation and attempts. *Journal of the American Academy of Child & Adolescent Psychiatry*, *34*(5), 599-611.

Rehkopf, D. H., & Buka, S. L. (2006). The association between suicide and the socio-economic characteristics of geographical areas: a systematic review. *Psychological medicine*, *36*(2), 145-157.

Romanelli, M., Sheftall, A. H., Irsheid, S. B., Lindsey, M. A., & Grogan, T. M. (2022). Factors associated with distinct patterns of suicidal thoughts, suicide plans, and suicide attempts among US adolescents. *Prevention science*, *23*, 73-84. https://doi.org/10.1007/s11121-021-01295-8

Rose, D. T., & Abramson, L. Y. (1992). Developmental predictors of depressive cognitive style: Research and theory. In D. Cicchetti & S. L. Toth (Eds.), *Developmental perspectives on depression* (pp. 323–349). University of Rochester Press.

Roy, A. (2003). Distal risk factors for suicidal behavior in alcoholics: Replications and new findings. *Journal of Affective Disorders, 77*, 267–271.

Rudd, M. D. (2006). Fluid Vulnerability Theory: A Cognitive Approach to Understanding the Process of Acute and Chronic Suicide Risk. In T. E. Ellis (Ed.), *Cognition and suicide: Theory, research, and therapy* (pp. 355–368). American Psychological Association. https://doi.org/10.1037/11377-016

Russotti, J., Warmingham, J. M., Duprey, E. B., Handley, E. D., Manly, J. T., Rogosch, F. A., & Cicchetti, D. (2021). Child maltreatment and the development of psychopathology: The role of developmental timing and chronicity. *Child abuse & neglect*, *120*, 105215.

Rutter, S. B., Cipriani, N., Smith, E. C., Ramjas, E., Vaccaro, D. H., Martin Lopez, M., ... & Perez-Rodriguez, M. M. (2020). Neurocognition and the suicidal process. *Behavioral Neurobiology of Suicide and Self Harm*, 117-153.

Shneidman E. S. (1993). *Suicide as Psychache: A Clinical Approach to Self-destructive Behavio*

ur. Jason Aronson Inc., Northvale.

Soloff, P. H., Lynch, K. G., & Kelly, T. M. (2002). Childhood abuse as a risk factor for suicidal behavior in borderline personality disorder. *Journal of Personality Disorders*, 16, 201–214.

Spangenberg, L., Glaesmer, H., Hallensleben, N., Rath, D., & Forkmann, T. (2019). (In) stability of capability for suicide in psychiatric inpatients: longitudinal assessment using ecological momentary assessments. *Suicide and Life-Threatening Behavior*, *49*(6), 1560-1572.

Spokas, M., Wenzel, A., Stirman, S. W., Brown, G. K., & Beck, A. T. (2009). Suicide risk factors and mediators between childhood sexual abuse and suicide ideation among male and female suicide attempters. *Journal of Traumatic Stress*, *22*(5), 467-470.

Stagaki, M., Nolte, T., Feigenbaum, J., King-Casas, B., Lohrenz, T., Fonagy, P., ... & Personality and Mood Disorder Research Consortium. (2022). The mediating role of attachment and mentalising in the relationship between childhood maltreatment, self-harm and suicidality. *Child Abuse & Neglect*, 128, 105576.

Tang, S., Reily, N. M., Arena, A. F., Sheanoda, V., Han, J., Draper, B., Batterham, P. J., Mackinnon, A. J., & Christensen, H. (2022). Predictors of not receiving mental health services among people at risk of suicide: A systematic review. *Journal of Affective Disorders*, *301*, 172–188. https://doi.org/10.1016/j.jad.2022.01.054

Thompson, R., Litrownik, A. J., Isbell, P., Everson, M. D., English, D. J., Dubowitz, H., ... & Flaherty, E. G. (2012). Adverse experiences and suicidal ideation in adolescence: Exploring the link using the LONGSCAN samples. *Psychology of violence*, *2*(2), 211.

United Nations. (1981). *Report of the Secretary-General* (A/36/215). New York : UN. Retrieved from https://digitallibrary.un.org/record/21539

U.S. Department of Health & Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau. (2023). *Child Maltreatment 2021*. Available from https://www.acf.hhs.gov/cb/data-research/child-maltreatment.

Van Orden, K. A., Witte, T. K., Cukrowicz, K. C., Braithwaite, S. R., Selby, E. A., & Joiner Jr, T. E. (2010). The interpersonal theory of suicide. *Psychological review*, *117*(2), 575.

Walsh, E. H., McMahon, J., & Herring, M. P. (2022). Research review: the effect of school-based suicide prevention on suicidal ideation and suicide attempts and the role of intervention and contextual factors among adolescents: a meta-analysis and meta-regression. *Journal of child psychology and psychiatry*, *63*(8), 836-845.

Wen, C. H., & Koppelman, F. S. (2001). The generalized nested logit model. *Transportation Research Part B: Methodological*, *35*(7), 627-641.

Wilson, L. C., Newins, A. R., & Kimbrel, N. A. (2021). An examination of the interactive effects of different types of childhood abuse and perceived social support on suicidal ideation. *Children's health care*, *48*(4), 394-409.

Xia, Y., & Yang, Y. (2019). RMSEA, CFI, and TLI in structural equation modeling with ordered categorical data: The story they tell depends on the estimation methods. *Behavior research methods*, *51*, 409-428.

APPENDIX A

This is a description of the detailed Procedures to create suicide-related measures and hopelessness measures.

Suicidal ideation and suicide attempt:

- **Lifetime suicidal ideation** (a binary variable)

This variable was created from 8 items across the different waves, by combining four items from the adolescence wave and four items from the Adult wave I and II. The 8 items were combined into a binary variable (0=no suicidal ideation, 1=suicidal ideation).

- ✓ *Suicidal ideation reported in the Adolescent wave.* There were 4 items (self-report, parent report, and interviewer observation) that asked about suicidal ideation or observed suicidal expression of children in adolescence wave. These items were recoded and combined into a binary variable, as shown in Table 4.1 below.

Table A.1 Variable combining and Recoding Process: *Suicidal ideation reported in the Adolescent wave*

Question asked	**Report type**	**Categories in the original item**	**Recoded categories in the final variable**
I think about killing myself	Self report; Adolescent wave	0=not true; 1=somewhat or sometimes true; 2=very true or often true	0 → 0 (no ideation) 1 or 2 → 1 (ideation)
Suicidality (from Beck's Depression Inventory)	Self report; Adolescent wave	0=I don't have any thoughts of killing myself; 1=I have thoughts of killing myself, but I would not carry them out; 2=I would like to kill myself;	0 → 0 (no ideation) 1/2/3 → 1 (ideation)

Question asked	Report type	Categories in the original item	Recoded categories in the final variable
		3=I would kill myself if I had the chance.	
Talking about killing self	Parent report; Adolescent wave	0=not true; 1=somewhat or sometimes true; 2=very true or often true	0 → 0 (no ideation) 1 or 2 → 1 (ideation)
Talking about killing self	Interviewer report; Adolescent wave	0=item was not observed; 1=very slight or ambiguous occurrence; 2=definite occurrence with mild to moderate intensity; 3=definite occurrence with sever intensity	0 or 1 → 0 (no ideation) 2 or 3 → 1 (ideation)

- ✓ *Suicidal ideation reported in Adult waves.* There were 4 items (self report items) that asked about suicidal ideation or suicidal plan from the Adult waves I and II. These items were recoded and combined into a binary variable, as shown in Table 4.2 below.

Table A.2 Variable combining and Recoding Process: *Suicidal ideation reported in Adult waves*

Question asked	Report type	Categories in the original item	Recoded categories in the final variable
Suicidality (from Beck's Depression Inventory)	Self report; Adult wave I	1=I don't have any thoughts of killing myself; 2=I have thoughts of killing myself, but I would not carry them out; 3=I would like to kill myself; 4=I would kill myself if I had the chance.	1→ 0 (no ideation) 2/3/4 → 1 (ideation)
Have you seriously thought about committing suicide at any time in the past 12 months?	Self report; Adult wave I	1=Yes; 2=No	1 → 0 (no ideation) 2 → 1 (ideation)
Have you ever made a plan for	Self report; Adult wave I	1=Yes; 2=No	1 → 0 (no ideation) 2 → 1 (ideation)

committing suicide? (Adult wave I)			
Have you ever made a plan for committing suicide? (Adult wave II)	Self report; Adult wave II	1=Yes; 2=No	1 → 0 (no ideation) 2 → 1 (ideation)

If *Suicidal ideation reported in Adolescent wave* = 1 or *Suicidal ideation reported in Adult waves* = 1, a new binary variable "Lifetime Suicidal Ideation" was coded as 1. If *Suicidal ideation reported in Adolescent wave* = 0 and *Suicidal ideation reported in the Adult waves* = 0, the variable was coded as 0.

- Adolescent suicidal ideation (a binary variable)

This variable was created from 9 items across the different waves, by combining four items from the Adolescent wave, three items from the Adult wave 1, and two items from the Adult wave 2. The first four items were firstly combined as a binary variable, and the latter five were additionally combined to the binary variable.

- ✓ *Suicidal ideation reported in Adolescent wave.* (This is the same variable described in the lifetime suicidal ideation variable.)
- ✓ *Suicidal ideation before age 25.* Five items indicating the timing of suicidal ideation/plan from the Adult waves 1 and 2 were combined into a binary variable (0= no evidence of suicidal ideation before age 25; 1=suicidal ideation before age 25). These items specifically asked participants about the age of first and last suicidal ideation/plan experience throughout the Adult waves 1 & 2 as follows:

  *Age of the last time seriously thought about suicide in Adult 1

  *Age of the first time made plan for committing suicide in Adult 1

*Age of the last time made plan for committing suicide in Adult 1

*Age of the first time made plan for committing suicide in Adult 2

*Age of the last time made plan for committing suicide in Adult 2

If any participant cases indicated suicidal ideation experience started before age 25 among any of these items, those cases were treated as a valid case for suicidal ideation experience before age 25. If participant cases indicated no experiences of suicidal ideation or initial suicidal ideation experience at age 25 or later, their cases were treated as no experience of suicidal ideation before age 25. Eventually, if *Suicidal ideation reported in Adolescent wave* = 1 or *Suicidal ideation before age 25* = 1, a new binary variable "Adolescent Suicidal Ideation" was coded as 1. If *Suicidal ideation reported in Adolescent wave* = 0 and *Suicidal ideation before age 25* = 0, the variable was coded as 0.

Thus, the variable "Adolescent Suicidal Ideation" includes any indicated signs of suicidal ideation before age 25 across the entire waves of the Lehigh Longitudinal Study. Two reasons led to the choice of age 25 as the cutoff point for defining "Adolescent Suicidal Ideation." First, since the Lehigh Longitudinal Study includes cases up to age 23 in the Adolescent wave, the defined cutoff for the adolescent years in the study was set to be at least under age 24. Second, age 25 is a widely recognized cutoff point for distinguishing a youth from an adult for statistical purposes, particularly by the United Nations and its affiliated organizations (United Nations, 1981, p.15). Hence, this study chose to adopt the conventional age cutoff.

- Adulthood suicidal ideation (a binary variable)

This variable was created from 5 items from the Adult wave 1 and 2, by combining 2 items indicating recent suicidal ideation in the Adult wave 1 and the other 3 items indicating the age of suicidal ideation in the Adult waves 1 and 2.

- ✓ *Recent Suicidal ideation reported in Adult wave 1.* There were two items that asked about recent suicidal ideation in Adult wave 1. The two items were recoded and combined into a binary variable, as shown in Table 4.3 below.

Table A.3 Variable combining and Recoding Process: *Recent Suicidal ideation reported in Adult wave I*

Question asked	Report type	Categories in the Original item	Recoded Categories
Suicidality (from Beck's Depression Inventory)	Self report; Adult wave 1	1=I don't have any thoughts of killing myself; 2=I have thoughts of killing myself, but I would not carry them out; 3=I would like to kill myself; 4=I would kill myself if I had the chance.	1 → 0 (no ideation) 2/3/4 → 1 (ideation)
Have you seriously thought about committing suicide at any time in the past 12 months?	Self report; Adult wave 1	1=No; 2=Yes	1 → 0 (no ideation) 2 → 1 (ideation)

- ✓ *Suicidal ideation after age 25.* The same five items used for creating "*Suicidal ideation before age 25*" were combined into another binary variable (0=no evidence of suicidal ideation after age 25; 1=suicidal ideation after age 25):

  *Age of the last time seriously thought about suicide in Adult 1

  *Age of the first time made plan for committing suicide in Adult 1

*Age of the last time made plan for committing suicide in Adult 1

*Age of the first time made plan for committing suicide in Adult 2

*Age of the last time made plan for committing suicide in Adult 2

For participants who reported experiencing suicidal ideation or making a plan after the age 25 from the items above, their cases were considered as valid for the experience of suicidal ideation after age 25. Conversely, for participants who reported no experience of suicidal ideation, or who reported suicidal ideation before the age 25 but reported no experience of suicidal ideation after age 25, their cases were treated as having no experience of suicidal ideation after age 25.

The variable "Adult Suicidal Ideation" encompasses any indications of suicidal ideation after the age of 25 throughout all waves of the Lehigh Longitudinal Study. The decision to use age 25 as the cutoff point was based on the same criteria used to define "Adolescent Suicidal Ideation."

- Lifetime suicide attempt (a binary variable)

Lifetime suicide attempt was assessed by combining two items from the two Adult waves. The two items asked the same question of "Have you ever attempted suicide?" If a participant indicated "yes" in either of the two items, the new variable was coded as 1. If a participant indicated "no" in both of the two items without any "yes", the new variable was coded as 0. (0=301, 1=85, missing=71)

- Adolescent suicide attempt (a binary variable)

This variable was created from 4 items in the Adult waves 1 and 2. Four items indicating the timing of suicidal ideation/plan from the Adult waves 1 and 2 were combined into a binary variable (0= no evidence of initial suicide attempt before age 25; 1=suicide attempt before age 25). These items specifically asked participants about the age of first and last suicide attempt across the Adult waves 1 & 2 are as follow:

*Age of the first time suicide attempt in Adult 1

*Age of the last time suicide attempt in Adult 1

*Age of the first time suicide attempt in Adult 2

*Age of the last time suicide attempt in Adult 2

If any of the items above indicated that a participants initially attempted suicide before age 25, those cases were treated as the initial experience of suicide attempt before age 25. On the other hand, for cases indicating no experience of suicide attempt or for cases indicating initial suicide attempt after age 25, they were treated as no initial suicide attempt before age 25. This approach to the data resulted in the following distribution of cases: (0=320, 1=65, missing=72).

Note: Even though this variable was named as "adolescent suicide attempt," a total of 7 participants reported that they first attempted suicide before age 12. All of them reported re-attempting suicide after age 12, but only 3 out of the 7 reported that they last attempted suicide between age 12 and age 24. Thus, it was not sure whether 4 participants attempted suicide during adolescence.

- Adulthood suicide attempt (a binary variable)

The variable was created from the four items as below, and combined into another binary variable (0=no evidence of suicide attempt after age 25; 1=any suicide attempt after age 25).

*Age of the first time suicide attempt in Adult 1

*Age of the last time suicide attempt in Adult 1

*Age of the first time suicide attempt in Adult 2

*Age of the last time suicide attempt in Adult 2

In cases where any of the four items indicated that a participant had attempted suicide after age 25, it was treated as their experience of a suicide attempt after that age. The difference between this variable and the variable 'First Suicide Attempt in Adulthood' is that this variable does count the cases with suicide attempt experience before and in adulthood as a valid suicide attempt case, whereas the variable 'First Suicide Attempt in Adulthood' considers cases with initial suicide attempt in adulthood as a valid case. This approach to the data resulted in the following distribution of cases: (0=344, 1=41, missing=72).

- Lifetime suicidality (a 3-category variable; no suicidality-ideation only-attempt)

The variable was created from the two variables below, and combined into another binary variable (0=no evidence of suicidality; 1=suicide attempt; 2=suicidal ideation only).

*Lifetime suicide attempt

*Lifetime suicidal ideation

From the two variables, any indications of suicide attempt were coded as 1, any indications of suicidal ideation without any reports of suicide attempt were coded as 2, and all the rest of the valid cases were coded as 0. As the main analysis program, Mplus, treats the highest number in a categorical variable as a reference group for conducting a multinomial logistic regression, the 'suicidal ideation only' category was coded as 2, which is the reference group, in order to compare the group with the 'no suicidality' group and the 'suicide attempt' group. This approach

to the data resulted in the following distribution of cases: (0=232, 1=85, 2=69, missing=71).

- Adolescence suicidality (a 3-category variable; no suicidality-ideation only-attempt)

The variable was created from the two variables below, and combined into another binary variable (0=no evidence of suicidality; 1=suicide attempt; 2=suicidal ideation only).

*Adolescence suicide attempt

*Adolescence suicidal ideation

Categorization procedures were the same as the "Lifetime suicidality." This approach to the data resulted in the following distribution of cases: (0=240; 1=65; 2=63; missing=89).

- Adulthood suicidality (a 3-category variable; no suicidality-ideation only-attempt)

The variable was created from the two variables below, and combined into another binary variable (0=no evidence of suicidality; 1=suicide attempt; 2=suicidal ideation only).

*Adulthood suicide attempt

*Adulthood suicidal ideation

Categorization procedures were the same as the "Lifetime suicidality." This approach to the data resulted in the following distribution of cases: (0=284; 1=41; 2=32; missing=100).

Hopelessness:

- Adolescence hopelessness (a composite score variable from the Adolescent wave)

The variable was created by summing the 20 items of the Beck's Hopelessness Scale, measured in the Adolescent wave (BHS; Beck et al., 1974). BHS consists of 20 true-false items that evaluate the extent of negative expectations regarding the future. The list of the item statements is described below. Because the set of items include both positive and negative statements about the future, participant responses in the 9 items with positive statements (item #1, #3, #5, #6, #8, #10, #13, #15, #19) were reverse-coded. Afterwards, the 20 items were summed to create a hopelessness score. BHS items are as shown in Table 4.4 below.

Table A.4 Items of the Beck's Hopelessness Scale

Item #	Statements	Reverse-coding
1	I look forward to the future with hope and enthusiasm.	O
2	I might as well give up because there is nothing I can do about making things better for myself.	X
3	When things are going badly, I am helped by knowing that they cannot stay that way forever.	O
4	I can't imagine what my life would be like in ten years.	X
5	I have enough time to accomplish the things I want to do.	O
6	In the future, I expect to succeed in what concerns me most.	O
7	My future seems dark to me.	X
8	I happen to be particularly lucky, and I expect to get more of the good things in life than the average person.	O
9	I just can't get the breaks, and there's no reason I will in the future.	X
10	My past experiences have prepared me well for the future.	O
11	All I can see ahead of me is unpleasantness rather than pleasantness.	X
12	I don't expect to get what I really want.	X
13	When I look ahead to the future, I expect that I will be happier than I am now.	O
14	Things just don't work out the way I want them to.	X
15	I have great faith in the future.	O
16	I never get what I want, so it's foolish to want anything.	X
17	It is very unlikely that I will get any real satisfaction in the future.	X
18	The future seems vague and uncertain to me.	X
19	I can look forward to more good times than bad times.	O
20	There's no use in really trying to get something I want because I probably	X

Item #	Statements	Reverse-coding
	won't get it.	

- Adult hopelessness (a sum score variable from the Wave 4)

Adult hopelessness was assessed by summing the 20 items of BHS measured in the Adult wave I. The procedures used to create a sum score were consistent with those employed for measuring hopelessness during adolescence.

APPENDIX B

Table B.1 Correlations among childhood adversity

Adversity type	1	2	3	4
1. Physical Abuse	—			
2. Emotional Abuse	.64**	—		
3. Neglect	.39**	.39**	—	
4. Sexual Abuse	.19**	.23**	.30**	—
5. Low SES	.21**	.09	.26**	.18**

Note. **p<.01

Table B.2 Correlations between childhood adversity and mediators/outcomes

Outcome/Mediator/Moderator	Low SES	Physical Abuse	Emotional Abuse	Neglect	Sexual Abuse
Adolescence Hopelessness	.17**	.21**	.10*	.20**	.10*
Adulthood Hopelessness	.17**	.20**	.14**	.09	.15**
Lifetime Suicidal Ideation	.08	.15**	.16**	.11*	.26**
Adolescence Suicidal Ideation	.11*	.14**	.15**	.15**	.26**
Adulthood Suicidal Ideation	.09	.13*	.15**	.04	.22**
Lifetime Suicide Attempt	.23**	.21**	.21**	.21**	.32**
Adolescence Suicide Attempt	.20**	.25**	.23**	.21**	.28**
Adulthood Suicide Attempt	.15**	.13*	.18**	.10	.23**

Note. *p<.05; **p<.01

Moo-Hyun Kim, MSW, PhD *Curriculum Vitae*

EDUCATION

PhD **University of Washington, Social Work** Summer 2023

Dissertation: *Adolescent and Adult Suicidality as Consequences of Maltreatment Experience and Low Socio-Economic Status in Childhood*

MSW **Washington University in St. Louis, Social Work** May 2014

Research Specialization Independent Study: *Difference in child maltreatment referral rates between rural and urban areas*

BASW **University of Seoul, South Korea, Social Welfare** February 2009

SKILLS AND AREAS OF EXPERTISE

Quantitative Analysis

Structural equation modeling, event history analysis, multivariate analysis (factor analysis and latent class analysis), longitudinal analysis, generalized linear regression analysis (Software: R, SPSS, STATA, and MPlus)

Systematic Review with Meta-analysis

Meta-analysis and meta-regression (Software: R and Comprehensive Meta-Analysis)

Language

Korean (First Language), English (Fluent)

AWARDS, HONORS, GRANTS & FELLOWSHIPS

Boeing Endowed Fellowship, University of Washington Scholarship for minority graduate students who committed to research focused on providing effective services to diverse populations	2014-2015
Blalock Fellowship, Center for Statistics and the Social Sciences, University of Washington	2014-2015
Wayne Vasey Scholarship, School of Social Work, Washington University in St. Louis	2012-2014

Scholarships for Excellent Achievement, College of City Science **University of Seoul**	2006-2007

RESEARCH INTERESTS & EXPERIENCE

Interests

Risk and protective factors for child maltreatment and suicidality, Family-strengthening community-based program (Family Resource Center), Independent living programs for foster youth and emancipated youth

Experience

Return on Investment (ROI) Workgroup for Family Resource Centers (PI: Peter J. Pecora) *Research Analyst* at Casey Family Programs, Seattle Conducted systematic review and meta-analysis on the effect of Family Resources Center	04/2022-06/2022 04/2021-12/2021
Studies on Independent Living Program for Transitional Youth from Out-of-Home care in South Korea (PI: Sang Jung Lee) *Research Fellow* at Korea Institute for Health and Social Affairs Conducted literature review and comparative analysis on the independent living programs in the US and other countries	10/2022-12/2022 05/2021-12/2021 04/2020-10/2020 04/2019-10/2019
Effects of Child Maltreatment on Adult Substance Use and Mental Health (PI: Todd I. Herrenkohl) *Research Assistant* at Social Development Research Group, University of Washington, Seattle, WA Reviewed literature, and analyzed data from the Lehigh Longitudinal Study, a unique prospective investigation of the causes and consequences of child maltreatment	2015-2016
Compensation Quality Improvement for Employees of Volunteer Centers (PI: Joon Young Lee) *Research Assistant* at Urban Science Research Institute, University of Seoul, Korea Conducted literature review, focus group interview, and descriptive analyses	11/2005-02/2006

TEACHING INTERESTS & EXPERIENCE

Interests

Child maltreatment, Child welfare policy, Research methods, and Systematic review with meta-analysis

Experience and Role

Social Welfare Policy, Teaching Assistant Guided BSW students to understand historical and political background of social welfare policy. Facilitated small discussion groups and gave a lecture on child welfare policies.	Spring 2022
Foundations of Social Welfare Research, Sole Instructor Instructed a range of social welfare research methods and guided individual research projects for MSW students.	Winter 2021
Introduction to Social Welfare Research, Statistics Lab Assistant Conducted a series of foundational SPSS labs (data entry, descriptive statistics, and inferential statistics) for BASW students.	Winter 2020 & Spring 2022
Social Welfare Research and Evaluation, Teaching Assistant Prepared a video series of foundational SPSS labs for MSW students, and guided them to analyze and interpret data from their research projects.	Spring 2020
Foundations of Social Welfare Research, Teaching Assistant Guided MSW students to develop research questions and plan their research project based on the questions.	Winter 2020
Evidence-Based Practice for BSW, Teaching Assistant Guided BSW students to understand the concepts of EBP framework and its application to social work practice. Gave a lecture on concepts of systematic reviews and how to read systematic review articles.	Winter 2016 & Winter 2018
Child And Family Inequalities: Policy/Services Platform, Teaching Assistant Guided MSW students to understand political strategies to strengthen children and families. Gave a lecture on child protection services.	Fall, 2016

PUBLICATIONS & PRESENTATIONS

Peer-Reviewed Publications

Nurius, P., LaValley, K., & **Kim, M.** (2020). Victimization, Poverty, and Resilience Resources: Stress Process Considerations for Adolescent Mental Health. *School Mental Health*, *12*(1), 124-135.

Hong, S., Lee, S., Harrington, D., & **Kim, M.** (2017). Impacts of Language Use, Family, School, and Neighborhood on Mental Distress: Analyzing Data on Immigrant Youth in California. *Health and Social Welfare Review, 37(2)*, 102-125.

Manuscripts under review

Hong, S., **Kim, M.**, Saba, S., Bender, A., Fedina, L., Grogan-Kaylor, A., & Herrenkohl, T. I. (Under Review). Emotional Empathy, Self-harm thoughts, and Suicide Attempts among Individuals with and without a History of Child Maltreatment. *Journal of Consulting and Clinical Psychology*.

Kim, M. (Under Review). The Effects of Different Types of Child Maltreatment on Suicidal Ideation in Adolescence and Early Adulthood. *Archives of Suicide Research.*

Manuscript in progress

Kim, M. & Pecora, P. J. (In preparation). Meta-analysis of the Effects of Family Resource Centers.

Book Chapters

Herrenkohl, T. I., **Kim, M.**, & Anderson, J. (2018). Child Maltreatment in American Professional Society on the Abuse of Children. In Klika, J. B. & Conte J. R. (Eds.) In *The APSAC Handbook on Child Maltreatment 4th Edition* (pp. 34-46).

Working Papers

Lee, S., Ha, T., Lee, J., Lim, S., Choi, K., & **Kim, M.** (2022). *Study on Support for Independent Living within the Extended Protection Period for Children in Need of Protection*. Korea Institute for Health and Social Affairs.

Lee, S., Kim, J., Ryu, J., Kim, J. & **Kim, M.** (2021). *Designing Evaluations of Independent Living Policy: A Cohort Study among Transition-age Youth in Child and Youth Protection Systems.* Korea Institute for Health and Social Affairs.

Lee, S., Kim, J., Ryu, J., Kim, J. & **Kim, M.** (2020). *Study on Independent Living Policy for Transition-age Youth in Child and Youth Protection Systems.* Korea Institute for Health and Social Affairs. 1-253.

Lee, S., Ryu, J., Kim, J., **Kim, M.**, & Jung, H. (2019). [Policy Report] *Research on Implementation and Effectiveness of Independent Living Subsidies and Integrated Housing Programs for Children Leaving Care in South Korea*. Ministry of Health and Welfare. Korea Institute for Health and Social Affairs. 1-280.

Lee, S., Ryu, J., Kim, J., **Kim, M.**, & Kim, J (2019*). Preparation for Independent Living among Children in Out-of-Home Care System*. Korea Institute for Health and Social Affairs. 1-305.

Lee, J., Shin, Y., Ju, C., **Kim, M.**, and Pak, E. (Jul. 2012). [Agency Report] A *Study of Compensation Status and Compensation Quality Improvement for Employees of Volunteer Centers*. Korea Volunteer Center. 1-97.

Presentations

Kim, M. & Nurius, P. (2017). Adapting ACEs Assessment Toward Explaining Adolescent Mental Health Outcomes in Population Data (Oral presentation). Society for Social Work Conference 2017, New Orleans Marriott, New Orleans, Louisiana, USA

ADDITIONAL PROFESSIONAL AND COMMUNITY SERVICE EXPERIENCE

Vision for Children at Risk (St. Louis, MO), Practicum Intern Supported collaborative agency meetings, Evaluated a training program provided for early child care providers, Collected data and developed early childhood asset maps using ArcGIS.	08/2013-05/2014
Volunteer Center (Seoul, Korea), Program Management Assistant Assisted to manage a mentoring program by connecting secondary schools to college student volunteers.	04/2012-05/2012
Nowon Hope Community Networks (Seoul Korea), Office Intern Tracked records of service recipients, reorganized network systems to improve the accessibility of available social services to members of the community networks.	12/2007-05-2008
Good Neighbors (Seoul, Korea), Student Apprentices Participated in a 'Child Abuse Prevention' campaign and a fund raising project, taught middle school students in a winter school program for low-income families.	01/2007-02/2007
UOS Community Welfare Center (Seoul, Korea), After-school teacher Developed and prepared lesson plans and taught low-income middle school students.	03/2003-09-2006