ABSTRACT

Title of Thesis:	**CHILDHOOD BEREAVEMENT AND INTERNALIZING SYMPTOMS: RELATIONSHIP QUALITY AS A MECHANISM AND EARLY ATTACHMENT SECURITY AS A BUFFER**
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Childhood bereavement has been linked with poor psychosocial outcomes. However, few studies have explored the mechanisms and protective factors affecting child outcome following the death of a close family member (i.e., loss), and a limited number of studies have considered the timing of loss. The present study leverages a population-based longitudinal cohort data from the Future of Families and Child Wellbeing Study (FFCWS) to examine outcomes (internalizing symptoms), mechanisms (relationship quality), and protective factors (early attachment security) at age 9 and 15 for children who experienced the death of a close family member during three developmental stages: early childhood, middle childhood, and late childhood/early adolescence. Although many of the hypothesized associations were not found, findings underscore the enduring impact of early childhood attachment in protecting children in the face of loss. Specifically, the protective role of early attachment security was found at age 15, particularly for individuals experiencing loss during late childhood/early adolescence. The study highlights the importance of continued investigation of the impact of childhood bereavement endured during different developmental stages, and the importance of examining outcomes at different ages.

CHILDHOOD BEREAVEMENT AND INTERNALIZING SYMPTOMS: RELATIONSHIP QUALITY AS A MECHANISM AND EARLY ATTACHMENT SECURITY AS A BUFFER

by

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Chapter 1: Introduction

In the United States, approximately 7% of children experience the death of a parent or sibling before the age of 18 years (Burns et al., 2020), globally at least 10,000 children lose a parent each day (Nar, 2021), and others experience the death of close people such as grandparents, other relatives, and friends during childhood. In 2020, there was an overall increase of 65,300 bereaved children in the United States compared to the previous four-year average: 22% of those due to accidental drug overdose, 4% due to homicide by gunshot, 5% due to Covid-19, and 69% due to other causes of death (Judi's House, 2022). Since 2020, the Covid-19 pandemic has further increased the prevalence of experiencing a death during childhood. In the United States, between January 2020 and February 2022, 203,649 children younger than 18 lost a caregiver to COVID-19, 91,000 children lost a parent, 79,000 children lost an in-home grandparent caregiver, and 15,000 children lost their only in-home caregiver (DeAngelis, 2023). In addition, the Covid-19 pandemic has contributed to more children experiencing premature deaths of close family members such as grandparents (Verdery et al., 2020).

Experiencing a death during childhood has been shown to be challenging and has been related to myriads of poor outcomes such as increased rates of internalizing symptoms (Dowdney, 2000; Livings et al., 2022; Stikkelbroek et al., 2016), decreased sense of belonging (Dyregrov & Dyregrov, 2005), poorer school adjustment (Lytje & Dyregrov, 2019), higher rates of delinquency (Feigelman et al., 2017), and shorter telomere length (an indicator of faster cellular aging; Mitchell et al., 2017). At the same time, studies have shown that psychological difficulties for most bereaved children desist or weaken over time (Akerman & Statham, 2011; Dowdney, 2000; Haine et al., 2008; Ratnarajah & Schofield, 2007). Thus, it is critical to identify what might contribute to the variation in psychosocial outcomes after experiencing a close death.

One important outcome to consider for children who have experienced a death is the development of internalizing symptoms, given its link to lower quality of life in young adulthood (Schlack et al., 2021), mental health problems in adulthood (Colman et al., 2007), physical health problems during adolescents and early adulthood (Jamnik & DiLalla, 2019), and poorer economic and social outcomes in adulthood (Vergunst et al., 2023). One possible mechanism between childhood bereavement and internalizing symptoms is relationship quality with others. Childhood bereavement has been associated with loss of friends (Holland, 2001), disruption of interpersonal relationships in general (Servaty & Hayslip, 2001), and loneliness (Nader, 1997). Parentally bereaved adolescents and young adults who reported higher-quality relationships with their caregivers, peers, and romantic partners exhibited fewer depressive symptoms as reported by both the youth and their caregivers (Schoenfelder et al., 2011). Thus, maintaining quality relationships is likely important for healing from the loss, yet according to a recent review, relationship quality after experiencing a death and its impact has not been extensively explored in children (Lytje & Dyregrov, 2019).

Further, it is important to understand potential protective factors for children who experience the death of a loved one (i.e., loss). Early attachment security may be one possible protective factor for children who experience a loss. Early attachment security has been shown to protect against many forms of adversities and challenges during childhood such as marital conflict (El-Sheikh & Elmore-Staton, 2004), maternal depressive symptoms (Milan et al., 2009; Whittenburg et al., 2023), negative life events (Dallaire & Weinraub, 2007), and living in institutions (McLaughlin et al., 2012; Tang et al., 2021). However, the protective effects of early attachment security for childhood bereavement have not been extensively explored.

In this section, I first review literature on the links between childhood bereavement and mental health outcomes such as internalizing problems and its prevalence. Second, I review literature on the links between childhood bereavement and relationship quality with others and how relationship quality impacts internalizing and related problems. Third, I review literature that suggests early attachment security would serve as a buffer for bereaved children in three ways: (a) between experiencing a death and internalizing problems, (b) between experiencing a death and relationship quality, and (c) between peer relationship quality and internalizing symptoms. Fourth, I review literature on how the age of the child when they experience a death and the age at which the child is examined after the death may contribute to child outcomes. Throughout the literature review, I will summarize the gaps and limitations of past childhood bereavement research, and the importance of further investigation on child outcomes after experiencing the death of a close family member. Finally, I will introduce the present study that aimed to examine the links above and fill some gaps in childhood bereavement research.

Childhood Bereavement and Internalizing and Related Problems

Many studies have reported a link between experiencing a death during childhood and developing internalizing problems (e.g., Berg et al., 2016; Brent et al., 2009; Kalter et al., 2003; Kaplow et al., 2010; Pham et al., 2018). A meta-analysis of fifteen population-based cohort studies found evidence of a positive association between experiencing the death of a parent before the age of 18 years and developing anxiety, affective, or other psychotic disorders (McKay et al., 2021). For example, the meta-analysis found that children who experienced a death during childhood were 1.5 times more likely to develop an affective disorder, and 1.2 times more likely to develop psychiatric disorder. Most studies that found links between experiencing a death and internalizing problems have focused on parental death (e.g., Brent et al., 2009; Cerel et

al., 2006; Stikkelbroek et al., 2016). Although relatively few, studies that included death of other family members have also found links between experiencing a death and increased internalizing and other mental health problems (Dyregrov & Dyregrov, 2005; Harrison & Harrington, 2001; Kaplow et al., 2010). For example, one study that used the Future of Families and Child Wellbeing Study (FFCWS) showed that a maternal grandmother's death in the past 7 years was associated with higher depression at year 15 controlling for depression prior to bereavement (Livings et al., 2022).

In summary, many studies show evidence for links between experiencing a death of close others during childhood and internalizing and related problems. However, most studies have focused on parental death. Given that the few studies that included the death of other family members also found links to internalizing problems, it is important to further examine how the death of close family members, in addition to parents, impacts the development of internalizing symptoms. It is important to note that although many studies found links between childhood bereavement and internalizing and other mental health problems, these problems do not persist for many children (Akerman & Statham, 2011; Dowdney, 2000; Haine et al., 2008; Ratnarajah & Schofield, 2007). Thus, understanding what contributes to differences in outcome after experiencing a death is crucial.

Childhood Bereavement, Relationship Quality, and Internalizing Symptoms

It is first important to identify what the mechanisms might be for the relation between childhood bereavement and internalizing symptoms, so that children who experience a death can be supported in ways that decrease the likelihood of developing internalizing symptoms. One possible mechanism between experiencing a death and internalizing symptoms is relationship quality with others. The loss of a parent during childhood is thought to negatively impact the

capacity to form and maintain intimate relationships in later life, cope with stressful life events, and fulfill developmental tasks (Cerniglia et al., 2014). Among adolescents, parental death has been found to disturb perceptions of interpersonal relationships (Servaty & Hayslip, 2001).

There are likely many reasons for why a child who experienced a death may struggle with having quality relationships with others. Adults may not know how to best support children who are grieving, which may contribute to poorer quality relationships. A qualitative study of teachers in Israel found that teachers felt helpless, confused, and anxious when talking to students who had lost a parent (Levkovich & Elyoseph, 2023). Surviving parents may struggle to maintain quality relationships with their bereaved child because they themselves are grieving or are unsure how to talk about the death with their child. A qualitative study of parentally bereaved children from grief counseling centers found that parent child-communication about the death varied. Themes included avoidance of talking about the death, one-sided communication of children's grief only, and mutual expression of grief (Schaefer et al., 2022). How parents talk to their children about the death may be one way that the relationship quality between the bereaved child and parent is impacted after experiencing a death in the family.

Relationship quality with the surviving parent has been shown to be an important predictor for how children cope after experiencing the death of a parent in a few studies. One study of parentally bereaved youth found that lower family cohesion and lower perceived social support measured after experiencing a death was correlated with depression 21 months later (Brent et al., 2009). Positive caregiver and child relationship quality related to lower intrusive grief-related thoughts 11 months after the death (Wolchik et al., 2008). Another study found that positive parenting predicted lower internalizing problems for parentally bereaved children, even in the face of continuing negative life events (Haine et al., 2006).

Bereaved children may also struggle to maintain their relationships with peers due to fears of causing discomfort to or alienating themselves from them (Worden, 1996). Childhood bereavement has been associated with the loss of friends (Holland, 2001). In one study, adolescents who experienced parental bereavement reported discomfort in interpersonal interactions and self-perceptions of inadequacy and inferiority (Servaty & Hayslip, 2001). Relationship quality with peers has also been shown to be important for children who experienced a death. For example, bereaved children's relationships with peers have been correlated with social and behavioral adjustment after loss (Rowan, 1995). Peer competence has been associated with lower reports of intrusive grief thoughts 6 years after experiencing a death (Sandler et al., 2010), as well as lower depressive symptoms (Schoenfelder et al., 2011). Children who reported talking to friends about their loss displayed higher levels of self-esteem and self-efficacy, and overall better adjustment to the death (Worden, 1996).

Thus, maintaining quality peer relationships appears to be important for healing from experiencing a death. However, as Lytje and Dyregrov (2019) have noted, relationship quality after experiencing a death has not been extensively explored in children. Further, it is important to note that childhood bereavement studies that have examined caregiver and peer relationship quality have focused specifically on experiences of parental death. Thus, it is crucial to examine whether relationship quality is important for children who experience the death of other close family members. It is also unclear from past research whether relationship quality with specific people (e.g., parents, peers) is what is important, or bereaved children having *someone* with whom they have a high-quality relationship is what is important. Further, childhood bereavement studies that have examined relationship quality have largely been with community samples; studies that examine relationship quality as a mechanism between experiencing a death during

childhood and internalizing problems in population-based samples are lacking. Thus, more research is needed to examine how relationship quality is affected after experiencing a death during childhood, and how it specifically relates to internalizing symptoms.

The Buffering Role of Early Attachment Security

It is also important to identify what might protect a child from experiencing negative outcomes after experiencing a death. Attachment security may be one protective factor both against developing internalizing symptoms and preserving relationship quality after a child experiences a death. Further, if attachment security does not buffer against poor peer relationship quality after experiencing a death, it may buffer the link between low peer relationship quality and internalizing symptoms.

In this section, I first briefly explain attachment theory and provide a framework for why early attachment security may serve as a protective factor in the face of family death. Then, I will review studies that suggest that attachment security may buffer the negative effects of experiencing the death of a close family member during childhood in three ways. One, by buffering the relation between experiencing the death and internalizing problems. Two, by buffering the relation between experiencing the death and poor relationship quality. Finally, early attachment security may buffer the relation between poor peer relationship quality and internalizing symptoms for children who experienced the death of a close family member.

Overview of Attachment Theory and Attachment Security

The attachment system is a biologically based evolutionary system for which the primary function is to increase proximity to a person who can provide support and protection in the face of a threat (Bowlby, 1969). Attachment theory posits that infants discover ways to maintain proximity with their caregivers and develop internal working models (IWMs) based on their

attachment-relevant experiences (Bowlby, 1980). IWMs guide individuals on how they view themselves and others, and what to expect in relationships (Bowlby, 1969). Based on IWMs, strategies are developed to manage interpersonal relationships, impacting how one regulates emotions (Bowlby, 1969). Those who have confidence in the availability and dependability of others are thought to have high attachment security. Having confidence in one's worth and dependability of others (i.e., high attachment security) may lead to effective emotion regulation skills (DeKlyen & Greenberg, 2016); this may serve as a buffer against negative social experiences.

The death of a loved one during childhood can be considered a disruption in the attachment system (Bowlby, 1982). Bowlby (1980) theorized that individual's response to loss stems partly from how one's attachment system is organized over time. Early attachment security may buffer the negative effects of experiencing the death of a close family member during childhood for several reasons. First, attachment security contributes to more effective emotion regulation skills (DeKlyen & Greenberg, 2016). Second, a secure IWM allows for confidence in the dependability of others (Sroufe, 2021) and high self-worth (Doyle et al., 2000). Although there is a dearth of empirical evidence for whether attachment security buffers against negative psychosocial effects for children who experienced a death, studies have shown attachment security to protect against many forms of adversities and challenges during childhood (e.g., Dallaire & Weinraub, 2007; El-Sheikh & Elmore-Staton, 2004; Tang et al., 2021; Whittenburg et al., 2023). Thus, it is reasonable to speculate that attachment security may protect against negative outcomes after experiencing the death of a close family member as well. Now, I will review studies that support the idea of early attachment security serving as protective factors in three specific ways.

1. Early Attachment Security Reduces the Link between Loss and Internalizing Symptoms

Higher attachment security may protect against increases in internalizing symptoms after experiencing a death. Early attachment security has been shown to decrease the relation between maternal depression and child depression over time (Milan et al., 2009; Whittenburg et al., 2023). Among children residing in orphanages in Romania, early attachment security predicted lower rates of internalizing problems one year later (McLaughlin et al., 2012). Another study found that attachment security at measured at 15 months of age decreased the relation between negative life events that a family experienced and 5-year-olds' anxiety symptoms (Dallaire & Weinraub, 2007). Further, secure attachment to mothers during middle childhood served as a protective factor between parents' marital conflict and child reported internalizing problems (El-Sheikh & Elmore-Staton, 2004). On the contrary, one study reported that secure attachment at 14 months increased irritability at age 9 and depression at age 13 for children who experienced inter-parental violence (Hill et al., 2023). Thus, attachment security may not protect against all forms of adversity.

At the same time, a meta-analysis that examined studies on attachment and behavioral problems with children between ages 3 –18 years found that the likelihood of developing internalizing problems were 2.4 times greater for children who were classified as having an insecure attachment compared to a secure attachment (Madigan et al., 2016). However, association of secure attachment to decreased internalizing problems were greater for children who were not exposed to family risk factors (Madigan et al., 2016). Family risk included children of adolescent parents, living with a single parent, parental psychopathology, maltreatment history, incarcerated parent, and/or child involvement in the juvenile system of

social services; the interaction between childhood bereavement and early attachment security predicting internalizing problems was not explored.

Overall, attachment security has been found to protect children against developing internalizing and related problems in various circumstances during different developmental stages. However, whether attachment security is protective may depend on the nature of *what* the child experiences (e.g., death of a loved one, maternal depression, parental incarceration). Thus, it is important to examine whether attachment security can protect children from developing internalizing symptoms after experiencing a death.

2. Early Attachment Security Reduces the Link between Loss and Poor Relationship Quality

Higher attachment security may protect children's relationship quality after experiencing a death as well. Few studies have examined whether early attachment security protects relationship quality later in life. One study found that among children who were raised in institutional care, early attachment security to foster mothers predicted more friends and more positive behavior with friends at age 16 years, demonstrating long-lasting positive impact of early attachment security (Tang et al., 2021). Another study found that attachment security in infancy buffered the relation between fathers' harsh parenting and positive relationship quality with fathers at age 3 years and age 10 years; only children with lower attachment security reported lower relationship quality with fathers who use harsh parenting (Bendel-Stenzel et al., 2023). Although there are no studies that examine the role of early attachment security protecting children's relationship quality after experiencing a death, there is evidence to suggest this possibility.

3. Early Attachment Security Buffers the Link Between Peer Relationship Quality and Internalizing Symptoms

Early attachment security may buffer the link between poor peer relationship quality and internalizing problems. To my knowledge, no studies have examined how early attachment security buffers the link between peer relationship quality and internalizing symptoms for any population. However, studies have found that the quality of the parent-child relationship broadly buffers children from the negative associations with poor peer relationship quality. One study found a stronger association between peer stressors and increases in depressive symptoms in youth with lower levels of positive parental relationship quality (Hazel et al., 2014). Another study found that only children with low maternal affection showed relation between lower peer acceptance and higher internalizing problems (Zarra-Nezhad et al., 2019). Among young adolescent boys, higher maternal support buffered the effects of low-quality friendships on perceived social competence (Rubin et al., 2004). Thus, positive relationship quality with parents has been shown to protect against the negative effects of poor peer relationship quality. It is important to examine whether early attachment security buffers the link between relationship quality with peers and internalizing symptoms as well.

Timing of Loss and Child's Age at Outcome

Very few studies have examined how the age at which a child experiences a death contributes to internalizing symptoms, as most studies consider childhood bereavement as experiencing a death before the age of 18 years (e.g., Berg et al., 2016; Brent et al., 2012), indicating a critical gap in past childhood bereavement research. For children, experiencing the death of a loved one may be particularly difficult and confusing, as they have limited experience encountering death closely and may still be learning what death means (Panagiotaki et al., 2018). It has been proposed that children between 2-5 years do not understand the difference between life and death, and that death is irreversible; children between 5-9 years do understand death as

the end of life but not that it is irreversible. Once children are 9 years and older, they likely understand death as a definitive and inevitable (Panagiotaki et al., 2018). Thus, for younger children experiencing the death of a close family member may be confusing, and for older children it may be quite difficult as they have just begun to understand the irreversible nature of death.

One study found that adolescents who experienced a death of a caregiver within the first three years of life continue to experience psychological difficulties over time (Cerniglia et al., 2014). Another study found that bereaved 12–15-year-olds were twice as likely to experience depressive symptoms compared to bereaved 8-11-year-olds (Gersten et al., 1991). Further, the age at which the outcome is measured after a child experienced a death may contribute to how they adapt as well. For example, adolescents may be able to count on larger and more intimate group of peers (Rheingold et al., 2004), making peer relationships more important for adolescents compared to younger children. It is also possible that because adolescents' capacity to communicate becomes more sophisticated (Haine et al., 2008), quality of relationships may be a more important mechanism during adolescence compared to younger children. Finally, a meta-analysis showed that early attachment security's impact on children's peer competence and internalizing problems did not vary based on the age at outcome, suggesting an enduring effect of early attachment security (Groh et al., 2017); it is important to examine whether early attachment security protects children after experiencing a death at different developmental stages. Overall, studies that have compared the timing of experiencing the death and age at which the outcome is measured are limited. Further investigation is needed to fully understand the impact of age for childhood bereavement.

The Present Study

As described above, many studies have shown a link between childhood bereavement and poor psychosocial outcomes. However, limited studies have examined the mechanisms and protective factors for child outcomes after experiencing a death. Further, previous studies on childhood bereavement have mainly focused on death of parents. Considering that the few studies that have included other close family member death have found these deaths to be impactful to children as well (e.g., Kaplow et al., 2010), it is important to extend childhood bereavement research by including other close family deaths. Finally, the timing of when children experience a death may differentially impact outcomes (Cerniglia et al., 2014; Gersten et al., 1991), but there are a limited number of studies that have closely examined how experiencing a death during different points of childhood associate with later outcomes.

In the present study, children's level of internalizing symptoms (i.e., depressive and anxiety symptoms) reported after experiencing a death was the outcome of interest. Relationship quality with peers, parents, and general relationship quality with others were examined as possible mechanisms through which experiencing the death of a close family member is related to internalizing symptoms. Finally, early attachment security was examined as a possible moderator of these associations. The overall conceptual model is presented in Figure 1.

The present study considered childhood bereavement as the death of a parent, the death of a grandparent (maternal or paternal) who lived in the house where the child resides, and the death of a maternal grandmother as close family deaths. The death of a parent was included because many studies have shown the negative effects of parental death (e.g., Brent et al., 2009). The death of a grandparent in the household was included because the death of a family member who is proximal to the child may be particularly impactful for children. No research to my knowledge has examined the impact of the death of a grandparent in the household. Considering

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that an increasing number of children in the US live in three generation families (Guarin, 2021), it is important to examine the effect of experiencing such deaths. Finally, maternal grandmother deaths were included because past research has shown that maternal grandmothers are most involved in providing care (Pashos, 2017), potentially making the maternal grandmother one of the first close family deaths that many children experience. To note, one study that used the Future of Families and Child Wellbeing Study (FFCWS) dataset found that recent maternal grandmother death predicted depressive symptoms among adolescent grandchildren (Livings et al., 2022). In summary, these three types of death were considered as close family deaths in this study.

The present study also focused on the timing of experiencing the death (loss) of a close family member. Thus, the sample was grouped based on the timing of that loss: early childhood (before age 5; early childhood loss group), middle childhood (between ages 5 and 9; middle childhood loss group), and early adolescence (between ages 9 and 15; referred to as late childhood loss group going forward for simplicity). This allowed for closer examination of whether experiencing loss during distinct developmental stages will associate with outcomes differently.

There were four principal aims of this study. First, I aimed to examine whether experiencing the death of a close family member impacts internalizing symptoms at both age 9 and 15 (Research Question 1). Second, I aimed to examine whether experiencing the death of a close family member impacts relationship qualities with parents and peers at age 9 and 15; at age 15 only, I aimed to examine whether experiencing the death of a close family member impacts general relationship quality as well (Research Question 2). Third, I aimed to examine whether quality of relationships with parents and peers at age 9 and 15 and general relationship quality at

age 15 associated with concurrent internalizing symptoms, and whether relationship quality was a mechanism between experiencing a loss and internalizing symptoms (Research Question 3). Fourth, I aimed to examine whether early attachment security buffers the effect of experiencing the death of a close family member in three ways: One, by directly buffering the relation between experiencing a loss and internalizing symptoms (Research Question 4a). Two, by directly buffering the relation between experiencing a loss and relationship quality with peers, parents, and general relationship quality (Research Question 4b). Third, by buffering the relation between peer relationship quality and its relation to internalizing symptoms differently for those who experienced a loss (Research Question 4c; see Figure 2). For all aims, the timing at which the children experienced the death of a close family member was examined separately. The specific hypotheses are listed below.

Hypothesis 1:

Experiencing the death of a family member during childhood will be associated with higher internalizing symptoms.

1a. experiencing the death of a close family member in early and middle childhood will relate to higher internalizing symptoms at age 9 compared to those who experienced no-loss before age 9.

1b. experiencing the death of a close family member in early, middle, and late childhood will relate to higher internalizing symptoms at age 15 compared to those who experienced no-loss before age 15.

Hypothesis 2:

Experiencing the death of a family member during childhood will be associated with lower quality of relationships with parents and peers compared to experiencing no-loss; experiencing a death will also relate to lower general relationship quality.

2a. experiencing the death of a close family member in early and middle childhood will relate to lower quality of relationships with parents and peers at age 9 compared to those who experienced no-loss before age 9.

2b. experiencing the death of a close family member in early, middle, and late childhood will relate to lower quality of relationships with parents and peers, as well as lower general relationship quality at age 15 compared to those who experienced no-loss before age 15.

Hypothesis 3:

Higher quality of relationships will predict lower internalizing symptoms, and relationship quality will be the mechanism between experiencing the death of a close family member internalizing symptoms.

3a. Both higher quality of relationship with parents and peers at age 9 will predict lower internalizing symptoms at age 9. Relationship quality with parents and peers will be the mechanism between experiencing the death of a close family member in early and middle childhood and internalizing symptoms.

3b. Higher quality of relationship with parents, peers, and general relationship quality at age 15 will predict lower internalizing symptoms at age 15. Relationship quality with parents and peers will be a mechanism between experiencing the death of a close family member in early, middle, and late childhood and internalizing symptoms.

Hypothesis 4:

Early attachment security will moderate the link between experiencing the death of a close family member and: (a) internalizing symptoms and (b) relationship qualities at age 9 and 15. Attachment security will also (c) moderate the relation between peer relationship quality and internalizing symptoms more strongly for children who experienced a death.

4a. Attachment security will moderate the link between experiencing a death and internalizing symptoms such that children with higher attachment security will show a weaker relation between experiencing a death and internalizing symptoms compared to children with lower attachment security.

4b. Attachment security will moderate the link between experiencing a death and relationship quality such that children with higher attachment security will show a stronger relation between experiencing a death and relationship quality compared to children with lower attachment security.

4c. For children who experienced a death, attachment security will moderate the relation between peer relationship quality and to internalizing symptoms more strongly, such that children with higher attachment will show a weaker relation between peer relationship quality and internalizing symptoms compared to children with lower attachment security.

Exploratory Questions

Additionally, I will examine two exploratory questions. First, I will examine whether the research questions above differ by the timing of experiencing a death (i.e., early, middle, and late childhood loss). Second, I will examine whether relationship quality with parents have more impact on internalizing symptoms depending on the age of the child at which internalizing

symptoms is assessed (i.e., at age 9 vs. at age 15) for those who experienced a death compared to experiencing no death.[1]

In order to test the research questions above, I conducted a secondary data analysis using the publicly available FFCWS dataset. The choice of conducting a secondary data analysis was made given the difficulty of recruiting child participants that have experienced a close family death. This dataset captured the death of close family members (i.e., parents and grandparents) at six waves of data collection from birth to year 15, making it an ideal dataset to understand the impact of experiencing a close family death during different developmental stages, including before year 5 (early childhood), between years 5-9 (middle childhood), between years 9-15 (late childhood).

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[1] I originally proposed to compare the strength of association between each relationship quality and internalizing problems at the *same* time point and *across* the two timepoints, to test whether there is a difference in the impact of peer and parent relationship quality on the levels of internalizing symptoms depending on the child's age at outcome. Since the measurement for child-peer relationship quality is slightly different at the two ages, it was later determined that this across time statistical comparison would not be meaningful. Similarly, because the measure for child-peer relationship quality and child-parent relationship quality differs, it was also determined that within time statistical comparison of these paths would also not be meaningful. Thus, I focused on the across time differences (i.e., at age 9 vs at age 15) of parent-child relationship quality and its impact on internalizing symptoms.

Chapter 2: Method

Data and Sample

 The study leverages data from the Future of Families and Child Wellbeing Study (FFCWS). The FFCWS is a population based longitudinal cohort study of families in large U.S. cities. The study employed a multistage stratified random sampling and oversampled nonmarital births between 1998-2000. It used a three-stage sampling process. First cities (based on all US cities with population over 200,000) were sampled, then the hospitals within the cities, and then the birth within the hospitals (Reichman et al., 2001). Hospitals with very few births were excluded for cost and efficiency reasons. Parents were excluded for the following reasons: parents who planned to place their child for adoption, if the father of the baby was not living at the time of birth, those who did not speak English and Spanish well enough to complete the interview, mothers who were too ill or had babies that were too ill to complete the interview, and those whose baby died before the interview could take place. Further, many hospitals prohibited interviews of parents under the age of 18. The study followed parents and children starting at birth. In this study, data from six waves of data collection are utilized (birth, child ages 1, 3, 5, 9, and 15). Data were collected from mothers and fathers from birth to age 9, from primary caregivers at age 15, and from children at age 9 and age 15. The total sample size at baseline was 4,898 families.

 For this study, parental responses at each time point were used to create four groups of interest: (a) early childhood loss group, (b) middle childhood loss group, (c) late childhood loss group, and (d) no-loss group. In this study, the term "loss" explicitly refers to loss resulting from death. A child is considered to have experienced a loss if a parent died, a grandparent (maternal or paternal) who lived in the house where the child resides died, or if a maternal grandmother

died. Children who experienced multiple close family deaths were excluded from the study for two reasons. First, it is unclear whether experiencing multiple close family deaths would exacerbate grief reactions or make the child more resilient. Second, the number of children who experienced multiple close family deaths was relatively small in this sample, making it difficult to examine the impact of multiple family deaths.

Parental Death

At each time point, parents were asked "What is your relationship with [the child's] father/mother now" where they could indicate if the other parent is deceased. Answers to this question at each time point were used to decipher between what years the child experienced the death of a parent (i.e., early, middle, late childhood).

Grandparent in the Household Death

At each time point, parents completed a household grid where they were asked to "make a list of people who currently live with you." Information from the household grid was used to determine whether a grandparent of the child lived with the mother or father at each time point. At each time point mothers and fathers also answered the question "How much of the time does the child live with you?" for which the parent could answer on a 4-point scale (1 = *all of the time*, 2 = *half of the time*, 3 = *sometimes*, 4 = *none of the time*). If the child was reported to be living with the mother and/or father at least some of the time, and that parent reported that their parent(s) lived in the house with them, it was determined that those children had grandparent(s) living with them. At ages 5, 9, and 15, parents were also asked about the vital status of their parents (i.e., the child's grandparents) with the question, "Are both of your parents living?" The parents responded to this question with one of the following four response options: "both living," "father dead," "mother dead," "both dead." The responses from the household grid, the child's

residence, and the vital status of the grandparent(s) were used to identify children who had experienced the death of a grandparent in the household at each time point. For example, if a parent responded that a grandparent lived in the household and that the child resided in at least some of the time at age 3, and subsequently answered that that grandparent was dead at age 5, that grandparent would be considered a grandparent's death in the household before age 5.

Maternal Grandmother Death

Information collected from mothers about the vital status of their mothers (i.e., maternal grandmother) was used to identify children who had experienced a maternal grandmother death during middle or late childhood. To note, maternal grandmother death (not living in the household) in early childhood was not considered in this study because there is a lack of data available regarding how long ago the maternal grandmother died prior to age 5 (e.g., the maternal grandmother could have died long before the child was born). Specifically, at age 1, mothers were asked "Parents are both deceased or unknown," with options "yes" or "no." In other words, there is no way to know if just one parent was deceased and, if so, whom at age 1. Further, no question that assesses grandparents' vital status was asked at age 3, making it impossible to know whether the maternal grandmother death reported at age 5 is a loss since the child was born or not. As with the grandparent in the household loss, children were only considered to have a maternal grandmother loss if they lived with their mother at least some of the time.

Creation of the Study's Three Loss Groups and No-Loss Group

Once the three types of loss and their timing of loss were determined, participants were divided into four groups: early childhood loss group (i.e., one loss from birth to year 5; n = 231), middle childhood loss group (one loss from year 5 to year 9; n = 225), late childhood loss group

(i.e., one loss from year 9 to year 15; n = 315), no-loss group (no-loss over 15 years; n = 4052). Those who experienced more than one loss over the 15 years were excluded from analyses (n = 75).

Measures

Child-Peer Relationship Quality

The Connectedness at School Scale (Institute for Social Research [ISR], 2007) is a 4-item child self-report questionnaire that assesses the degree of inclusiveness, closeness, happiness, and safety at school. This questionnaire was completed at both ages 9 and 15. In this present study, one of the four items from this measure "feel close to people at your school" was used to represent peer relationship quality at each time point. At age 9, children were asked at a home visit "In the last month, how often did you…" and rated the items on a 5-point scale (0 = *not once in past month,* 4 = *every day*). At age 15, the question was asked over the telephone, and the question format was modified to "How much do you agree with the statement" and rated the items on a 4-point scale (1 = *strongly agree*, 4 = *strongly disagree*). The score at age 15 was reversed scored so that higher scores indicate better relationship quality, as it did at age 9. This scale was originally created for the Panel Study of Income Dynamics (PSID) Child Development Supplement, a longitudinal study of a representative sample of U.S. individuals and the families that they reside with (ISR, 2007).

Child-Parent Relationship Quality

Children answered questions about their quality of relationship with their parents at both ages 9 and 15. Children answered both about their mother and father separately on 2 items each. The first item, "How close do you feel to your mom/dad?" was rated on a 4-point scale (1 = *extremely close*, 4 = *not very close*). The second item, "How well do you and dad/mom share

ideas/talk about things that really matter" was rated on a 4-point scale (1 = *extremely well*, 4 = *not very well*). The scores were reverse coded so that higher numbers indicate higher relationship quality. The mean of all 4 items will be used to represent the quality of relationship with parents (age 9 ω = 0.74; age 15 ω = 0.83). These items were taken from the Family Functioning and the Middle Childhood and Adolescent sections of the National Survey of Child Health (NSCH, 2003).

General Relationship Quality

At age 15 only, children completed the Positive Adolescent Functioning scale, adapted from the EPOCH Measure of Adolescent Wellbeing (Kern et al., 2016). Children rated 20 items comprising of five subscales (engagement, perseverance, optimism, connectedness, and happiness), and rated how they felt in the past four weeks on a 4-point scale (1 = *strongly agree*, 4 = *strongly disagree*). Here, we focus on the connectedness subscale. One item from this subscale "I have friends that I really care about" was excluded, as it taps into relationship quality with a friend instead of overall general relationship quality. Thus, the mean of three of the four items ("When something good happens to me, I have people who I like to share the good news with," "When I have a problem, I have someone who will be there for me," "There are people in my life who really care about me") were used to represent general relationship (ω = 0.63).

Internalizing Symptoms (Depressive and Anxiety Symptoms)

At both ages 9 and 15, primary caregivers completed the Child Behavior Checklist (CBCL/6-18; Achenbach & Rescorla, 2000). The original CBCL/6-18 contains 118 items. At age 9, 111 of the 118 items were administered. At year 15, 34 of the 118 items were administered. At both time points, items were rated on a 3-point scale (0 = *not true*, 2 = *very true*). The CBCL DSM oriented subscales were created to map onto diagnosis made with the Diagnostic and

Statistical Manual of Mental Disorders (*DSM;* American Psychiatrics Association, 2000). Two of the DSM-oriented subscales, the Affective Problems Subscale and the Anxiety Problems Subscale, were used to represent depressive and anxiety symptoms at both age 9 and age 15 (See Appendix A for full list of items for each subscale at each timepoint).

Depressive Symptoms. The 14 items Affective Problems Scale was used to represent depressive symptoms. At age 9, three items from this scale were not included in the survey. Thus, the mean of 11 of the 14 items were used to represent depressive symptoms at year 9. Sample items include "child enjoys very little" and "child cries a lot" ($\omega = 0.81$). In year 15, six additional items from age 9 were not included in the survey. Thus, the mean of five of the 14 items were used to represent depressive symptoms at age 15. Sample items include "child is underactive, slow moving, or lacks energy" and "child is unhappy, sad, or depressed" ($\omega = 0.72$). The Affective Problems Scale has been significantly correlated with other self-reported, parent-reported, and clinician-reported measures of depression among a clinical sample of children and adolescents (Nakamura et al., 2009).

Anxiety Symptoms. The six items Anxiety Problems Scale was used to represent anxiety symptoms. At age 9, all six items were asked, and their scores were averaged to represent anxiety symptoms ($\omega = 0.71$). At age 15, two items were dropped. These two items were: "child fears certain animals, situations, or places, other than school" and "child fears going to school." Thus, the mean of four of the six items were used to represent anxiety symptoms at age 15 ($\omega = 0.71$). The Anxiety Problems Scale has been shown to be a significant predictor of the presence or absence of the DSM-IV anxiety disorders assessed through a semi-structured interview among children and adolescents seeking treatment (Knepley et al., 2019).

Early Child Attachment Security

At age 3, mothers completed an adapted version of the attachment Q-Sort (Toddler Attachment Sort-39 (TAS-39); Waters & Deane, 1985) as part of an in-home activity. Mothers sorted 39 cards with items about how their children may behave. The mothers first sorted the cards into two piles: the "applies" pile and the "not-applies" pile. Then, the mother sorted the piles again (at the second level) into "almost always applied" and "rarely or hardly ever applies" piles, to create a total of four piles. The raw data were scored using a data-driven approach by Dr. John Kirkland at Massey University (New Zealand), and an attachment security score was derived using a multidimensional scaling guide (Bimler & Kirkland, 2005). An example item from the security dimension is "is easily comforted by contact or interaction with mother when crying or otherwise distressed." The range of scores for the sample was -1 to 1, with a mean of 0.45, with higher scores indicating higher attachment security. Because only the factor score of the Q-sort is available in the FFCWS dataset, the internal consistency is not able to be computed. Past studies using the FFCWS dataset that used the Q-sort showed that having been classified as having a secure attachment was associated with lower behavioral problems as measured on the CBCL (Keyser et al., 2017), and higher child attachment security scores were positively correlated with increased adolescent social skills (Hong et al., 2023), and lower aggression at age 9 (Juan et al., 2020) demonstrating predictive validity.

Covariates

In order to account for other factors that may influence relationship quality and internalizing problems as well as the influence of attachment security, the following were included as covariates: child gender, parental education, and parent relationship status at birth; child's early depressive and anxiety symptoms (the average from ages 3 and 5); parental incarceration history by age 15; family income-to-needs ratio at age 9 and 15; parental

depressive symptoms at ages 9 and 15. For both incomes-to-needs ratio and parental depressive symptoms, the multicollinearity was low between the two time points (i.e., VIF < 10), so they were included separately as covariates.

Chapter 3: Results

I begin this section by describing the final analytic sample and preliminary analyses. Next, I present my results to the four research questions followed by the results to the exploratory questions examined in this study. This study was pre-registered to with the Open Science Framework (https://doi.org/10.17605/OSF.IO/6FB8Q)

Analytic Sample

Data were collected for 4,898 families. Of these 4,898 children, 75 experienced more than one close family death and thus were excluded from analyses (See Data and Sample section above for more details), bringing the analytic sample to 4,823. Of these 4,823 families, the city level replicate weights included in this study were missing for 109 families because these families were not randomly selected for the core sample (Geller et al., 2017) and thus were excluded from analyses[2]. Thus, the final analytic sample for this study totaled 4,714: early childhood loss group ($n = 221$), middle childhood loss group ($n = 225$), late childhood loss group ($n = 315$), and no-loss group ($n = 3,953$). The demographics for the total analytical sample and for each group can be found in Table 1.

Preliminary Analyses

Missing Data

Preliminary analyses were conducted in R version 2023.12.1+463. All variables included contained missing data, with the extent of missingness ranging from 25.54% – 54.05%, with an average of 32.37%. Missing data was evaluated for whether it meets the criteria of missing at random. Following a previous study that used the Future of Families and Child Wellbeing Study

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[2] Replicate weights were missing for families in the early childhood loss group (n = 10) and the no-loss group ($n = 99$).

(FFCWS) dataset (Gard et al., 2020), mother's marital status, the number of children and adults living in the household, and mother-reported family poverty ratio at all waves were evaluated for their relation to all missing data at the same and later waves. Mothers' marital status (at birth, age 1, age 3, age 5), the number of children in the household (at birth, age 1, age 3, age 5), the number of adults in the household (at birth, age 1, age 3, age 5), and mother-reported family poverty ratio (at birth, age 1, age 3, age 5, age 9) were associated with missing key variables, and were not missing at random. Because mother's marital status at birth and mother-reported family poverty ratio at age 9 were already included as covariates, mother's marital status at ages 1, 3, and 5, as well as number of children and adults in the household and mother-reported family poverty ratio at these ages as well as at birth were included as auxiliary variables. The specific association between each key variable and missing variables are described in Appendix B. Finally, full information maximum likelihood estimation was used to estimate scale level missingness.

Outliers

Boxplots for key variables of interests were obtained to evaluate for outliers. Boxplots showed outliers for ages 9 and 15 depressive symptoms; ages 9 and 15 anxiety symptoms, age 9 child-parent relationship quality, age 15 child-peer relationship quality, age 15 general relationship quality, and age 3 attachment security (see Appendix C for boxplots). Thus, a 90% winsorization was performed for these key variables. There were no outliers identified for age 9 child-peer relationship quality and age 15 child-parent relationship quality. Means and standard deviations of both raw data and winsorized data for the study variables for the entire sample and each group of interest are displayed in Table 2. It can be noted that there were no substantial

differences in the means and standard deviations once the data were winsorized for variables with outliers.

Correlations

When looking at the entire analytic sample ($n = 4,714$), almost all key variables were significantly inter-correlated (r range = -0.04 – 0.58; $ps < 0.05$) except for the correlation between early attachment security and age 15 child-parent relationship quality and age 15 general relationship quality. Next, I examined whether there were any meaningful differences in the correlations among key variables between the no-loss group and the early, middle, and late childhood loss groups. As expected, given that the sample size for each of the loss groups is much smaller compared to the no-loss group, substantially fewer significant correlations were found. Although there were some minor differences in the directionality of how variables correlate when comparing the no-loss group to each of the three loss groups, because the magnitudes of correlations were so small, it was difficult to make any meaningful comparisons. Overall, the correlations among variables seem to be comparatively the same for each of the four groups, as it can be seen from the four-pane figure of the visual representation of magnitude of the correlations among key variables for each group (see Figure 3). The full correlation matrix among the key variables for the entire analytic sample and for each group can be found in Tables 3a-3e.

Principal Analyses

In this section, I discuss the findings related to my four principal research questions (see Chapter 1 for specific hypotheses). First, I discuss my findings on whether children who experienced the death of a close family member (i.e., children in the three loss groups) reported higher internalizing symptoms at ages 9 and 15 compared to children who experienced no death

of a close family member (i.e., children in the no-loss group). Second, I discuss my findings on whether children in the loss groups reported lower relationship quality with peer and parents at ages 9 and 15 as well lower general relationship quality at age 15 compared to children in the no-loss group. Third, I discuss my findings on whether relationship quality with peers, parents, and general relationship quality are associated with internalizing symptoms, and whether relationship quality is a mechanism between experiencing the death of a close family member (vs. not) and internalizing symptoms. Fourth, I discuss my findings on whether early attachment security buffers the effect of experiencing the death of a close family member and internalizing symptoms, relationship quality, and the association between peer relationship quality and internalizing symptoms. For all analyses, group comparisons were made to answer each research question. Because the principal analyses focus on the effects of experiencing the death of a close family members at different developmental stages, for each question, the no-loss group were compared to each of the three loss groups. All analyses included replicate weights to adjust for sample design, non-response at baseline, and attrition based on observed characteristics (Geller et al., 2017). All principal analyses were conducted in Mplus version 8.8 (Muthén & Muthén, 1997-2018).

Research Question 1: What are the associations between experiencing the death of a close family member during childhood and internalizing symptoms at age 9 and age 15?

Robust Means Modeling (RMM; Fan & Hancock, 2012) was utilized to examine whether children in each of the three loss groups reported higher levels of internalizing symptoms compared to the no-loss group, controlling for the covariates (see Chapter 2 for detail about covariates). The choice of using RMM instead of a traditional ANOVA was made because RMM has been shown to be comparatively robust to "Type I error rates across different distributional

shapes and different sample sizes and variance conditions" (Fan & Hancock, 2012). No significant differences in mean levels of internalizing symptoms were found between the no-loss group and any of the three loss groups (see Table 4).

Research Question 2: What are the associations between experiencing the death of a close family member during childhood and relationship quality with peers and parents at age 9 and age 15, and general relationship quality at age 15?

Mirroring analyses for Research Question 1, RMM was utilized to examine whether children in the each of the three loss groups reported lower levels of relationship quality with peers, parents, and general relationship quality compared to the no-loss group. No significant differences in levels of relationship quality were found between the no-loss group and any of the three loss groups (see Table 5).

Research Question 3: Is relationship quality with peers and parents at ages 9 and 15 and general relationship quality at age 15 associated with concurrent internalizing symptoms? Is relationship quality with peers, parents, and/or general relationship quality a mechanism for the association between experiencing the death of a close family member (vs. not) and internalizing symptoms?

The structural model depicted in Figure 4 was run separately for all for groups: early childhood loss group, middle childhood loss group, late childhood loss group, and no-loss group. The structural model was first evaluated for its model fit (e.g., CFI>0.95, RMSEA<0.06, SRMR <0.08). Overall, model-fit indices demonstrated satisfactory fit (CFI = 0.942, SRMR = 0.026, RMSEA = 0.054). Because the CFI was less than 0.95, modification indices were examined to see whether any additional relations should be included in the model; no theory supported

additional relations were suggested, so I proceeded with the analyses using the original structural

model, which was deemed acceptable.

To answer Research Question 3, first the concurrent association between relationship

quality variables and internalizing symptoms at ages 9 and 15 were examined for each group. At

age 9, relationship quality variables did not significantly associate with concurrent internalizing

symptom variables for any group ($ps > 0.05$). At age 15 child-peer relationship quality was not

associated with age 15 internalizing symptoms ($ps > 0.05$) among the early and middle childhood

loss groups. Higher age 15 child-peer relationship quality significantly associated with lower

concurrent depressive symptoms ($\beta = -0.239$, $p < 0.01$), and marginally associated with lower

concurrent anxiety symptoms for the late loss group ($\beta = -0.231$, $p = 0.08$). In addition, higher

age 15 child-peer relationship quality significantly associated with lower age 15 internalizing

symptoms for the no-loss group as well ($\beta s = -0.104$; -0.096, $ps < 0.05$). Higher age 15 parent-

child relationship quality significantly associated with lower age 15 depressive symptoms for the

no-loss group only ($\beta = -0.046$, $p < 0.05$), and age 15 child-parent relationship quality did not

significantly associate with anxiety symptoms for any groups ($ps > 0.05$). Among the middle

childhood and no-loss groups, age 15 general relationship quality was not associated with age 15

internalizing symptoms. For the early childhood loss group, higher age 15 general relationship

quality marginally associated with lower age 15 anxiety symptoms ($\beta = -0.207$, $p = 0.09$) but did

not predict depressive symptoms ($p > 0.05$). Interestingly, for the late childhood loss group,

higher age 15 general relationship quality marginally associated with age higher 15 depressive

symptoms ($\beta = 0.174$, $p = 0.07$), which was in the opposite direction than expected. All

associations between relationship quality variables and internalizing symptoms are presented in

Table 6.

Next, the average impact of relationship quality variables on internalizing symptoms variables across all four groups was examined. The average impact reflects the overall association between the relationship quality and internalizing symptom variables across all four groups, calculated by multiplying the paths from each group model by its sample size and averaging the path across the four groups; this approach was taken to account for the large differences in sample size between the groups. At age 9, there was a significant average impact of child-peer relationship quality on anxiety symptoms (β = -0.024, *SE* = 0.010, *p* = 0.015), but not on depressive symptoms (*p* > 0.05). There was no average impact of age 9 child-parent relationship quality on age 9 internalizing symptoms (*ps* > 0.05). At age 15, there was a significant average impact of child-peer relationship quality on depressive symptoms (β = -0.105, *SE* = 0.024, *p* = 0.000) and on anxiety symptoms (β = -0.099, *SE* = 0.041, *p* = 0.017). There was also a significant average impact of age 15 parent-child relationship quality on depressive symptoms (β = -0.044, *SE* = 0.015, *p* = 0.003), but not on anxiety symptoms (*p* > 0.05). There was no average impact of age 15 general relationship quality on internalizing symptoms (*ps* > 0.05).

Finally, the mean differences of each relationship quality variable between the no-loss group and each of the three loss groups were multiplied by the average path. This computed parameter constitutes the indirect effect (i.e., loss → relationship quality → internalizing symptoms), which described whether a loss leads to internalizing symptoms via lower relationship quality with peers, parents and/or general relationship quality. The significance of the indirect path was estimated with replicate weights first. Then, the significance of the indirect effect parameter was also assessed using bootstrapping[3], but without including replicate weights.

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[3] The bootstrapped results did not include auxiliary variables.

Two separate analyses were conducted because of the inability to use bootstrapping methods and simultaneously include replicate weights. Estimating the indirect effects using bootstrapping methods were important to take non-normality (which is often the case for indirect effects) into account. In both analyses, no indirect paths were significant ($ps > 0.05$). All indirect effects estimated with replicate weights are presented in Table 7.

Research Question 4: (a) Does early attachment security moderate the effect of experiencing the death of a close family member on internalizing symptoms? (b) Does early attachment security moderate the effect of experiencing the death of a close family member and relationship quality with peers, parents, and general relationship quality? (c) Does early attachment security moderate the association between peer relationship quality and internalizing symptoms differently for children who experienced the death of a close family member compared to children who experienced no-loss?

To test Research Questions 4a and 4b a new parameter that compares the differences in parameters between each of the three loss groups and no-loss group from the early attachment security variable to each variable of interest was created (see Figure 4). This new parameter constitutes the moderating role of attachment security, by showing whether attachment security interacts with experiencing the death of a close family member to predict each variable of interest (i.e., internalizing symptoms, relationship quality with parents, peers, and general relationship quality). To test Research Question 4c, the path between the interaction of attachment security and peer relationship quality was compared between the no-loss group and each of the three loss groups (see Figure 4). This new parameter constitutes the group differences in the moderating role of attachment security on the association between peer relationship quality and internalizing symptoms.

Research Question 4a: Does early attachment security moderate the link between experiencing the death of a close family member and internalizing symptoms at age 9 and age 15?

Early attachment security did not moderate the association between experiencing the death of a close family member in early or middle childhood and internalizing symptoms at age 9 or at age 15 ($ps > 0.05$). Similarly, early attachment security did not moderate the association between experiencing the death of a close family member in late childhood and internalizing symptoms at age 9 or anxiety symptoms at age 15 ($ps > 0.05$). On other hand, early attachment security marginally moderated the association for the late childhood loss group (vs. no-loss group) and age 15 depressive symptoms, such that children with higher early attachment security showed a weaker association between being in the late childhood loss group and depressive symptoms compared to children with lower attachment security (estimated difference = -1.003, SE = 0.536, p = 0.06). Specifically, for the children in the late childhood loss group, the association between early attachment security and age 15 depression was more strongly negative (β = -1.417, SE = 0.458, p = 0.002) compared to no-loss group (β = -0.415, SE = 0.202, p = 0.040). In other words, higher attachment security was associated with lower depressive symptoms at age 15 for both the late childhood and no-loss group, but the protective effect of early attachment security was stronger for the group that experienced the death of a close family member compared to not experiencing the death of a close family member. In sum, early attachment security marginally buffered the effects of experiencing the death of a close family member during late childhood and depressive symptoms (see Figure 5). All associations for the interaction between early attachment security and loss and its association with internalizing symptoms are presented in Table 8.

Research Question 4b: Does early attachment security moderate the association between experiencing the death of a close family member and relationship quality at age 9 and age 15?

Early attachment security did not moderate the association between experiencing the death of a close family member at any age and any relationship quality at age 9 and 15 ($ps > 0.05$). All associations for the interaction between early attachment security and loss and its association with relationship quality variables are presented in Table 9.

Research Question 4c: (c) Does early attachment security moderate the association between peer relationship quality and internalizing symptoms differently for children who experienced the death compared to children who experienced no-loss at age 9 and age 15?

There were no significant differences in how early attachment security moderated the association between age 9 child-peer relationship quality and age 9 internalizing symptoms between any of the loss groups and the no-loss group ($ps > 0.05$). Further, early attachment security did not moderate the association for the middle childhood loss group at age 15 either ($p > 0.05$). However, early attachment security did moderate the association between age 15 child-peer relationship quality and age 15 internalizing symptoms for the early and late childhood loss group in different ways. The results for these two groups are presented in the following sections. All group differences in the moderating role of early attachment security on the association between child-peer relationship quality and internalizing symptoms at ages 9 and 15 are presented in Table 10.

No-Loss vs Early Childhood Loss. The difference in the moderating role of early attachment security for the association between age 15 child-peer relationship quality and age 15 depressive symptoms between the no-loss group and the early childhood loss group was not significant ($ps > 0.05$). However, the difference in the moderating role of early attachment

security for the association between age 15 child-peer relationship quality and age 15 anxiety symptoms between the no-loss group and early childhood loss group was significant (estimated difference = 0.647, *SE* = 0.234, *p* = 0.006). Specifically, age 15 child-peer relationship quality was significantly negatively associated for the no-loss group (β = -0.096, *SE* = 0.048, *p* = 0.045), whereas it was not associated with age 15 anxiety symptoms for the early childhood loss group (β = 0.092, *SE* = 0.100, *p* = 0.359). For both groups, the interaction of early attachment security and age 15 peer relationship quality was nonsignificant (no-loss: β = 0.079, *SE* = 0.119; early loss: β = -0.143, *SE* = 0.268; *ps* > 0.05*)* Although the interaction of early attachment security and age 15 child-peer relationship quality was nonsignificant for both groups, the difference of this interaction between the group was significant, such that the effect of the moderating role of attachment security was stronger for the early childhood loss group compared to the no-loss group. In sum, early attachment security buffered the effect of age 15 child-peer relationship quality on its impact on age 15 anxiety symptoms more strongly for the early childhood loss group, such that children with higher attachment security showed a more negative association between age 15 peer relationship quality and age 15 anxiety symptoms compared to children with lower attachment security (see Figure 6).

No-Loss vs Late Childhood Loss. The difference in the moderating role of attachment security for the association between age 15 child-peer relationship quality and age 15 anxiety symptoms between the no-loss group and the late childhood loss group was not significant (*ps* > 0.05). However, the difference in the moderating role of early attachment security for the association between age 15 child-peer relationship quality and age 15 depressive symptoms between the no-loss group compared to the late childhood loss group was significant (β = 0.321, *SE* = 0.160, *p* = 0.045). Specifically, for the no-loss group, age 15 child-peer relationship quality

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negatively associated with age 15 depressive symptoms (β = -0.104, *SE* = 0.027, *p* = 0.000), whereas for the late-loss group this association was more strongly negative (β = -0.239, *SE* = 0.064, *p* = 0.000). Further, attachment security moderated the association between age 15 peer relationship quality and age 15 depressive symptoms for both the no-loss group (β = 0.132, *SE* = 0.053, *p* = 0.013), and for the late childhood loss group (β = 0.453, *SE* = 0.145, *p* = 0.002). In sum, early attachment security buffered the stronger negative association between peer relationships and depressive symptoms for children who were in the late childhood loss group more strongly compared to the no-loss group, such that the strength of association was weaker for children with higher attachment security compared to children with lower attachment security (see Figure 7).

Exploratory Analyses

Exploratory Question 1: Do the four research questions above differ by the timing of experiencing a death?

To examine whether there are differences depending on when a child experiences a death of a close family member, the research questions 1-4 were repeated, this time comparing the three loss groups to one another (i.e., early vs middle childhood loss; early vs late childhood loss; middle vs late childhood loss). There were no group differences between the three loss groups for Research Questions 1, 2, or 3. Specifically, there were no differences in internalizing symptom variables or relationship quality variables, and no significant indirect effects were found when comparing the three loss groups to one another (*p* > 0.05).

There were two significant differences in the moderating role of early attachment security between the early and late childhood loss groups. First, there was a significant moderating role of attachment security at path c (Figure 1). Specifically, early attachment security moderated the

association between experiencing the death of a close family member during early compared to late childhood and age 15 depressive symptoms (estimated differences = 1.763, $SE = 0.646$, $p = 0.006$). For the early childhood loss group, the association between early attachment security and age 15 depression was nonsignificant ($\beta = 0.344$, $SE = 0.379$, $p = 0.364$), whereas for the late childhood loss group, it was significantly negative ($\beta = -1.417$, $SE = 0.458$, $p = 0.002$), and the difference between these paths were significant. In other words, early attachment security buffered the association between experiencing the death of a close family member during late childhood and age 15 depressive symptoms, such that children with higher attachment security show a weaker association compared to children with lower attachment security (see Figure 8).

Second, there was a significant difference between the early and late childhood loss group in how early attachment security moderated path b (Figure 1). Specifically, there was a significant difference in how early attachment security moderated the association between age 15 peer relationship quality and age 15 depressive symptoms (estimated differences = -0.548, $SE = 0.179$, $p = 0.002$). For the early childhood loss group,15 child-peer relationship quality was not associated with age 15 depressive symptoms ($\beta = 0.074$, $SE = 0.079$, $p = 0.354$) whereas for the late childhood loss group, there was significantly negatively association ($\beta = -0.239$, $SE = 0.064$, $p = 0.000$) Further, for the early childhood loss group, early attachment security did not moderate the association between age 15 child-peer relationship quality and age 15 depressive symptoms ($\beta = -0.095$, $SE = 0.131$, $p = 0.468$) whereas for the late childhood loss group, it positively and significantly moderated this association ($\beta = 0.453$, $SE = 0.145$, $p = 0.002$). In summary, early attachment security buffered the association between age 15 child-peer relationship quality and age 15 depressive symptoms more strongly for the late childhood loss group compared to the early childhood loss group, such that children with higher attachment showed a weaker

association compared to children with lower attachment security (see Figure 9). No other significant differences were found between the early childhood loss group and the late childhood loss group ($ps > 0.05$). In addition, there were no significant differences between the middle childhood loss group and the early or the late childhood loss group.

Exploratory Question 2: Does relationship quality with parents have more impact on internalizing symptoms depending on the child's age at outcome (i.e., at age 9 vs at age 15) for those who experienced a death compared to experiencing no death?

To answer this question, I first examined whether the strength of association between child-parent relationship quality and internalizing symptoms differed across the two time points of outcome (i.e., at age 9 and at age 15) within each of the four groups. For this question, the internalizing symptoms items were matched between age 9 and age 15, such that the same items were used to represent each construct (i.e., depressive and anxiety symptoms) at both ages. No significant differences in the strength of association between age 9 child-parent relationship quality and internalizing symptoms compared to age 15 child-parent relationship quality and internalizing symptoms were found in any group ($ps > 0.05$). Next, I examined whether the difference in the strength of association across the two time points differed between any of the three loss groups compared to the no-loss group. Again, no statistical differences were found ($ps > 0.05$).

Chapter 4: Discussion

The present study utilized a longitudinal population-based cohort study (FFCWS), and employed a multigroup comparison framework to examine differences in outcomes (internalizing symptoms), mechanisms (relationship quality), and protective factors (early attachment security) for children who experienced the death of a close family member during three developmental stages (i.e., early childhood, middle childhood, and late childhood/early adolescence) compared to children who did not experience any close family death by age 15 (Research Questions 1-4). The study also exploratively examined differences in the above outcomes, mechanism, and protective factors between children who experienced the death of a close family member during different developmental stages (Exploratory Question 1). Finally, the study exploratively examined whether there were differences in how parent-child relationship quality impacts internalizing symptoms, depending on whether they were measured at age 9 or at age 15 (Exploratory Question 2). Although many of the hypothesized associations were not found, findings highlight some buffering role of early attachment security for children who experienced the death of a close family member during early and late childhood.

In this section, I will first consider the findings of this study in two parts. First, I will consider the overall null findings of Research Questions 1-3, which investigated differences in levels of internalizing symptoms and relationship quality between the no-loss group and each of the three childhood loss groups, and whether relationship quality is a mechanism between experiencing the death of a close family member and internalizing symptoms at age 9 and at age 15. Here, I will also consider the null findings of Exploratory Question 1 (which similarly examined these differences between each of the three loss groups), as well as the null findings of Exploratory Question 2 (which examined whether child-parent relationship quality has more

impact on internalizing symptoms depending on the age at which child outcome is assessed).

Second, I will consider Research Question 4, which examined the moderating impact of early

attachment security when comparing the no-loss group to each of the three loss groups, followed

by the findings for Exploratory Question 1 that examined the moderating impact when

comparing each of the three loss groups to one another. Following the discussion of findings, I

will discuss the study strengths and limitations, and conclusions.

Internalizing Symptoms, Relationship Quality, and Time of Loss (Research Questions 1-3)

Group Differences in Levels of Internalizing Symptoms and Relationship Quality

Contrary to previous studies, no significant differences were found between the no-loss

group and each of the three loss groups in the levels of internalizing symptoms (path c, Figure 1)

or relationship quality (path a, Figure 1) at age 9 or at age 15. Similarly, there were no significant

differences observed among the three loss groups.

Relationship Quality as a Predictor of Internalizing Symptoms

The study found partial support for relationship quality with parents and peers at age 9

and age 15 as a predictor for concurrent internalizing symptoms. There was an average impact

(defined/described in the results section) of age 9 and age 15 child-peer relationship quality on

some anxiety symptoms and an average impact of age 15 peer and parent relationship quality on

depressive symptoms when examining the four groups collectively, while taking the sample size

of each group into account. When the no-loss group and the three loss groups were examined

separately, there were also some descriptive similarities and differences for whether peer and

parent relationship quality predicted internalizing symptoms. For example, age 9 relationship

quality variables did not predict internalizing for any groups, whereas age 15 child-parent

relationship quality was associated with concurrent depressive symptoms for the no-loss group

only, and child-peer relationship quality was associated with concurrent internalizing symptoms for both the no-loss and late childhood loss group only. To note, there were no differences in the impact of child-parent relationship quality on internalizing symptoms regardless of whether the child was assessed at age 9 or age 15.

These findings converge with previous studies that have shown that support from parents and peers may influence internalizing symptoms during early adolescence (Lyell et al., 2020). The finding also suggests that child-peer relationship quality might be particularly important for anxiety symptoms whereas parent relationship quality may be more important for depressive symptoms, and that relationship quality with parents and peers are collectively more predictive of internalizing problems at age 15 compared to at age 9. Finally, these findings indicate that in the context of considering timing of experiencing the death of a close family member, quality of relationship with peers may be most important for children who experienced the death of a close family member during late childhood/early adolescence. This converges with a previous report that grieving adolescents tend to spend more time with their peers (Harris, 1991).

The study also separately examined the impact of general relationship quality with a non-specific other at age 15 on concurrent internalizing symptoms. No average impact of general relationship quality on internalizing symptoms was found. However, general relationship quality predicted marginally lower anxiety symptoms (but not depressive symptoms) for the early childhood loss group only, whereas it predicted marginally higher depressive symptoms (but not anxiety symptoms) for the late childhood loss group only. This may suggest that general relationship quality is particularly important for internalizing symptoms for the early and late loss groups. However, for the late loss group, higher general relationship quality may not have a positive impact. This may suggest that for children who experienced the death of a close family

member during late childhood, a sense of having *someone* who is there for them is not sufficient, and that having quality of relationship with a specific person (i.e., parent or peer) is most important.

Relationship Quality as a Mechanism between Loss and Internalizing Symptoms

Although some descriptive group differences were found in how/which relationship quality predicts internalizing symptoms, relationship quality was not a mechanism for explaining the link between experiencing the death of a close family member and internalizing symptoms. In sum, the hypotheses for Research Questions1-3, and the exploratory questions regarding these three questions were largely not supported.

Summary and Conclusions: Internalizing Symptoms, Relationship Quality, and Loss

These nonsignificant findings of differences in the levels of internalizing symptoms and relationship quality, as well as nonsignificant finding of relationship quality as a mechanism for children who experienced the death of a close family member may be due to several factors. Firstly, it may have been due to the age at which the outcomes were measured. A meta-analysis that examined childhood bereavement studies and its impact on developing anxiety, affective, or other psychotic disorders included studies that examined outcomes *after* the age of 15, with the majority being measured after the age of 18 (McKay et al., 2021). Thus, it is possible that the association between experiencing a death and internalizing problems and relationship quality manifests later in life during adulthood. Indeed, our study found hardly any associations at age 9 (except for the average impact of age 9 peer relationship quality on concurrent anxiety symptoms), suggesting that the impact of experiencing the death of a close family member may not appear when children are younger. Although parent, peer, and general relationship quality did predict depressive and/or anxiety symptoms on average and for some of the groups at age 15, no

indirect effects of relationship quality between experiencing loss and internalizing symptoms were found. This may indicate that although relationship quality begins to impact internalizing symptoms at age 15, the impact of loss does not manifest strongly at age 15.

Another reason may be due to the fact that this study considered deaths of parents, grandparents in the household, and maternal grandmother as close family deaths, but was unable to assess how relationally close the children felt to the deceased family member. Thus, it is possible that some children in each loss group do not accurately represent children who experienced relationally close family deaths.

Finally, there may have been measurement related issues that hindered the ability to reliably capture the constructs of interest. First, this study only included parent-reported internalizing symptoms. Considering that past studies have shown that bereaved children self-report more psychiatric symptoms compared to their parents (Dowdney, 2000), it may have been important to include child-reported internalizing symptoms. Further, the assessment of child-peer relationship quality was measured through 1 item only, which likely was not the most reliable measure. Likewise, the assessment of child-parent relationship contained only 2 items for each parent, which may not have adequately captured the diverse ways in which children experience and perceive the quality of their relationship with their parents. Considering that relationship quality involves aspects such as trust, feeling of security, satisfaction, expression of emotion (Farooqi, 2014), more items were likely required to fully capture this construct.

The Moderating Role of Early Attachment Security (Research Question 4)

Now, I turn to findings regarding the moderating role of attachment security for children who experienced the death of a close family member at different developmental stages. Although past studies have demonstrated the buffering effects of early attachment security against many

forms of adversities and challenges during childhood (e.g., Dallaire & Weinraub, 2007; El-Sheikh & Elmore-Staton, 2004; Tang et al., 2021; Whittenburg et al., 2023), to my knowledge, this is the first study that has examined the moderating role of early attachment security on psychosocial outcomes after experiencing the death of a close family member during childhood.

In sum, findings indicated that early attachment security showed a moderating effect on path c and path b (see Figure 1) at age 15 (but not at age 9) for the early and late childhood loss group (but not the middle childhood loss group). No moderating effects were found for path a (see Figure 1). I will now delve more deeply into the findings concerning paths c and b and discuss how early attachment security acted as a moderator.

Attachment Security Moderated Path C (Loss → Depressive Symptoms)

The moderating role of early attachment security between experiencing the death of a close family member and internalizing symptoms (path c, Figure 1) was examined by comparing the three loss groups to the no-loss group (Research Question 4a) and the three loss groups to one another (Exploratory Question 1). Attachment security marginally moderated the association between experiencing the death of a close family member and age 15 depressive symptoms (but not anxiety symptoms) for the late childhood loss group only, when compared to both the no-loss (see Figure 5) and early loss group (see Figure 8). It is important to note that early attachment security directly related to lower depressive symptoms for both the late and no-loss group, but the protective effect of early attachment security was stronger for children who experienced the death of a close family member during late childhood/early adolescence compared to children who experienced no death of a close family member. Further, attachment security did not directly relate to depressive symptoms for the early or middle childhood loss groups.

Considering that experiencing the death of a loved one during the developmental period of adolescence has been posited to be particularly difficult (Worden, 1996), the findings indicate that these difficulties may be (at least marginally) mitigated if children had high attachment security early in life. This finding contrasts with the results of a meta-analysis of studies with 3–18-year-old children, which showed that the association between secure attachment and lower internalizing problems was more pronounced for children who were *not* exposed to family risk factors such as parental psychopathology, maltreatment history, and an incarcerated parent (Madigan et al., 2016). Although, this meta-analysis did not include childhood bereavement, childhood bereavement could be considered a family risk factor as well. Contrary to findings from Madigan et al. (2016), this study shows that the impact of higher security is more pronounced for children who experienced late childhood loss compared to no-loss. At the same time, the meta-analysis included a larger age range, whereas this study found support for the late-childhood loss group only. Therefore, this may indicate that early attachment security has a more pronounced effect on internalizing symptoms only when family risk (e.g., childhood bereavement) is experienced later but not earlier in childhood. Another possible explanation is that Madigan et al. (2016) considered family risk as zero or one or more risks and did not differentiate the type of family risk. It is possible that attachment security can buffer for some but not other types of family risk. Future studies should try and disentangle the types of family risk that attachment security can buffer the negative outcomes for.

The reason for why the moderating role of attachment security was observed only in the late childhood loss group at age 15 may be attributed to the timing of the outcome measurement, which most closely followed the experience of the death of a close family member for the late loss group compared to the early and middle childhood loss groups. At the same time, given that

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no moderating role was evident at age 9 for the middle childhood loss group (loss between ages 5-9), even when the loss occurred most proximately at this age for this group, it is nonetheless possible that there are specific aspects related to experiencing the death of a close family member during late childhood/early adolescence that prompt early attachment security to moderate the association between loss and depressive symptoms. However, since only a marginal moderating effect was observed ($p = 0.06$), future studies are warranted to validate this finding.

Group Differences in Attachment Security as a Moderator for Path B (Peer Relationship Quality → Internalizing Symptoms)

The between-group differences in the moderating role of early attachment security on the association between peer relationship quality and internalizing symptoms (path b) at age 9 and age 15 were examined by comparing the no-loss group to the three loss groups (Research Question 4c) and the three loss groups to one another (Exploratory Question 1). Early attachment security differentially moderated path b among the following group comparisons at age 15 only: no-loss vs early loss, no-loss vs late loss, and early vs late loss. To my knowledge, no other studies have examined how early attachment security moderates the link between peer relationship quality and internalizing problem for any population. I will now consider these novel findings below.

No-Loss vs Early Childhood Loss. When comparing the no-loss group to the early loss group, early attachment security moderated the association between child-peer relationship quality and anxiety symptoms (but not depressive symptoms) more strongly for the early loss group. Specifically, for the no-loss group, the association between child-peer relationship and anxiety symptoms was negative at both lower and higher early attachment security levels. On the other hand, for the early loss group, there was a slightly nonsignificant but positive association

between child-peer relationship quality and anxiety symptoms at the lower early attachment security level, but the association between child-peer relationship quality and anxiety symptoms shifted to a nonsignificant and negative association at the higher early attachment security level (see Figure 6). Thus, the moderating effect of early attachment security for the association between peer relationship quality and anxiety symptoms was more pronounced for the early loss group.

The finding of a stronger moderating role of early attachment security on the association between peer relationship quality and anxiety symptoms for the early loss group suggests that children who undergo the loss of a close family member in early childhood but have higher levels of early attachment security, may be better protected from the effect of peer relationship quality and its influence on anxiety symptoms. However, given that there were no differences in internalizing symptoms, relationship quality with peers, and there were no significant interaction of early attachment security and peer relationship quality on anxiety symptoms, future studies are needed to validate this interpretation.

No-Loss/Early Loss vs Late Childhood Loss Group. On the other hand, when separately comparing the no-loss and early loss group to the late loss group, early attachment security moderated the association between child-peer relationship quality and depressive symptoms (but not anxiety symptoms) more strongly for the late loss group. Specifically, for the late loss group, the association between peer relationship quality and depressive symptoms was strongly negative when attachment security was low, but this association became considerably weaker when attachment security was high. On the other hand, for the no-loss group, the negative association between peer relationship quality and depressive symptoms was evident regardless of the attachment security level (see Figure 7) and for the early loss group, there was

no association between peer relationship quality and depressive symptoms regardless of the attachment security level (see Figure 9).

The finding that peer relationship quality had a stronger impact on depressive symptoms for children who experience late childhood/early adolescence loss aligns with reports indicating that grieving adolescents spend more time with their peers (Harris, 1991), and that early adolescents who have experienced the death of close others look to peers for acceptance and a sense of belonging (Balk, 2011). In general, susceptibility to peer influence during adolescence has been associated with negative outcomes such as depression (Allen et al., 2006). Thus, adolescents who experience the death of someone close to them may be particularly susceptible to the influence of peers having impact on their depressive symptoms, but having a higher early attachment security may buffer against the vulnerability to peer influence.

Summary of Attachment Security as a Moderator for Path B. In sum, these findings of the moderating role of early attachment security at path b for the early and late loss groups suggests that when a child experiences the death of a close family member, child-peer relationship quality may function differently in its relation to internalizing symptoms, and early attachment security can protect children from the impact of child-peer relationship on internalizing symptoms. To my knowledge, this is the first study that showed that early attachment security buffers the link between peer relationship quality and internalizing symptoms for any population, converging and extending past studies that have demonstrated that quality of parent-child relationship broadly buffers children from the effects of peer relationship quality (e.g., Hazel et al., 2014; Zarra-Nezhad et al., 2019). Further, the findings highlight that early attachment security may be particularly protective for the association between peer relationship quality and internalizing symptoms for children who experience the death of a close

family member during early and late childhood. Finally, the findings suggest that there needs to be special attention paid to children who experience the death of a close family member during late childhood, considering that most significant findings were observed for these children.

Attachment Security as a Moderator: Summary and Conclusions

Overall, findings indicate that early attachment security mostly buffers the impact of experiencing the death of a close family member during late childhood on age 15 depressive symptoms. When the early loss group was compared to the no-loss group, early attachment security also moderated the association between age 15 child-peer relationship quality and anxiety symptoms more strongly (indicating that early attachment security functions differently for the early loss group compared to the no-loss group). Yet, early attachment security did not significantly moderate this link for either group when examined separately. In other words, it is unclear whether early attachment security buffers the effect of early loss. Thus, the findings from the present study suggest that early attachment security may be particularly protective for the late childhood loss group.

Given that experiencing the death during adolescence has been shown to be particularly difficult because of the transitional period of this time (Worden, 1996), it is important to identify how these children can be protected from negative outcomes. The findings highlight that early childhood attachment security can have long lasting effects on protecting children in the face of loss to some degree, but that this may depend on the timing at which the child experiences the loss. Future studies should continue to examine how losing a close family member during different developmental stages differentially impact outcomes overtime.

Strengths, Limitations, Future Directions, and Conclusions

Strengths

The strengths of this study include utilization of a large secondary dataset from a longitudinal population-based cohort study, inclusion of replicate weights for unbiased estimates for the cities from which children were sampled, the examination of multiple pathways to explore theorized mechanisms and outcomes for bereaved children, and utilization multi-reporter assessments during childhood. This allowed for understanding of how children who experience the death of a close family member are faring at a population level, as well as a more nuanced comprehension of various aspects of their experiences that may influence later outcomes. In addition, since many childhood bereavement studies examine outcomes in adulthood (e.g., Berg et al., 2016; Brent et al., 2012), this study adds to the literature by investigating how the impact of close family death may manifest during childhood. Further, the study also included a broader range of close family deaths and considered the impact of experiencing these deaths at three distinct developmental stages. Considering that past studies have largely focused on parental death (e.g., Brent et al., 2009; Cerel et al., 2006; Stikkelbroek et al., 2016) and few studies have compared outcomes of experiencing the death during different developmental stages (Cerniglia et al., 2014), this study extends previous research to understand the importance of whether the death of proximal family members (regardless of who the person is) and the timing at which the child experiences these deaths impact outcomes differently. Finally, the study demonstrates the ability to capitalize on available datasets to examine populations that may be difficult to recruit (i.e., children who experienced the death of a close family member.)

Limitations and Future Directions

Although there are notable strengths to this study, there are limitations as well. Further, many of the strength are accompanied by corresponding limitations. In this section, I will discuss these limitations and their implications for informing future studies. Although the use of a

longitudinal population-based longitudinal cohort study and the use of replicate weights allowed for generalizable findings, this approach may also have contributed to null findings for several reasons.

First, since the original dataset was not designed to examine childhood bereavement, the sample consisted of very few children who experienced the death of a close family member. This led to large differences in the sample size between the no-loss group and the three loss groups. Despite the fact that the study employed statistical techniques aimed at mitigating the effects of the uneven sample size across groups, it is possible that it nonetheless hindered the accurate comparison of the groups of interests.

Second, although the replicate weights allowed for generalizing these findings to the cities at which children were born, this may not accurately represent children who are at higher risk of experiencing the death of a close family member during childhood. For example, studies have shown that those who are more educated may have lower risk of mortality over the lifespan (Kitagawa & Hauser, 1973; Hummer & Lariscy, 2011). As a result, children with families that have lower education may experience the death of a close family member younger compared to children who have families with higher education. Thus, it may be important for future studies to focus more specifically on children who are at higher risk, rather than focusing on the population level.

Third, although we were able to examine the death of a close family member at three developmental stages, the age range included for each group (which was largely influenced by available timepoints of data) may not have been the best representation of different transitional periods during childhood. For example, the middle childhood loss group consisted of children who experienced the death between age 5 and age 9, and the late childhood loss group consisted

of children who experienced the death between age 9 and age 15. There are many developmental transitions during both age ranges. For example, it has been shown that children from ages 6 to 11 (often referred to as middle childhood), experience shifts in aspects such as cognition, social behavior, and psychopathology (DelGiudice, 2017). Additionally, a prior study found that children who experienced a death between ages 12-15 were twice as likely to experience depressive symptoms compared to children who experienced the death between the ages 8-11 (Gersten et al., 1991). Thus, future research should divide timing at loss by developmental stages that may be more meaningful in relation to established developmental stages.

Fourth, this study considered deaths of parents, grandparents in the household, and maternal grandmother as close family deaths, but was unable to assess how relationally close the children felt to the deceased family member, as this was not captured in the dataset. Thus, it is possible that not all children in each loss group accurately represent children who experienced relationally close family deaths. Future studies should include measures that can capture how close the child felt to the deceased family member. Overall, this highlights the limitation of using a secondary dataset that was not intended to examine the question at hand.

Further, children in this sample had overall low levels of internalizing symptoms and high levels of relationship quality across groups. As previous studies have shown, although some children who experienced death show long term effects, others do not (Akerman & Statham, 2011; Dowdney, 2000; Haine et al., 2008; Ratnarajah & Schofield, 2007) — capturing these differences and examining the mechanism between those who exhibit clinical and/or long-term effects of experiencing the death of a close family member is likely important for identifying those who struggle the most, and examining what contributes to these differences.

Additionally, there may have been measurement issues that did not reliability capture the constructs of interest. First, this study included parent-reported internalizing symptoms only. Studies have found that cross informant correlations tend to be weak for children's internalizing symptoms (De Los Reyes et al., 2015), and that different reporters may tap into different aspects of children's internalizing symptoms (De Los Reyes et al., 2023). Thus, future studies should carefully consider the reporter of the constructs of interest and select measures from informants that reliably captures the outcomes associated with childhood bereavement. Further, the relationship quality measures have some limits. Both relationship quality with peers and parents were measured through few items, which may not have adequately captured the diverse ways in which children experience and perceive the quality of their relationship with their peers and parents. Future studies should include items that more comprehensively capture relationship quality with both peers and parents and focus on aspects of these relationships that hold particular significance for children who experienced the death of a close family member. Finally, the study examined associations between relationship quality and internalizing symptoms assessed at the same time point. Future studies should utilize multiple time points to assess whether relationship quality assessed after experiencing the death associates with internalizing symptoms at a later time, to establish temporal precedence.

Conclusions

Despite these limitations and largely nonsignificant findings for direct and indirect effect (mechanism) questions, this study identified one potential source of protection for at least some children who experienced the death of a close family member during childhood: early attachment security. Considering that attachment security measured at age 3 buffered internalizing symptoms at age 15, this study highlights the possible long-term protective role of early

attachment security. Experiencing the death of a close family member is an unavoidable human experience. Although most children go through childhood without experiencing close family deaths, others unfortunately encounter this experience early on, which can have a long-lasting impact on psychosocial wellbeing (e.g., Livings et al., 2022; Dyregrov & Dyregrov, 2005; Feigelman et al., 2017). Thus, it is important to continue to investigate pathways through which experiencing the death of a close family member during childhood impacts later outcomes, and identify children who struggle the most, so that these children can be better supported. Finally, this study further highlights the importance of fostering security early in life, so that children may be more protected from negative impacts of adverse experiences.

Tables

Table 1

Basic Demographics for Total Analytic Sample and by Each Group

	Total Sample	Early Loss Group	Middle Loss Group	Late Loss Group	No-Loss Group
Sample size N (%)	4,714 (100%)	221 (4.69%)	225 (4.77%)	315 (6.68%)	3,953 (83.86%)
Child gender					
Girl	2,306 (47.80%)	104 (47.1%)	106 (47.1%)	150 (47.6 %)	1,896 (48.0%)
Boy	2,516 (52.20 %)	117 (52.9 %)	119 (52.9%)	165 (52.4 %)	2,057 (52.0 %)
Mother's race/ethnicity					
Black, non-Hispanic	2,222 (47.1%)	148 (67.0%)	131 (58.2%)	170 (54.0%)	1,773 (44.9%)
Hispanic	1,292 (27.4%)	44 (19.9%)	45 (20.0%)	66 (21.0%)	1,137 (28.8%)
White, non-Hispanic	999 (21.2%)	25 (11.3%)	41 (18.2 %)	66 (21.0%)	867 (21.9%)
Other	191 (4.10%)	4 (1.80%)	7 (3.1%)	13 (4.10 %)	167 (4.20%)
Missing	10 (0.20 %)	NA	1 (0.40%)	NA	9 (0.20%)
Father's race/ethnicity					
Black, non-Hispanic	2,305 (48.9%)	147 (66.5%)	144 (64.0%)	180 (57.1%)	1,834 (46.4%)
Hispanic	1,307 (27.7%)	47 (21.3%)	46 (20.4%)	61 (19.4%)	1,153 (29.2%)
White, non-Hispanic	869 (18.4%)	21 (9.5%)	26 (11.6%)	57 (18.1%)	763 (19.3%)
Other	209 (4.40%)	6 (2.7%)	9 (4.0%)	16 (5.1%)	178 (4.5%)
Missing	26 (0.60%)	NA	NA	1 (0.30%)	25 (0.60%)
Mother's education					
Less than high school	1,642 (34.9%)	96 (43.4%)	88 (39.1%)	99 (31.4%)	1,359 (34.4%)
High school or equivalent	1,435 (30.5%)	69 (31.20%)	67 (29.8%)	102 (32.4%)	1,197 (30.3%)
Some college	1,133 (24.1%)	52 (23.5%)	54 (24.0%)	74 (23.5%)	953 (24.1%)
College or graduate	499 (10.6%)	4 (1.8%)	16 (7.1 %)	40 (12.7%)	439 (11.1%)
Missing	5 (0.1%)	0 (0%)	0 (0%)	0 (0%)	5 (0.13 %)
Father's education					
Less than high school	1,565 (34.6%)	97 (45.5%)	75 (34.4%)	104 (34.4%)	1,289 (34.0%)
High school or equivalent	1,619 (33.6%)	75 (35.2%)	91 (41.7 %)	115 (38.1%)	1,238 (32.7%)
Some college	971 (21.5%)	35 (15.4%)	35 (16.1%)	52 (17.2%)	849 (22.4%)
College or graduate	465 (10.3%)	6 (2.80%)	17 (7.8 %)	31 (10.3%)	411 (10.9%)
Missing	194 (4.1%)	8 (3.61%)	7 (3.11 %)	13 (4.13%)	166 (4.20 %)

Table 2

Descriptive Statistics (Means and Standard Deviations) for Key Study Variables: Raw Data and Winsorized Data

	Total Sample		Early Loss Group		Middle Loss Group		Late Loss Group		No-Loss Group	
	Raw	Win	Raw	Win	Raw	Win	Raw	Win	Raw	Win
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Child-peer relationship quality (Y9)	2.79 (1.46)	NA	2.66 (1.47)	NA	2.71 (1.45)	NA	2.81 (1.51)	NA	2.81 (1.45)	NA
Child-peer relationship quality (Y15)	3.30 (0.80)	3.35 (0.69)	3.24 (0.94)	3.32 (0.76)	3.27 (0.76)	3.31 (0.67)	3.34 (0.74)	3.37 (0.64)	3.30 (0.80)	3.35 (0.39)
Child-parent relationship quality (Y9)	3.27 (0.65)	3.29 (0.61)	3.25 (0.64)	3.26 (0.61)	3.34 (0.59)	3.34 (0.58)	3.25 (0.70)	3.28 (0.64)	3.27 (0.65)	3.29 (0.61)
Child-parent relationship quality (Y15)	2.96 (0.73)	NA	2.97 (0.75)	NA	3.05 (0.74)	NA	3.04 (0.71)	NA	2.94 (0.73)	NA
General relationship quality (Y15)	3.77 (0.40)	3.79 (0.32)	3.78 (0.41)	3.80 (0.33)	3.71 (0.49)	3.76 (0.36)	3.78 (0.36)	3.79 (0.31)	3.77 (0.39)	3.79 (0.32)
Depressive symptoms (Y9)	0.10 (0.18)	0.08 (0.13)	0.09 (0.15)	0.08 (0.11)	0.10 (0.23)	0.08 (0.13)	0.10 (0.18)	0.09 (0.13)	0.09 (0.18)	0.08 (0.13)
Depressive symptoms (Y15)	0.21 (0.30)	0.20 (0.26)	0.22 (0.29)	0.21 (0.26)	0.22 (0.32)	0.20 (0.26)	0.21 (0.29)	0.21 (0.26)	0.21 (0.30)	0.19 (0.26)
Anxiety symptoms (Y9)	0.24 (0.28)	0.23 (0.24)	0.23 (0.26)	0.22 (0.23)	0.21 (0.27)	0.20 (0.22)	0.26 (0.28)	0.25 (0.25)	0.24 (0.28)	0.23 (0.24)
Anxiety symptoms (Y15)	0.33 (0.38)	0.31 (0.33)	0.33 (0.41)	0.31 (0.35)	0.33 (0.39)	0.31 (0.34)	0.35 (0.39)	0.34 (0.34)	0.32 (0.38)	0.31 (0.33)
Early attachment security (Y3)	0.45 (0.27)	0.46 (0.25)	0.38 (0.30)	0.40 (0.25)	0.44 (0.25)	0.44 (0.25)	0.44 (0.26)	0.45 (0.24)	0.46 (0.27)	0.46 (0.25)

Note. Win = values after 90% winsorization was performed. Y9 = measure at age 9, Y15 = measured at age 15, Y3 = measured at age 3. M = mean, SD = standard deviation.

Table 3a

Correlations with Confidence Intervals for Entire Analytic Sample

Variable	1	2	3	4	5	6	7	8	9
1. Child-peer relationship quality (Y9)									
2. Child-peer relationship quality (Y15)	.10**								
	[.06, .13]								
3. Child-parent relationship quality (Y9)	.15**	.06**							
	[.12, .19]	[.03, .10]							
4. Child-parent relationship quality (Y15)	.06**	.17**	.17**						
	[.02, .10]	[.14, .20]	[.14, .21]						
5. General relationship quality (Y15)	.05**	.24**	.11**	.30**					
	[.02, .09]	[.21, .28]	[.07, .14]	[.27, .33]					
6. Depressive Symptoms (Y9)	-.06**	-.07**	-.09**	-.07**	-.05**				
	[-.10, -.03]	[-.10, -.03]	[-.13, -.06]	[-.11, -.04]	[-.09, -.02]				
7. Depressive Symptoms (Y15)	-.06**	-.15**	-.08**	-.18**	-.13**	.31**			
	[-.10, -.03]	[-.19, -.12]	[-.11, -.04]	[-.21, -.15]	[-.16, -.09]	[.28, .34]			
8. Anxiety Symptoms (Y9)	-.05**	-.04*	-.06**	-.03	-.04*	.52**	.27**		
	[-.09, -.02]	[-.07, -.00]	[-.09, -.02]	[-.06, .01]	[-.08, -.01]	[.50, .55]	[.23, .30]		
9. Anxiety Symptoms (Y15)	-.05**	-.10**	-.10**	-.10**	-.07**	.29**	.58**	.34**	
	[-.08, -.01]	[-.13, -.06]	[-.13, -.06]	[-.13, -.07]	[-.11, -.04]	[.26, .33]	[.56, .60]	[.31, .37]	
10. Early Attachment Security (Y3)	.06*	.06**	.08**	.02	.03	-.15**	-.08**	-.11**	-.09**
	[.01, .10]	[.02, .11]	[.03, .12]	[-.03, .07]	[-.02, .07]	[-.20, -.11]	[-.13, -.04]	[-.15, -.06]	[-.13, -.04]

Note. Values in square brackets indicate the 95% confidence interval for each correlation. * Indicates $p < .05$. ** indicates $p < .01$.
Y9 = measured at age 9, Y15 = measure at age 15, Y3 = measure at age 3.

Table 3b

Correlations with Confidence Intervals for Early Loss Group

Variable	1	2	3	4	5	6	7	8	9
1. Child-peer relationship quality (Y9)									
2. Child-peer relationship quality (Y15)	.07								
	[-.09, .22]								
3. Child-parent relationship quality (Y9)	.06	-.03							
	[-.09, .21]	[-.19, .13]							
4. Child-parent relationship quality (Y15)	.06	.12	.18*						
	[-.10, .21]	[-.03, .27]	[.02, .33]						
5. General relationship quality (Y15)	.16*	.18*	.02	.34**					
	[.00, .31]	[.03, .33]	[-.14, .18]	[.19, .46]					
6. Depressive symptoms (Y9)	-.20**	-.16	-.03	-.06	-.05				
	[-.34, -.06]	[-.30, .00]	[-.18, .12]	[-.21, .10]	[-.20, .10]				
7. Depressive symptoms (Y15)	-.10	-.15	.09	-.25**	-.26**	.34**			
	[-.25, .06]	[-.29, .00]	[-.06, .24]	[-.39, -.11]	[-.39, -.11]	[.19, .47]			
8. Anxiety symptoms (Y9)	-.11	.07	-.11	-.10	-.05	.39**	.23**		
	[-.26, .03]	[-.09, .22]	[-.25, .04]	[-.25, .06]	[-.20, .10]	[.26, .51]	[.08, .37]		
9. Anxiety symptoms (Y15)	-.14	-.06	.04	-.21**	-.13	.27**	.55**	.40**	
	[-.29, .01]	[-.21, .09]	[-.12, .19]	[-.35, -.06]	[-.28, .02]	[.12, .41]	[.44, .64]	[.26, .52]	
10. Early attachment security (Y3)	.19*	.07	.00	.08	.14	-.23*	-.09	-.15	-.09
	[.01, .36]	[-.11, .26]	[-.18, .19]	[-.10, .26]	[-.05, .31]	[-.39, -.05]	[-.27, .09]	[-.32, .04]	[-.26, .10]

Note. Values in square brackets indicate the 95% confidence interval for each correlation. * Indicates $p < .05$. ** indicates $p < .01$. Y9 = measured at age 9, Y15 = measure at age 15, Y3 = measure at age 3.

Table 3c

Correlations with Confidence Intervals for Middle Childhood Loss Group

Variable	1	2	3	4	5	6	7	8	9
1. Child-peer relationship quality (Y9)									
2. Child-peer relationship quality (Y15)	-.02								
	[-.17, .13]								
3. Child-parent relationship quality (Y9)	.17*	.11							
	[.03, .31]	[-.04, .25]							
4. Child-parent relationship quality (Y15)	-.00	.21**	.16*						
	[-.15, .14]	[.07, .35]	[.01, .30]						
5. General relationship quality (Y15)	-.03	.37**	.06	.30**					
	[-.18, .12]	[.24, .49]	[-.09, .20]	[.16, .42]					
6. Depressive symptoms (Y9)	-.03	-.08	-.13	-.15*	-.03				
	[-.17, .12]	[-.23, .07]	[-.27, .01]	[-.29, -.00]	[-.18, .12]				
7. Depressive symptoms (Y15)	-.01	-.13	-.17*	-.11	-.12	.30**			
	[-.16, .14]	[-.27, .02]	[-.31, -.03]	[-.25, .04]	[-.26, .02]	[.16, .43]			
8. Anxiety symptoms (Y9)	-.03	-.07	-.11	-.11	-.14	.52**	.23**		
	[-.17, .12]	[-.22, .08]	[-.25, .03]	[-.26, .04]	[-.28, .01]	[.41, .62]	[.09, .37]		
9. Anxiety symptoms (Y15)	-.07	-.13	-.16*	-.12	-.15*	.32**	.58**	.31**	
	[-.21, .08]	[-.27, .01]	[-.30, -.02]	[-.26, .02]	[-.29, -.01]	[.18, .44]	[.47, .66]	[.18, .44]	
10. Early attachment security (Y3)	-.05	.07	.11	.02	.05	-.10	.07	-.07	.01
	[-.23, .15]	[-.13, .26]	[-.08, .30]	[-.18, .21]	[-.14, .24]	[-.29, .09]	[-.12, .26]	[-.26, .12]	[-.18, .20]

Note. Values in square brackets indicate the 95% confidence interval for each correlation. * Indicates $p < .05$. ** indicates $p < .01$. Y9 = measured at age 9, Y15 = measure at age 15, Y3 = measure at age 3.

Table 3d

Correlations with Confidence Intervals for Late Childhood Loss Group

Variable	1	2	3	4	5	6	7	8	9
1. Child-peer relationship quality (Y9)									
2. Child-peer relationship quality (Y15)	.15*								
	[.02, .27]								
3. Child-parent relationship quality (Y9)	.07	.02							
	[-.05, .19]	[-.10, .15]							
4. Child-parent relationship quality (Y15)	.04	.13*	.15*						
	[-.08, .16]	[.01, .24]	[.03, .27]						
5. General relationship quality (Y15)	.03	.28**	.17**	.32**					
	[-.09, .16]	[.17, .38]	[.05, .28]	[.21, .41]					
6. Depressive symptoms (Y9)	-.19**	-.10	-.13*	.04	-.10				
	[-.30, -.07]	[-.22, .02]	[-.24, -.01]	[-.08, .16]	[-.22, .02]				
7. Depressive symptoms (Y15)	-.12	-.17**	-.08	-.09	-.12*	.26**			
	[-.24, .00]	[-.28, -.05]	[-.20, .04]	[-.20, .02]	[-.23, -.00]	[.15, .37]			
8. Anxiety symptoms (Y9)	-.12	-.01	-.08	.22**	-.05	.52**	.17**		
	[-.23, .00]	[-.13, .11]	[-.19, .05]	[.10, .33]	[-.17, .07]	[.42, .60]	[.05, .28]		
9. Anxiety symptoms (Y15)	-.14*	-.11	-.13*	.07	-.11	.32**	.60**	.36**	
	[-.25, -.02]	[-.22, .01]	[-.25, -.01]	[-.04, .18]	[-.22, .00]	[.21, .43]	[.53, .67]	[.25, .46]	
10. Early attachment security (Y3)	.01	-.04	.08	-.03	-.06	-.17*	-.15*	-.12	-.12
	[-.14, .16]	[-.19, .12]	[-.08, .23]	[-.18, .12]	[-.21, .09]	[-.31, -.01]	[-.29, -.01]	[-.27, .03]	[-.26, .02]

Note. Values in square brackets indicate the 95% confidence interval for each correlation. * Indicates $p < .05$. ** indicates $p < .01$. Y9 = measured at age 9, Y15 = measure at age 15, Y3 = measure at age 3.

Table 3e

Correlations with Confidence Intervals for No Loss Group

Variable	1	2	3	4	5	6	7	8	9
1. Child-peer relationship quality (Y9)									
2. Child-peer relationship quality (Y15)	.10**								
	[.06, .14]								
3. Child-parent relationship quality (Y9)	.16**	.07**							
	[.13, .20]	[.03, .11]							
4. Child-parent relationship quality (Y15)	.07**	.18**	.18**						
	[.03, .11]	[.14, .21]	[.14, .22]						
5. General relationship quality (Y15)	.06**	.24**	.11**	.30**					
	[.02, .10]	[.20, .27]	[.07, .15]	[.27, .34]					
6. Depressive symptoms (Y9)	-.04*	-.06**	-.09**	-.08**	-.05*				
	[-.08, -.00]	[-.10, -.02]	[-.13, -.05]	[-.12, -.04]	[-.09, -.01]				
7. Depressive symptoms (Y15)	-.06**	-.16**	-.08**	-.19**	-.12**	.31**			
	[-.10, -.02]	[-.19, -.12]	[-.12, -.04]	[-.23, -.16]	[-.16, -.08]	[.28, .35]			
8. Anxiety symptoms (Y9)	-.04*	-.05*	-.05*	-.04*	-.03	.53**	.28**		
	[-.08, -.01]	[-.09, -.01]	[-.09, -.01]	[-.08, -.00]	[-.07, .01]	[.51, .56]	[.24, .32]		
9. Anxiety symptoms (Y15)	-.03	-.10**	-.10**	-.11**	-.06**	.29**	.58**	.34**	
	[-.07, .01]	[-.14, -.06]	[-.14, -.06]	[-.15, -.07]	[-.10, -.02]	[.25, .33]	[.56, .61]	[.30, .38]	
10. Early attachment security (Y3)	.06*	.07**	.08**	.02	.02	-.15**	-.08**	-.11**	-.09**
	[.01, .11]	[.02, .12]	[.03, .13]	[-.03, .07]	[-.03, .07]	[-.20, -.10]	[-.13, -.03]	[-.16, -.06]	[-.14, -.04]

Note. M and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. * indicates *p* < .05. ** indicates *p* < .01.

Table 4

Research Question 1: Comparisons of Internalizing Symptoms Robust Means Modeling Results

	No-Loss Group – Early Childhood Loss Group		
	Estimated differences	*SE*	*p*
Y9 Depressive symptoms	0.004	0.092	0.964
Y9 Anxiety symptoms	-0.099	0.203	0.624
Y15 Depressive symptoms	-0.193	0.203	0.706
Y15 Anxiety symptoms	-0.064	0.170	0.341
	No-Loss Group – Middle Childhood Loss Group		
	Estimated Differences	*SE*	*p*
Y9 Depressive symptoms	0.056	0.077	0.466
Y9 Anxiety symptoms	0.124	0.202	0.539
Y15 Depressive symptoms	-0.202	0.135	0.136
Y15 Anxiety symptoms	-0.056	0.125	0.657
	No-Loss Group – Late Childhood Loss Group		
	Estimated Differences	*SE*	*p*
Y15 Depressive symptoms	-0.133	0.120	0.266
Y15 Anxiety symptoms	0.031	0.186	0.869

Note. Y9 = measured at age 9, Y15 = measured at age 15.

Table 5

Research Question 2: Comparisons of Relationship Quality Robust Means Modeling Results

	No-Loss Group – Early Childhood Loss Group		
	Estimated differences	*SE*	*p*
Y9 Peer relationship quality	-0.691	1.158	0.551
Y9 Parent relationship quality	0.025	0.523	0.962
Y15 Peer relationship quality	-0.096	0.432	0.824
Y15 Parent relationship quality	-0.383	0.521	0.462
Y15 General relationship quality	0.008	0.182	0.965
	No-Loss Group – Middle Childhood Loss Group		
	Estimated differences	*SE*	*p*
Y9 Peer relationship quality	-0.662	1.188	0.578
Y9 Parent relationship quality	-0.448	0.375	0.233
Y15 Peer relationship quality	0.257	0.389	0.508
Y15 Parent relationship quality	-0.256	0.788	0.746
Y15 General relationship quality	0.069	0.338	0.839
	No-Loss Group – Late Childhood Loss Group		
	Estimated differences	*SE*	*p*
Y15 Peer relationship quality	-0.206	0.324	0.524
Y15 Parent relationship quality	-0.358	0.768	0.641
Y15 General relationship quality	-0.010	0.190	0.959

Note. Y9 = measured at age 9, Y15 = measured at age 15.

Table 6

Research Question 3: Comparison of the Association Between Relationship Quality Variables and Internalizing Symptoms Variables at Age 9 and Agee 15 for the Four Groups.

	No-Loss	Early Loss	Middle Loss	Late Loss
Y9 Peer → Depressive symptoms	β = -0.001, *SE* = 0.013, *p* = 0.953	β = -0.019, *SE* = 0.029, *p* = 0.517	β = -0.014, *SE* = 0.026, *p* = 0.579	NA
Y9 Peer → Anxiety symptoms	β = -0.025, *SE* = 0.015, p = 0.095	β = -0.009, *SE* = 0.064, *p* = 0.890	β = 0.111 *SE* = 0.068, *p* = 0.105	NA
Y9 Parent → Depressive symptoms	β = -0.012, *SE* = 0.011, p = 0.272	β = 0.001, *SE* = 0.034, *p* = 0.983	β = -0.014, *SE* = 0.026, *p* = 0.601	NA
Y9 Parent → Anxiety symptoms	β = 0.008, SE = 0.016, *p* = 0.623	β = 0.013, *SE* = 0.097, *p* =0.895	β = 0.002, *SE* = 0.058, *p* = 0.793	NA
Y15 Peer → Depressive symptoms	***β = -0.104, SE = 0.027,*** ***p = 0.000***	β = 0.074, *SE* = 0.079, *p* =0.354	β = -0.129, *SE* = 0.110, *p* = 0.238	***β = -0.239, SE = 0.064,*** ***p = 0.000***
Y15 Peer → Anxiety symptoms	***β = -0.096, SE = 0.048,*** ***p = 0.045***	β = 0.092, *SE* = 0.100, *p* = 0.359	β = -0.170, *SE* = 0.182, *p* = 0.350	***β = -0.231, SE = 0.134,*** ***p = 0.084***
Y15 Parent → Depressive symptoms	***β = -0.046, SE = 0.021,*** ***p = 0.029***	β = -0.044, *SE* = 0.045, *p* = 0.322	β = 0.036, *SE* = 0.062, *p* = 0.562	β = -0.064, *SE* = 0.052, *p* = 0.222
Y15 Parent → Anxiety symptoms	β = - 0.008, *SE* = 0.014, *p* = 0.594	β = -0.030, *SE* = 0.048, *p* = 0.533	β = 0.009, *SE* = 0.091, *p* = 0.924	β = -0.011, *SE* = 0.086, *p* = 0.897
Y15 General → Depressive symptoms	β = 0.004, *SE* = 0.047, *p* = 0.929	β = -0.114, *SE* = 0.120, *p* = 0.342	β = -0.040, *SE* = 0.150, *p* = 0.791	***β = 0.174, SE = 0.087,*** ***p = 0.074***
Y15 General → Anxiety symptoms	β = -0.045, *SE* = 0.042, *p* = 0.291	***β = -0.207, SE = 0.123,*** ***p = 0.092***	β = -0.040, *SE* = 0.125, *p* = 0.752	β = 0.068, *SE* = 0.184, *p* = 0.714

Note. Paths at age 9 are not reported (NA) for the late childhood loss group, since this group of children had not yet experienced the death of a close family member at age 9.

SE = standard error. Y9 = measured at age 9, Y15 = measured at age 15; Peer = child-peer relationship quality, parent = child-parent relationship quality, general = general relationship quality.

Bolded and underlined indicates significant at *p* < 0.05. Bolded indicates marginal significance (*p* < 0.1).

Table 7

Research Question 3: Indirect Effects (Loss → Relationship Quality → Internalizing Symptoms) at Age 9 and Age 15

	Early Loss vs No-Loss			Middle Loss vs No-Loss			Late Loss vs No-Loss		
	Indirect effect	*SE*	*p*	Indirect effect	*SE*	*p*	Indirect effect	*SE*	*p*
Measured at Age 9									
Loss → Child-peer relationship quality → depressive symptoms	-0.001	0.009	0.881	-0.004	0.016	0.799	NA	NA	NA
Loss → Child-peer relationship quality → anxiety symptoms	-0.011	0.051	0.831	-0.034	0.022	0.131	NA	NA	NA
Loss → Child-parent relationship quality → depressive symptoms	-0.004	0.007	0.562	-0.008	0.010	0.400	NA	NA	NA
Loss → Child-parent relationship quality → anxiety symptoms	0.002	0.004	0.556	0.005	0.010	0.656	NA	NA	NA
Measured at age 15									
Loss → Child-peer relationship quality → depressive symptoms	0.009	0.059	0.875	-0.030	0.049	0.540	0.012	0.048	0.802
Loss → Child-peer relationship quality → anxiety symptoms	0.009	0.057	0.877	-0.028	0.053	0.593	0.011	0.048	0.816
Loss → Child-parent relationship quality → depressive symptoms	0.022	0.031	0.484	-0.016	0.045	0.714	-0.034	0.086	0.693
Loss → Child-parent relationship quality → anxiety symptoms	0.004	0.007	0.545	-0.003	0.011	0.774	-0.007	0.034	0.844
Loss → general relationship quality → depressive symptoms	-0.002	0.006	0.798	-0.001	0.006	0.921	-0.001	0.005	0.756
Loss→ general relationship quality → anxiety symptoms	0.006	0.014	0.683	0.002	0.033	0.953	0.005	0.020	0.794

Note. Indirect effects at age 9 are not reported (NA) for the late childhood loss group, since this group of children had not yet experienced the death of a close family member at age 9. The indirect effect was calculated by multiplying the mean differences of each relationship quality (loss – no-loss) by the average path.

Table 8

Research Question 4a: The Interaction between Loss and Early Attachment Security and its Association on Internalizing Symptoms at Age 9 and Age 15.

	No-Loss vs Early Loss			No-Loss vs Middle Loss			No Loss vs Late Loss		
	Estimated Difference	*SE*	*p*	Estimated Difference	*SE*	*p*	Estimated Difference	*SE*	*p*
Early Attachment Security→ Y9 Depressive Symptoms	-0.180	0.208	0.388	0.006	0.188	0.976	NA	NA	NA
Early Attachment Security → Y9 Anxiety Symptoms	-0.301	0.401	0.453	-0.195	0.563	0.729	NA	NA	NA
Early Attachment Security → Y15 Depressive Symptoms	0.758	0.462	0.101	-0.074	0.755	0.922	**-1.003**	**0.536**	**0.062**
Early Attachment Security → Y15 Anxiety Symptoms	0.829	0.794	0.296	-0.307	1.269	0.808	-1.432	1.195	0.231

Note. The path differences were always calculated by subtracting the path of the no-loss group from the path of each loss group (i.e., path difference = loss – no-loss). The path differences constitute the moderating role of attachment security, by showing whether attachment security interacts with loss to predict internalizing symptoms.

Paths at age 9 are not reported (NA) for the late childhood loss group, since this group of children had not yet experienced the death of a close family member at age 9.

SE = standard error. Early attachment security was measured at age 3. Y9 = measured at age 9, Y15 = measured at age 15.

Bold = marginally significant (p < 0.1).

Table 9

Research Question 4b: The Interaction between Loss and Early Attachment Security and its Association on Relationship Quality at Age 9 and Age 15

	No-Loss vs Early Loss			No-Loss vs Middle Loss			No Loss vs Late Loss		
	Estimated Difference	*SE*	*p*	Estimated Difference	*SE*	*p*	Estimated Difference	*SE*	*p*
Early Attachment Security→ Y9 Peer Relationship Quality	0.246	2.107	0.907	-0.084	0.698	0.905	NA	NA	NA
Early Attachment Security → Y9 Parent Relationship Quality	-0.538	0.708	0.447	0.118	0.707	0.867	NA	NA	NA
Early Attachment Security → Y15 Peer Relationship Quality	-0.438	0.903	0.628	-0.419	0.563	0.457	0.282	0.348	0.417
Early Attachment Security → Y15 Parent Relationship Quality	1.190	0.813	0.143	0.945	0.649	0.146	1.829	1.992	0.358
Early Attachment Security → Y15 General Relationship Quality	0.532	0.333	0.110	-0.065	0.491	0.895	0.602	0.663	0.364

Note. The path differences were always calculated by subtracting the path of the no-loss group from the path of each loss group (i.e., path difference = loss – no-loss). The path differences constitute the moderating role of attachment security, by showing whether attachment security interacts with loss to predict relationship quality.

Paths at age 9 are not reported (NA) for the late childhood loss group, since this group of children had not yet experienced the death of a close family member at age 9.

SE = standard error. Early attachment security was measured at age 3. Y9 = measured at age 9, Y15 = measured at age 15.

Table 10

Research Question 4c: Group Differences in the Moderating Role of Early Attachment Security on the Association Between Child-peer Relationship Quality and Internalizing Symptoms at Age 9 and Age 15

	No-Loss vs Early Loss			No-Loss vs Middle Loss			No Loss vs Late Loss		
	Estimated Difference	*SE*	*p*	Estimated Difference	*SE*	*p*	Estimated Difference	*SE*	*p*
Early Attachment Security x Y9 Peer Relationship Quality → Depressive Symptoms	0.029	0.073	0.695	0.019	0.047	0.691	NA	NA	NA
Early Attachment Security x Y9 Peer Relationship Quality → Anxiety Symptoms	0.072	0.152	0.636	0.193	0.173	0.265	NA	NA	NA
Early Attachment Security x Y15 Peer Relationship Quality → Depressive symptoms	-0.227	0.150	0.131	0.097	0.256	0.704	**0.321**	**0.160**	**0.045**
Early Attachment Security x Y15 Peer Relationship Quality → Anxiety Symptoms	**0.647**	**0.234**	**0.006**	0.205	0.420	0.625	0.380	0.355	0.285

Note. The path differences were always calculated by subtracting the path of the no-loss group from the path of each loss group (i.e., path difference = loss – no-loss). The path differences constitute the difference in the moderating role of attachment security on the association between peer relationship quality and internalizing symptoms. Paths at age 9 are not reported (NA) for the late childhood loss group, since this group of children had not yet experienced the death of a close family member at age 9. *SE* = standard error. Early attachment security was measured at age 3. Y9 = measured at age 9, Y15 = measured at age 15. Bold = marginally significant (p < 0.1).

Figures

Figure 1

The Overall Conceptual Model: Childhood Bereavement, Quality of Relationships, Internalizing Symptoms
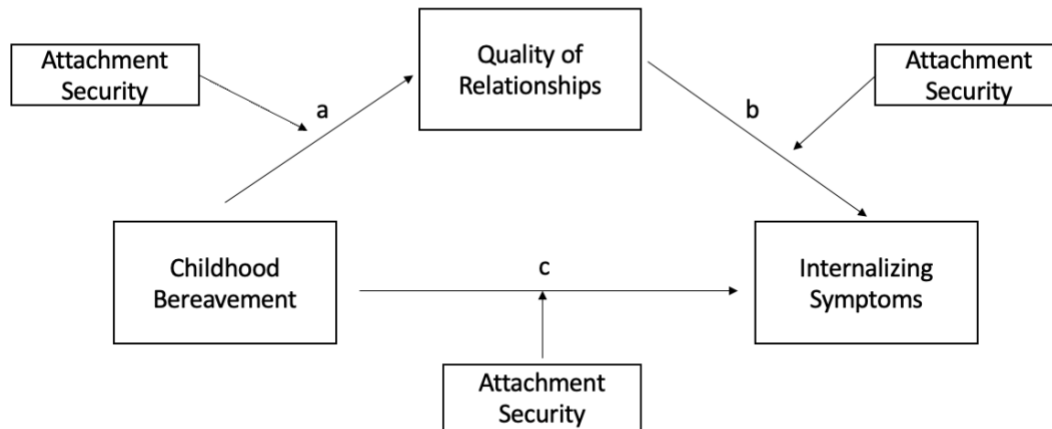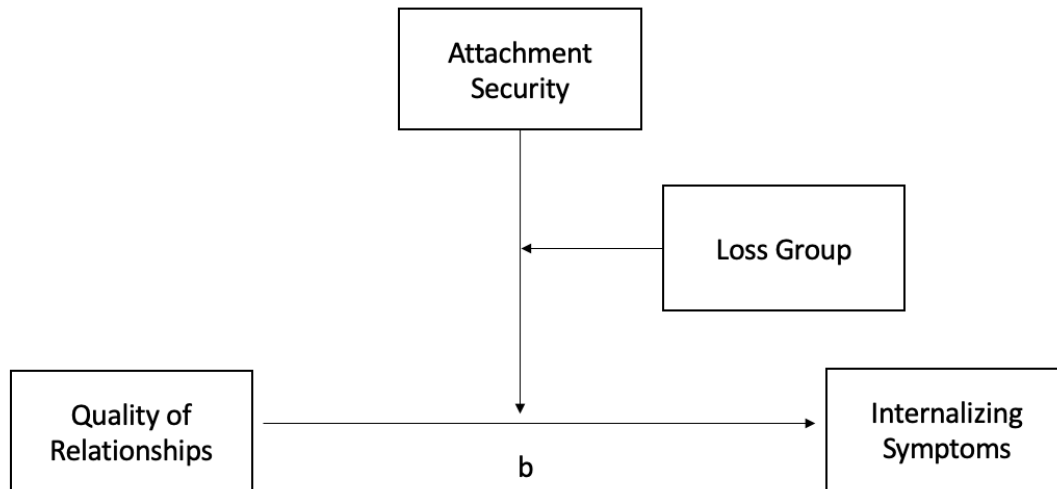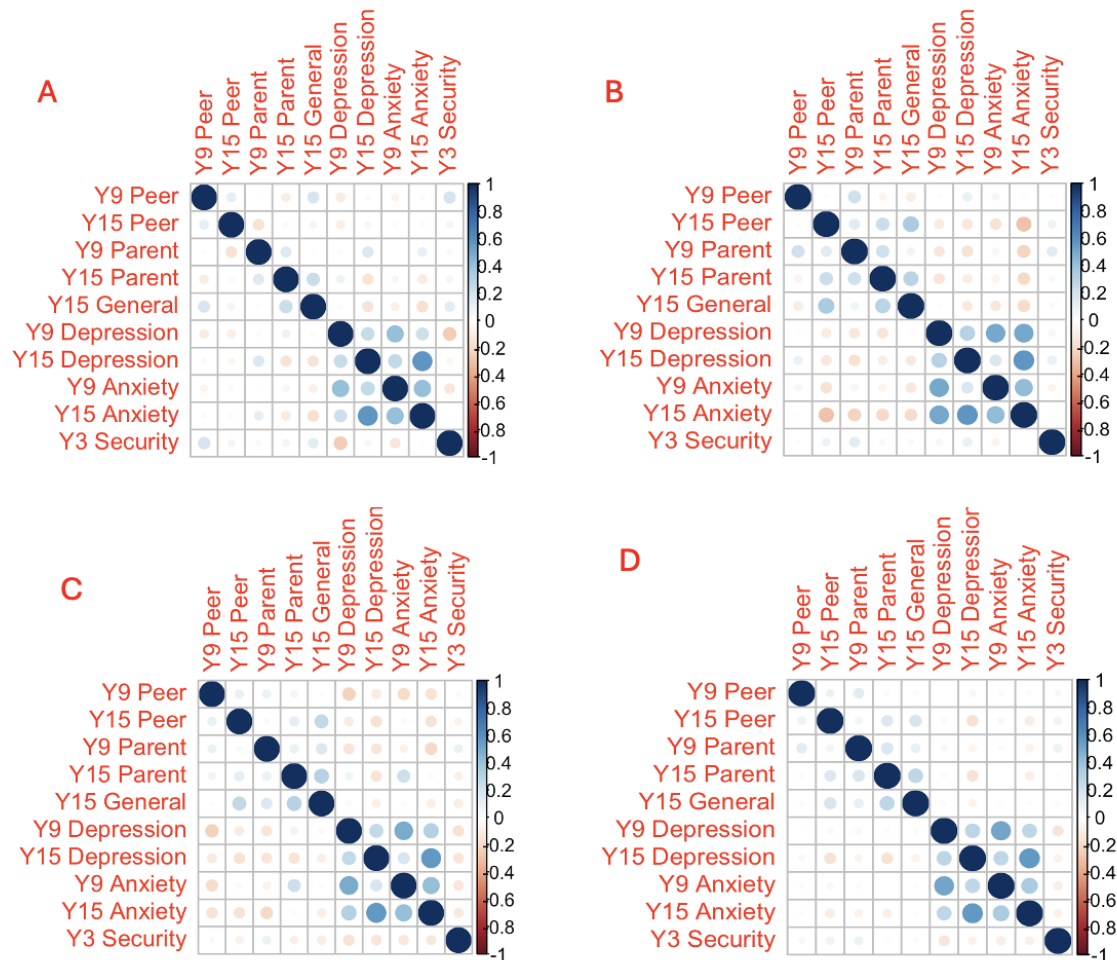
Figure 2

The Conceptual Model for Research Question 4c: Moderating Role of Early Attachment Security on the Association between Quality of Relationships and Internalizing Symptoms, Difference by Loss Group

Note. This conceptual model depicts research question 4c. This research question examines a moderated moderation, where the strength of the moderating role of attachment security on path b (Figure 1) is moderated by loss group.

Figure 3

Magnitude of Correlations Among Key Variables: Comparison of the Four Groups

Note. This figure provides a visual comparison of the magnitude of correlation of key variables. A = early childhood loss group; B = middle childhood loss group; C = late childhood loss group; D = no loss group.

Figure 4

The Analytical Model: Childhood Bereavement, Relationship Quality as a Mechanism, Early Attachment Security as a Moderator
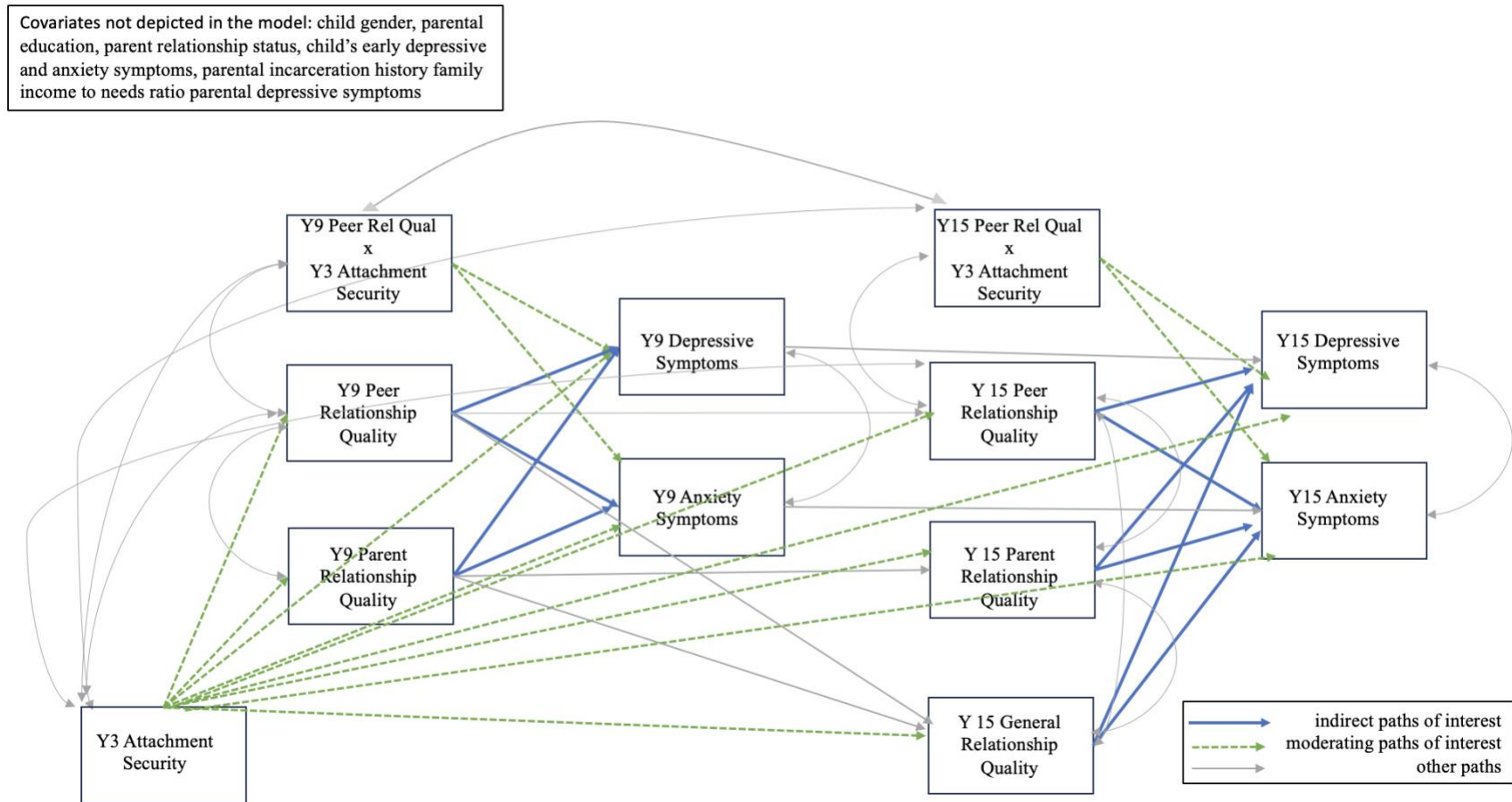
Note. This model was run separately with the early, middle, late, and no loss groups, and paths were compared between groups. The blue paths were compared to examine indirect effects (Research Question 3), and the green dotted paths were compared to examine moderation question (Research Question 4).

Figure 5

Early Attachment Security and Age 15 Depressive Symptoms: No-Loss vs Late Loss.
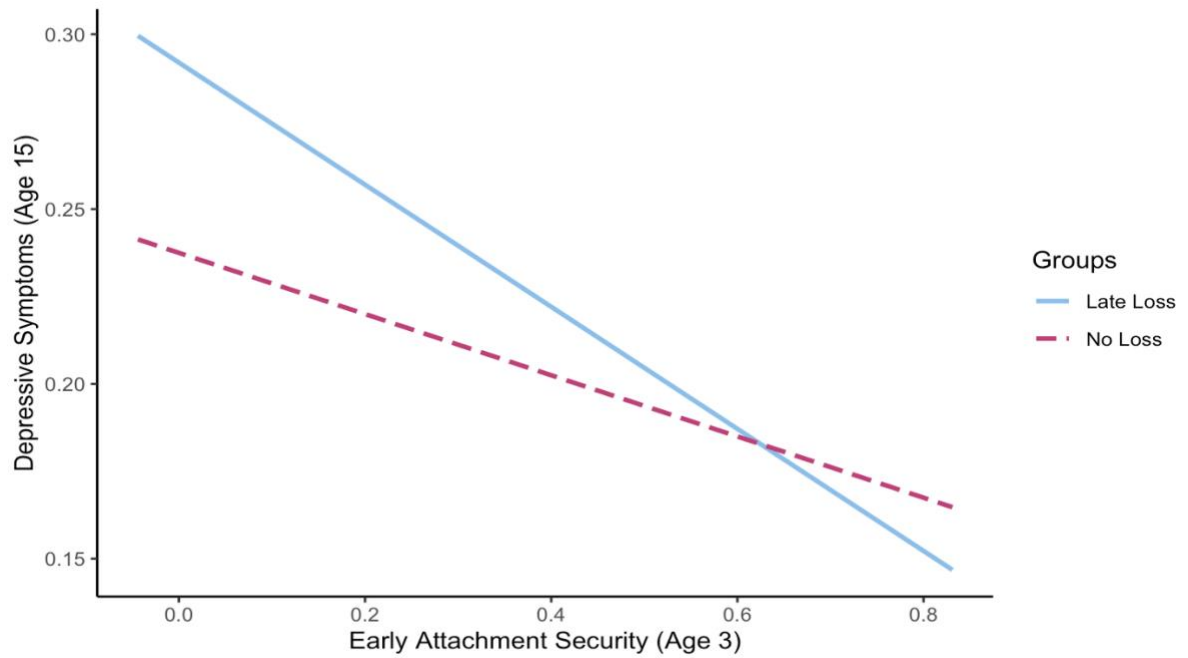
Note. This figure was created by regressing early attachment security at age 3 on depressive symptoms at age 15 with the two loss groups (no-loss and late loss) as a moderator, and thus is not a precise depiction of the estimates obtained from the full analytical model in Figure 4.
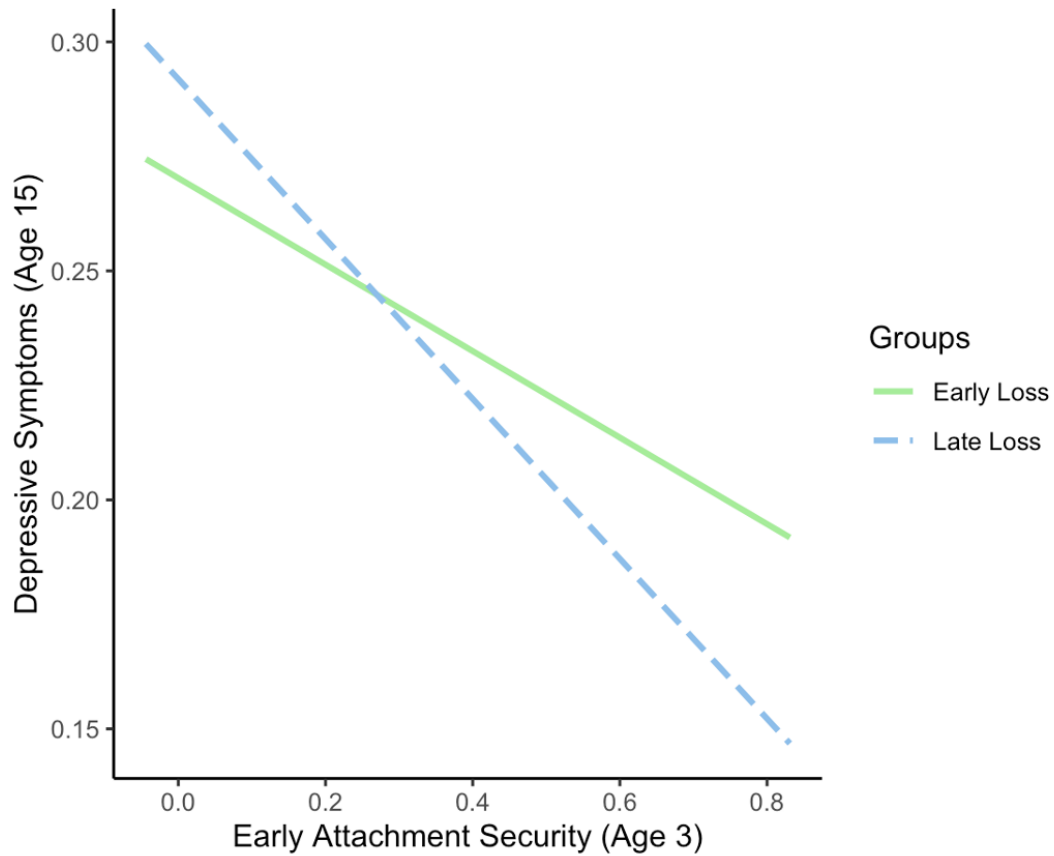
Figure 6

Moderating Role of Early Attachment Security on the Association Between Age 15 Child-Peer Relationship Quality and Concurrent Anxiety Symptoms: No-Loss vs Early Loss
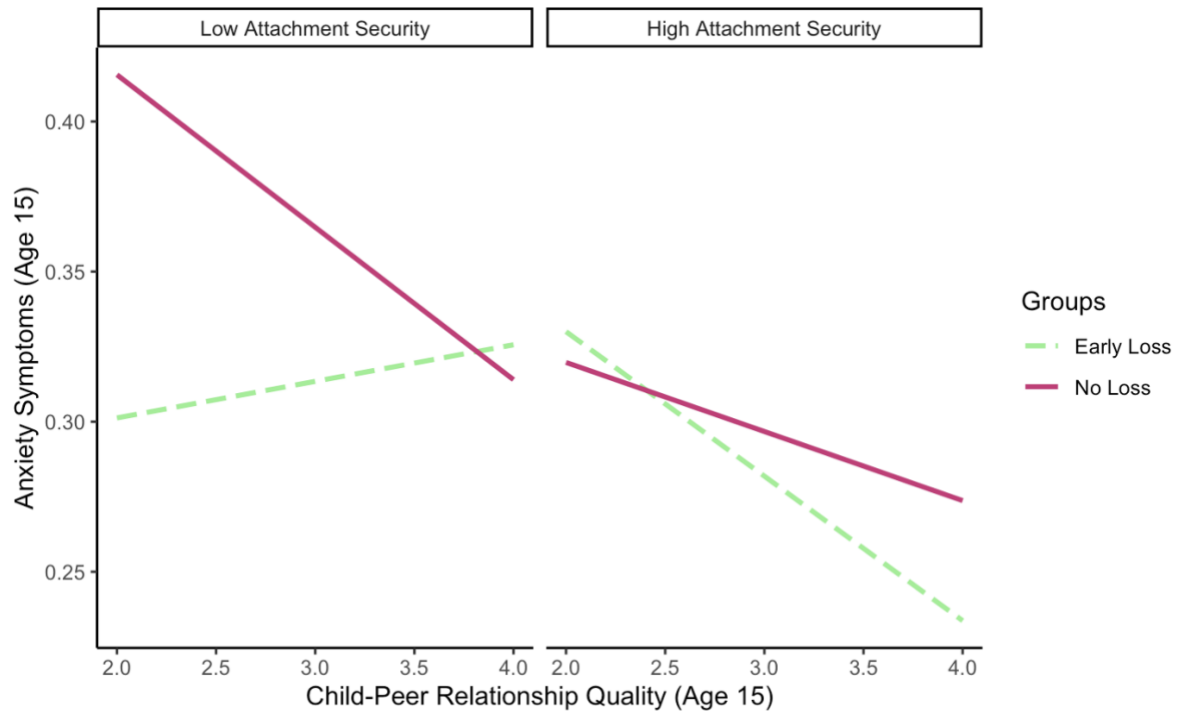
Note. This figure was created by regressing age 15 child-peer relationship quality on age 15 anxiety symptoms with the two loss groups (no-loss and early loss) and attachment security as moderators, and thus is not a precise depiction of the estimates obtained from the full analytical model in Figure 4.
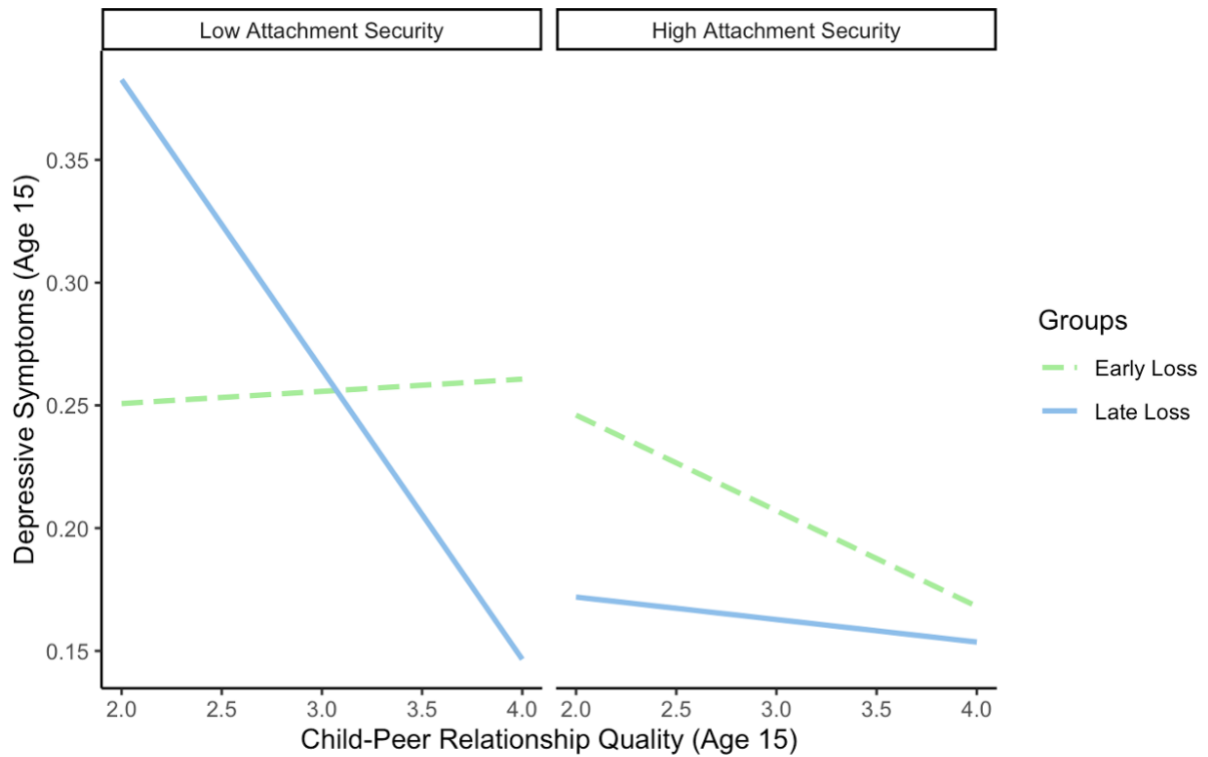
Figure 7.

Moderating Role of Early Attachment Security on the Association Between Age 15 Child-Peer Relationship Quality and Concurrent Depressive Symptoms: No-loss vs Late Loss.
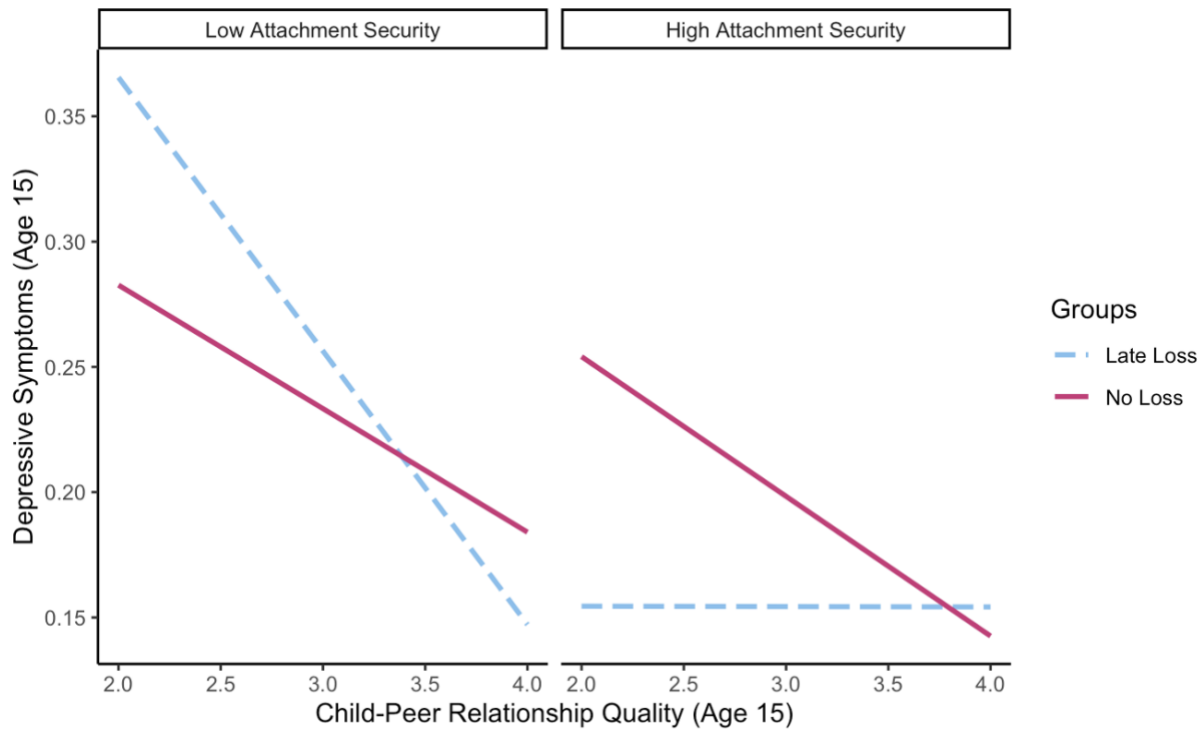
Note. This figure was created by regressing age 15 child-peer relationship quality on age 15 depressive symptoms with the two loss groups (no-loss and late loss) and attachment security as moderators, and thus is not a precise depiction of the estimates obtained from the full analytical model in Figure 4.

Figure 8

Early Attachment Security and Age 15 Depressive Symptoms: Early Loss vs Late Loss

Note. This figure was created by regressing early attachment security at age 3 on depressive symptoms at age 15 with the two loss groups (early loss and late loss) as a moderator, and thus is not a precise depiction of the estimates obtained from the full analytical model in Figure 4.

Figure 9

Moderating Role of Early Attachment Security on the Association Between Age 15 Child-Peer Relationship Quality and Concurrent Depressive Symptoms: Early Loss vs Late Loss

Note. This figure was created by regressing age 15 child-peer relationship quality on age 15 depressive symptoms with the two loss groups (early loss and late loss) and attachment security as moderators, and thus is not a precise depiction of the estimates obtained from the full analytical model in Figure 4.

Appendices

Appendix A. Child Behavior Checklist

The following questions are about (CHILD/YOUTH) and how he or she behaves. For each item, please report whether this is Not True (so far as you know), Somewhat or Sometimes True, OR Very True or Often True for (CHILD/YOUTH)?

Affective Problems Subscale (i.e. depressive symptoms)
Age 9 items
1. Child enjoys very little
2. Child is underactive, slow moving, or lacks energy
3. Child is unhappy, sad, or depressed
4. Child cries a lot
5. Child feels worthless or inferior
6. Child feels too guilty
7. Child talks about killing self
8. Child is overtired without good reason
9. Child deliberately harms self or attempts suicide
10. Child sleeps less than most kids
11. Child has trouble sleeping

Age 15 items
1. Missing
2. Child is underactive, slow moving, or lacks energy
3. Child is unhappy, sad, or depressed
4. Child cries a lot
5. Child feels worthless or inferior
6. Child feels too guilty
7-11. Missing

Anxiety Problems Subscale (i.e., anxiety symptoms)
Age 9 Items
 1 .Child fears certain animals, situations, or places, other than school
2. Child fears going to school
3. Child is nervous, high strung, or tense
4. Child is too fearful or anxious
5. Child worries
6. Child clings to adults or too dependent

Age 15 Items

1-2. Missing
3. Child is nervous, high-strung, or tense
4. Child is too fearful or anxious
5. Child worries
6. Child clings to adults or too dependent

Appendix B. Missing Data Analysis

Below I provide details of how each auxiliary variables associated with missing the key variables included in this study. The number of individuals missing data for each key variable is displayed in Table B.

Table B.

Number and Percentage of Missingness for Key Variables

Measure	N (Percent Missing)
Age 9 Child-Peer Relationship Quality	1,473 (31.25 %)
Age 15 Child-Peer Relationship Quality	1,392 (29.53 %)
Age 9 Child-Parent Relationship Quality	1,452 (30.80%)
Age 15 Child-Parent Relationship Quality	1,355 (28.75%)
Age 15 General Relationship Quality	1,343 (28.49%)
Age 9 Internalizing Symptoms	1,442 (30.59%)
Age 15 Internalizing Symptoms	1,204 (25.54 %)
Age 3 Attachment Security	2,548 (54.05 %)

Note. The total analytic sample size was 4,714.

Mother's Marital Status

Families who mothers who reported being married at birth, age 1, age 3, and age 5 were more likely to be missing measures of age 9 child-peer relationship quality and internalizing symptoms (range of χ^2 = 4.44 - 10.27, *ps* < 0.05). Families who mother reported being married at birth, age 1, and age 3 were also more likely to be missing measures of age 9 child-parent relationship quality (range of χ^2 = 7.45 – 10.18, *ps* < 0.05). Finally, mothers who reported being married birth, age 1, and age 3 were more likely to be missing the measure of early attachment security (range of χ^2 = 10.41 –40.86, *ps* < 0.01).

Number of Children in Household

Families with less number of children living in the household at age 3 were more likely to be missing measures of age 9 internalizing symptoms (t[1932] = -2.01, *p* <0.05). Families with less number of children living in the household at age 5 were more likely to be missing measures of child-peer relationship quality (t[1774] = -2.63, *p* < 0.01), child-parent relationship quality (t[1686] = -2.45, *p* < 0.05), and internalizing symptoms (t[1771] = -2.62, *p* < 0.01) at age 9. Families with less number of children at birth, age 1 and age 3 were more likely to be missing the measure of early attachment security (birth: t [4618] = -4.505; age 1: t[4322] = -4.7426, age 3: t[4170] = -5.25, *ps* < 0.01).

Number of Adults in the Household

Families with greater number of adults living in the household at birth and age 1 were more likely to have missing measure of child-peer relationship quality (birth: t[2585] = 4.08; age 1: t[1892] = 3.75, *ps* < 0.01), child-parent relationship quality (birth: t[2473] =3.68; age 1: t[1787] = 3.43, *ps* <0.01), general relationship quality (birth: t[2433] = 3.77; age 1: t[1763] = 3.54, *ps* < 0.01), and internalizing symptoms (birth: t[2097] = 3.20; age 1: t[1463] = 4.29, *ps* < 0.01) at age 15. Families with greater number of adults living in the household at age 1 were

more likely to be missing measure of child-peer relationship quality (t[2138] = 2.44, $p < 0.05$), child-parent relationship quality (t[2061] = 2.29, $p < 0.05$), internalizing symptoms (t[2021] = 2.72, $p < 0.01$) at age 9. Families with greater number of adults living in the household at age 3 and 5 were more likely to be missing measures of internalizing symptoms at age 15 (age 3: t[1308] = 2.55, p = 0.01; age 5: t[1158] = 2.57, ps = 0.01). Families with greater number of adults living in the household at age 1 and 3 were more likely to be missing measure of early attachment security (age 1: t[4334] = 3.16; age 3: t[4111] = 3.37, ps <0.01).

Household Poverty-Ratio Reported by Mothers

Families who reported lower poverty-ratio (more poverty) at birth, age 5, and age 9 were more likely to be missing measures of child-peer relationship quality (birth: t[3133] = -2.69; age 5: t[2006] = -3.00; age 9: t[593] = -2.21, $p < 0.01$), child-parent relationship quality (birth: t[3056] =,-3.23; age 5: t[1863] = -3.26; age 9: t[509] = -2.38, $p < 0.01$), general relationship quality (birth: t[3009] = -3.04; age 5: t[1826] = -3.01; age 9: t[501] = -2.25, $p < 0.01$) at age 15. Families who reported more poverty at birth and age 5 were also more likely to be missing measures of internalizing symptoms at age 15 (birth: t[2522] = -2.98, age 5: t[1455] = -2.85, $p < 0.01$).

Families who reported higher poverty ratio (less poverty) at age 1 and 3 were more likely to be missing measure of attachment security at age 3(age 1: t[4316] = 3.19; age 3: t[3225] = 5.45 , $p < 0.05$). Families who reported less poverty at age 3 and 9 were more likely to be missing measures of child-peer relationship quality at age 9 (age 3: t[1645] = 2.14; age 9: t[354] = 2.58, $p < 0.05$). Families who reported higher poverty ratio (less poverty) at age 9 more likely to be missing measures of child-parent relationship quality (t[300] = 2.57, $p < 0.05$) and internalizing symptoms at age 9 (t[314] = 2.80, $p < 0.01$).

Appendix C. Outliers

In this section, figures of boxplots for measures that showed outliers are displayed.

Figure C1

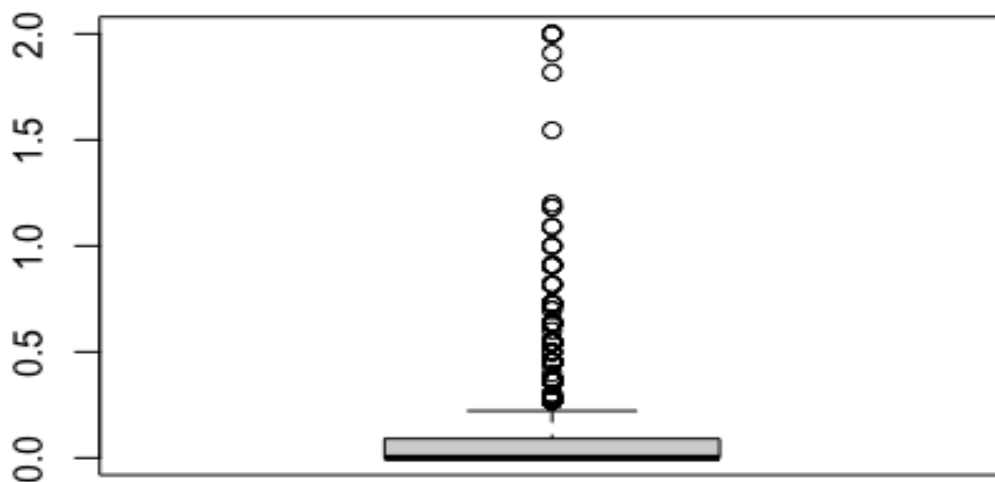*Age 9 Child-Peer Relationship Quality Boxplot for Original Data with Outliers*

Figure C2

Age 15 Child-Peer Relationship Quality Boxplot for Original Data with Outliers
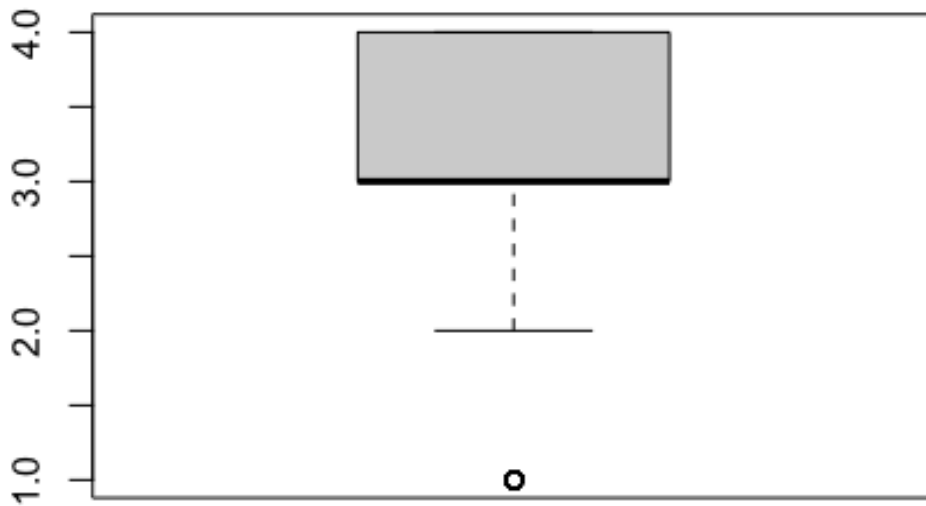
Figure C3

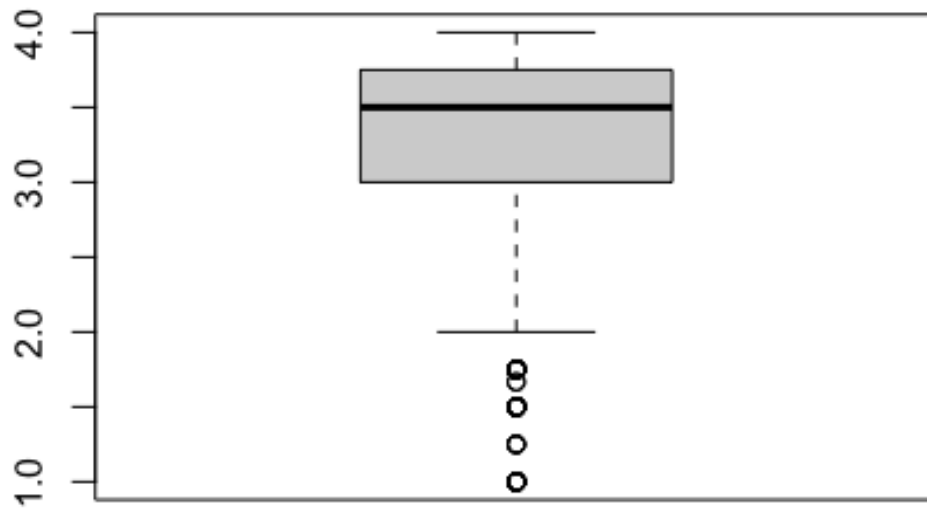*Age 9 Child-Parent Relationship Quality Boxplot for Original Data with Outliers*

Figure C4

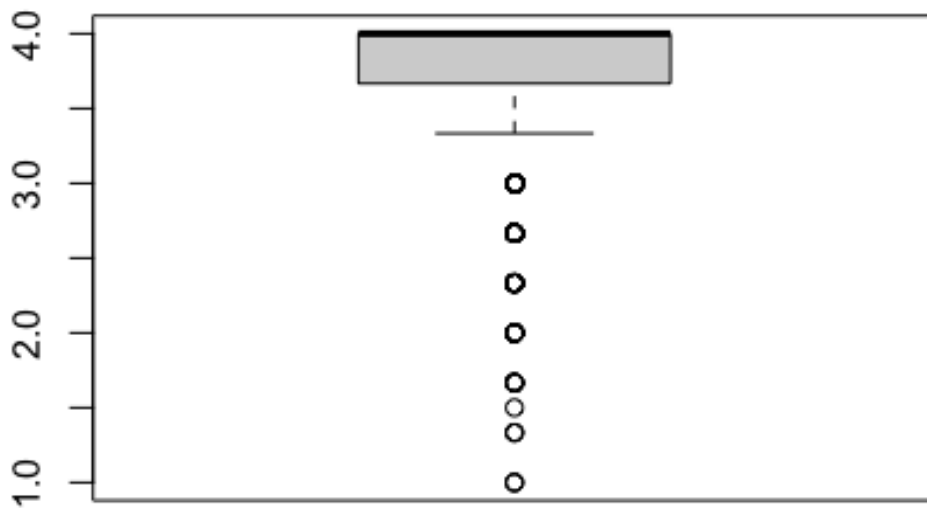*Age 15 General Relationship Quality Boxplot for Original Data with Outliers*

Figure C5

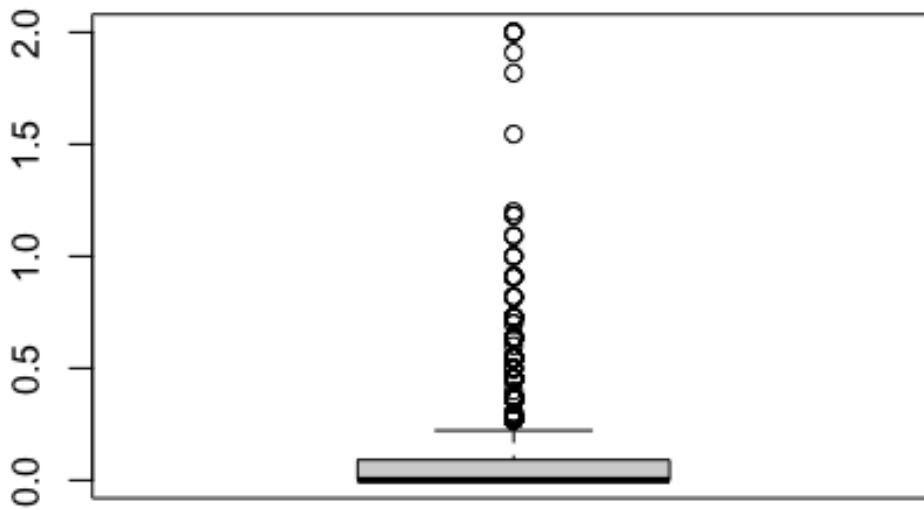*Age 9 Depressive Symptoms Boxplot for Original Data with Outliers*

Figure C6

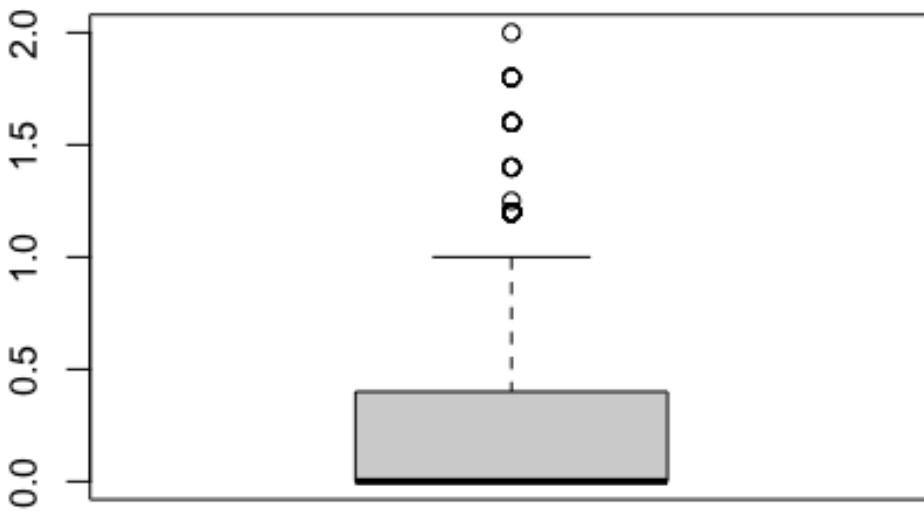*Age 15 Depressive Symptoms Boxplot for Original Data with Outliers*

Figure C7

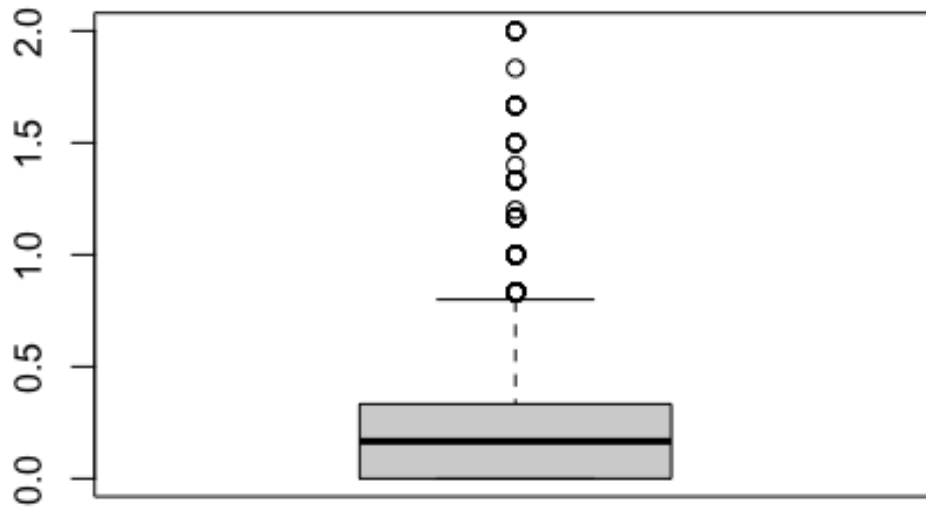*Age 9 Anxiety Symptoms Boxplot for Original Data with Outliers*

Figure C8

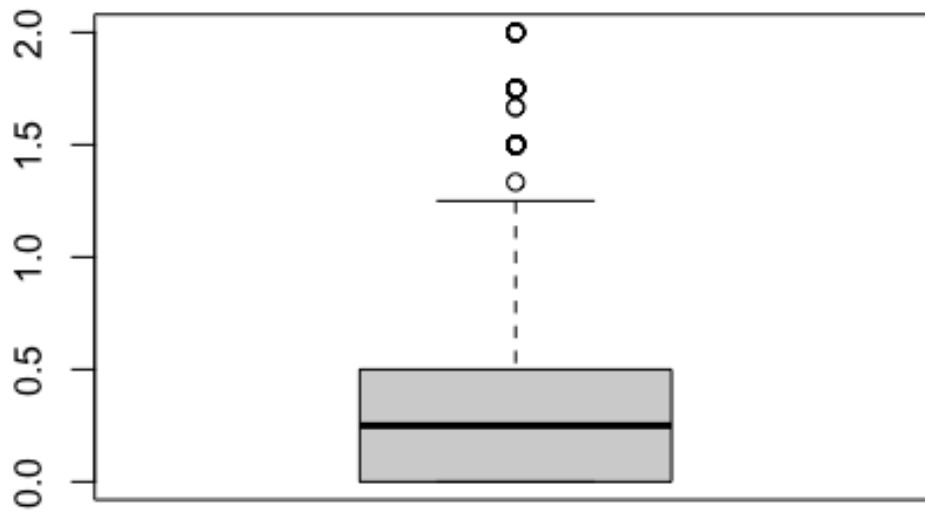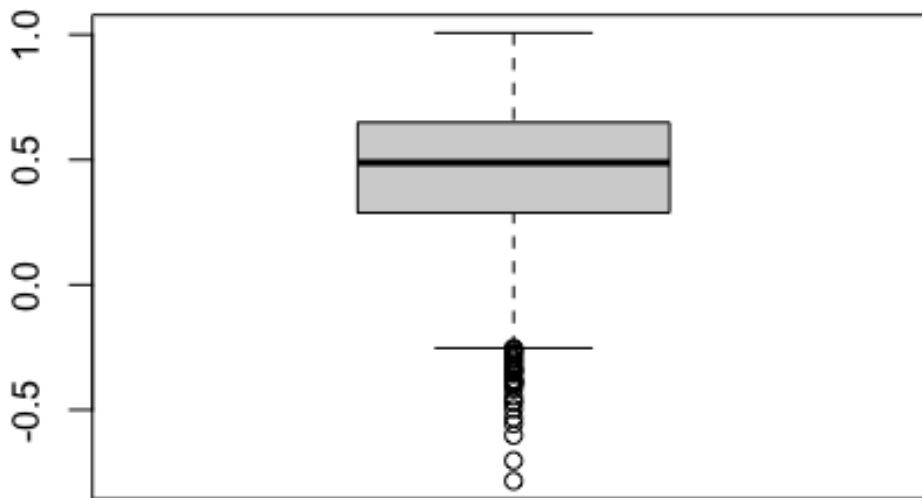*Age 15 Anxiety Symptoms Boxplot for Original Data with Outliers*

Figure C9

Age 3 Attachment Security Boxplot for Original Data with Outliers

Appendix D. IRB Not Human Subject Research Letter

UNIVERSITY OF
MARYLAND

INSTITUTIONAL REVIEW BOARD

1204 Marie Mount Hall
College Park, MD 20742-5125
TEL 301.405.4212
FAX 301.314.1475
irb@umd.edu
www.umresearch.umd.edu/IRB

DATE: April 10, 2023

TO: Sayaka Awao
FROM: University of Maryland College Park (UMCP) IRB

PROJECT TITLE: [2043775-1] Childhood Bereavement and Adolescent Mental Health Outcomes: Maintaining Relationships as a Mechanism and Attachment as a Buffer.

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF NOT HUMAN SUBJECT RESEARCH
DECISION DATE: April 10, 2023

Thank you for your submission of New Project materials for this project. The University of Maryland College Park (UMCP) IRB has determined this project does not meet the definition of human subject research under the purview of the IRB according to federal regulations.

We will retain a copy of this correspondence within our records.

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

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

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