MULTIPLE MALTREATMENT AND ADVERSE CHILDHOOD EXPERIENCES:

EXPLORING CUMULATIVE THREATS TO ATTACHMENT QUALITY

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Abstract

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James E. Barnett

Child maltreatment is associated with internalizing and externalizing symptoms across the lifespan. Maltreatment often co-occurs with other adverse childhood experiences (ACEs), such as parental incarceration or substance use. Studies have examined child maltreatment and other ACEs mostly independently, and both variables have been linked to poor adult functioning, such as insecure attachments. However, research discerning the unique contributions of maltreatment versus ACEs in predicting developmental outcomes is limited. For example, it is unclear if these connections to adult functioning persist across both early and middle adulthood. Recent studies suggest that maltreatment and ACEs uniquely predicting socioemotional problems. However, other studies suggest they are similar in impact, supporting a general "cumulative risk" perspective. Understanding the possible unique contributions of maltreatment versus other ACEs is necessary for full conceptualization of the ACEs and cumulative risk constructs and may. Clarity of these constructs may inform approaches to intake assessment in healthcare and social service settings by exploring the parsimonious utility of the ACE measure to screen for risks that may derail stage-salient task completion.

This study examined 379 young (under age 30) and middle-aged (30-60 years) adults in a community sample who answered life experience questions. First, participants were asked about 12 different ACEs (household domestic violence, parental incarceration, parental drug use, parental mental illness, etc.). Additionally, childhood maltreatment was measured by asking participants about their histories of sexual and physical abuse and neglect. Participants were asked to describe their typical relationship patterns with intimate partners in order to assess adult attachment styles. Three hierarchical regression analyses examined the unique contributions of ACEs and maltreatment to the outcomes of avoidant, anxious, and fearful adult attachment quality. Greater numbers of ACEs and maltreatment experiences were related to all insecure attachment styles; moreover, maltreatment failed to predict significant variance above and beyond that explained by ACEs. Regression results did not differ by age or gender. Therefore, maltreatment may be categorized as part of a general cumulative risk profile that does not uniquely predict adult socioemotional outcomes.

These findings lend credence to a cumulative risk model, suggesting that the types of ACEs matter less than the accumulated experience of chronic risk when predicting socioemotional outcomes. In practice, this finding suggests that intake/assessment in healthcare and social service settings may better predict future outcomes by tracking a wide array of adversities instead of focusing on specific risks. Moreover, a parsimonious ACE screening tool may expedite the screening process for negative health and psychological outcomes, resulting in more efficient client referral and treatment. Furthermore, similar regression findings between the young and middle-aged adults

suggests that the impacts of collective childhood adversity may linger across time,

potentially interrupting stage-salient task completion across the lifespan.

Table of Contents

List of Tables

Introduction

Childhood maltreatment is linked to increased risk for developing

psychopathology (Berzenski & Yates, 2011; Perry, 2008; Rogosch & Cicchetti, 2004),

including internalizing and externalizing symptoms (Kim & Cicchetti, 2010; Mackenzie,

Kotch, Lee, Augsberger, & Hutto, 2011; Pears, Kim, & Fisher, 2008). Maltreated

individuals also perceive their physical health as poorer than individuals with no history

of abuse or neglect (Felitti et al., 1998; Min, Minnes, Hyunsoo, & Singer, 2013; Springer,

Sheridan, Kuo, & Carnes, 2007). Collectively, the consequences of child maltreatment

cost the U.S. $124 billion annually (Centers for Disease Control & Prevention [CDC],

2015). These costs impact society due to welfare, physical and mental healthcare, and

legal services provided to individuals and families who have experienced maltreatment

(DilLillo, Fortier, & Perry, 2006).

The CDC (2015) defines childhood maltreatment as abuse or neglect of a minor

by an adult caregiver. Child maltreatment is often broadly characterized by acts of

omission, commission, or both. Acts of omission involve depriving individuals of

resources they need for proper development, resulting in child neglect (Mennen, Kim,

Sang, & Trickett, 2010). Conversely, acts of commission involve disrupting a child's

sense of emotional and physical security. These actions may take the form of physical

abuse, sexual abuse, or emotional abuse (CDC, 2014). About twenty percent of children

are physically or sexually abused (Edwards, Holden, Felitti, & Anda, 2003). Men tend to

report higher rates of childhood physical abuse, while women tend to report higher rates

of childhood sexual abuse (Dube et al., 2005; Edwards et al., 2003); however, rates differ

based on the reporting method (Shaffer, Huston, & Egeland, 2008), with prospective studies documenting higher rates of abuse compared to retrospective accounts of abuse.

Some research suggests that certain subtypes of maltreatment may be differentially related to internalizing and externalizing symptom profiles (Arata, Langhinrichsen-Rohling, Bowers, & O'Farrill-Swails, 2005; Berzenski & Yates, 2011; Conroy, Degenhardt, Mattick, & Nelson, 2009; Fergusson, Boden, & Horwood, 2008; Kim & Cicchetti, 2010; Lowell, Renk, & Adgate, 2014); however, these findings are often mixed. One of the complexities in examining outcomes of different maltreatment types is that maltreatment subcategories are highly correlated with each other (Arata et al., 2005; Teicher et al., 2006). Many people experience multiple maltreatment (MM), or more than one type of maltreatment, which may compound the negative outcomes associated with single types of maltreatment. Because chronic abuse histories are associated with greater frequencies of multidimensional problems in childhood and adulthood (Jaffee & Maikovich-Fong, 2011; Jonson-Reid, Kohl, & Drake, 2012; Pears et al., 2008), cumulative assessments of maltreatment are a priority for research and clinical settings (Higgins, 2004). A cumulative risk perspective asserts that the number of different adversities experienced predicts incrementally poorer health and developmental outcomes (Sameroff, Seifer, & McDonough, 2004).

Individuals who experience MM tend to also experience other stressors that contribute to their cumulative risk profile. For example, research suggests that along with various maltreatment subtypes, victims of abuse and neglect also tend to experience other adverse childhood experiences (ACEs) such as household domestic violence,

parental substance abuse, parental mental illness, parental separation, and parental incarceration (Dong et al., 2004). These findings suggest that children who experience abuse often suffer from a range of other familial factors that may be just as damaging to their overall development. Furthermore, experiencing more of these different adversities is linked to health outcomes such as cancer, heart disease, and obesity (Felitti et al., 1998).

Although prevention of adverse childhood experiences is the goal in medical, educational, and social service settings, complete prevention of childhood adversity is a formidable task (Kagi & Regala, 2012). The consistent associations between adverse childhood experiences and future negative developmental and health-related outcomes reinforce the necessity of utilizing Felitti et al.'s (1998) Adverse Childhood Experience (ACE) Questionnaire to screen for children who may be in need of interventions (Steele et al., 2016). Despite these consistent associations found in research, there are no official national guidelines for what contexts necessitate asking about ACEs in healthcare settings (Waite, Gerrity, & Arango, 2010). This is problematic, as medical providers are left without a definitive process by which to screen for early adversity that may lead to poor health outcomes and shorter life expectancy.

Besides health outcomes, of particular developmental concern is the primary stage-salient task of infancy, attachment formation, which may be disrupted by an accumulation of ACEs (Rogosch & Cicchetti, 2004), predisposing victims of maltreatment to multidimensional negative developmental outcomes. Prior research stemming from John Bowlby's Attachment Theory (1977; 1982) identified links between

maltreatment victimization and attachment quality later in life (Finzi, Ram, Har-Even, Shnit, & Weizman, 2001). Specifically, experiencing maltreatment or other adversities (e.g., household violence or caregiver substance abuse) is related to insecure adult attachment (Locke & Newcomb, 2004; Maikovich, Jaffee, Odgers, & Gallop, 2008), which may develop due to the formation of insecure internal working models (IWMs; Sroufe, Carlson, Levy, & Egeland, 1999).

An IWM is comprised of cognitive representations of relationships and caregivers' availability to meet an individual's needs (Ainsworth, 1989). Adults often react to current socioemotional stimuli in ways that are consistent with their IWMs, which reflect caregiving experiences from years earlier; thus, IWMs developed in childhood often serve as templates for how an individual perceives future relationships.

The previously discussed associations between maltreatment, ACEs, and adult attachment quality provide insight to the interrelated nature of these constructs. Studies suggest that maltreatment and ACEs predict attachment quality through the experience-dependent organization of insecure IWMs; however, what remains unclear is whether maltreatment and other ACEs differentially predict unique variance in attachment quality. As previously mentioned, some research suggests that unique experience profiles may not be meaningful for predicting adult outcomes. Specifically, subtypes of maltreatment have been shown to be equally influential in individuals' susceptibility to psychopathology and other negative outcomes (Vachon, Krueger, Rogosch, & Cicchetti, 2015). This may also be true when considering the collective impacts of maltreatment and ACEs. Therefore, examining whether maltreatment and ACEs uniquely predict

attachment quality is required to determine if these constructs uniquely predict anxious, avoidant, or fearful adult IWMs. If these two variables do not uniquely predict variance in adult IWMs, then recognizing maltreatment as an adversity within the collective ACE construct may be more meaningful.

Additionally, examining the potential cumulative impacts of maltreatment and other ACEs on attachment quality may have clinically significant implications. Some researchers and healthcare professionals argue that the ACE construct is not clearly operationalized, resulting in different conceptualization of ACEs and related constructs (e.g., maltreatment) in practice and research (Bright, Thompson, Esernio-Jenssen, Alford, & Shenkman, 2015; Kalmakis, 2013). Bright et al. (2015) found that most pediatricians who serve low-income families believed they should screen for both maltreatment and ACEs; however, as few as half actually screen for specific ACEs. Some pediatricians stated that this implementation discrepancy was influenced by several factors, including the belief that there is not a good ACE screening measure. This critique may be partially influenced by the fact that the ACE scale fails to assess the severity of specific adversities (Evans, Li, & Whipple, 2013).

In light of the above findings, viewing MM and ACEs as part of a single construct may support the cumulative risk perspective, which states that all forms of childhood adversity similarly disrupt psychological and physiological health outcomes. Addressing whether MM and ACEs represent a single construct may support the utility of Felitti et al.'s (1998) ACE intake measure by providing construct clarity and the ability to parsimoniously screen for major risks to human health and development. As a result,

healthcare professionals may be more willing to screen for ACEs and identify at-risk children who may require assistance to meet their stage-salient tasks (Dumaret, Constantin-Kuntz, & Titran, 2009; Frederick & Goddard, 2008; Locke & Newcomb, 2004). Discerning whether or not maltreatment or chaotic home environments contribute more to the development of insecure adult IWMs may encourage further construct development to increase healthcare professionals' understanding of ACEs who can advocate for national screening practice standards that are supported by research (Garner et al., 2012; Johnson, Riley, Granger, & Riis, 2013). Specifically, recognizing MM as a subcomponent of ACEs may encourage healthcare professionals to view childhood adversity as a collective risk variable, resulting in a clearer operationalization and and potentially greater ACE assessment compliance through a unified understanding of ACEs among healthcare professionals.

Few studies have examined the differential impact of maltreatment and ACEs on long-term outcomes. Narayan, Kalstabakken, Labella, Nerenberg, Monn, and Masten (2016) and Finkelhor, Shattuck, Turner, and Hamby (2013) did examine differential impacts of child maltreatment and ACEs in accounting for children's socioemotional development. In a sample of homeless families, Narayan et al. (2016) found that maltreatment in childhood, but not ACEs, was related to poorer socioemotional development (e.g., emotion-regulation and peer relations), suggesting differential influences of maltreatment and ACEs on developmental outcomes.

Earlier research by Finkelhor et al. (2013) aimed to improve the predictive power of ACE measurement by assessing how the original ACE scale compared to a revised

ACE measure with additional adversity variables added (e.g., poverty-related crime, peer victimization, and community violence). In a sample of over two-thousand children and adolescents, both maltreatment and other ACEs predicted socioemotional problems (e.g., anger and anxiety); however, some of the original ACEs (e.g., household substance abuse and domestic violence) were no longer significant predictors after accounting for additional adversity variables (e.g., community violence, peer victimization, and household property damage). Additionally, maltreatment remained a uniquely significant predictor in their second model, leading the authors to suggest that maltreatment may still individually contribute to emotional-regulatory developmental outcomes.

Clearly, more research is needed to continue unpacking whether or not maltreatment and other ACEs are differentially associated with developmental outcomes. Ultimately, research is needed to further explore whether or not maltreatment and ACEs can be conceptualized as separate sub-constructs, or if maltreatment is another similar variable adding to a child's general cumulative risk profile, accounting for no more variance in attachment outcomes than other ACEs.

Moreover, few studies assessing maltreatment and other ACEs investigate cognitive representations of relationship quality as outcomes (Corso, Edwards, Fang, Mercy, 2008; Nurius, Green, Logan-Greene, Borja, 2015; Felitti et al., 1998). For example, the attachment literature is inconclusive as to whether or not younger or older adults have significantly different levels of IWM security. No known studies have compared younger and older adults' attachment quality in relation to MM and ACEs. Most research on these constructs has been performed on children and adolescents.

Therefore, the current study aimed to assess differential associations between maltreatment and ACEs and adult attachment quality outcomes, while also exploring age group differences in IWMs, in a sample of both young and middle-aged adults.

Literature Review

Multiple Maltreatment

As previously noted, childhood maltreatment is widespread and detrimental to development. It also puts an economic burden on our welfare system. Unfortunately, many children repeatedly experience maltreatment, including different categories of abuse and neglect simultaneously, resulting in MM profiles (Arata et al., 2005; Berzenski & Yates, 2011; Davis, Petretic, & Ting, 2001; Pears et al., 2008; Thornberry, Matsuda, Greenman, Augustyn, Henry, Smith, & Ireland, 2014). In community samples of primarily European-American adults, 43-59% of maltreated individuals experienced more than one subtype (Edwards et al., 2003; Teicher et al., 2006). Multiple maltreatment (MM) is also prevalent in low-risk college student samples (Arata et al., 2005). Arata et al. (2005) found that MM was more common than any single type of maltreatment.

Research examining one abuse or neglect category is methodologically limited in that other types of maltreatment are often co-occurring (Edwards, et al., 2003). Rehan, Antfolk, Johansson, and Santtila (2016) found that single maltreatment events correlated with psychopathology symptoms; however, this finding was mainly driven by the tendency for various maltreatment types to co-occur. Therefore, associations between single types of abuse and psychopathology symptoms may be over-stated when the collective impacts of multiple maltreatment types are considered. In line with Sameroff, Seifer, Baldwin, and Baldwin's (1993) conceptualization of cumulative adversity, researchers suggest using a cumulative operationalization of childhood maltreatment

instead of assessing single types. Cumulative adversity, such as MM, puts children at increased risk for mental illness and addiction (Turner & Lloyd, 1995). For example, a diverse community sample of Canadian adults was 1.9 times more likely to be diagnosed with mental health or addiction problems if they had experienced a history of both childhood physical and sexual abuse. Reporting more than one type of maltreatment is also related to persistent use of licit drugs, such as alcohol and nicotine (Elliot et al., 2014). In this study, the relationship between maltreatment and licit drug use was incremental, where the rate of persistent drug use increased as individuals experienced more maltreatment subtypes. These findings may be influenced by abuse occurring at different points across children's development, potentially interfering with the completion of important stage-salient tasks (Teicher et al., 2006).

If intervention is not available or successful, children who experience MM are at risk for behavioral and emotional problems (Jonson-Reid et al., 2012). Specifically, lower self-esteem, greater depression, and more suicidal ideation are common internalizing issues in MM victims (Arata et al., 2005). In regard to externalizing problems, individuals experiencing MM tend to have higher rates of criminal behavior, drug use, promiscuity, and life-threatening self-injurious behaviors (Arata et al., 2005).

Developmentalists suggest that the accumulation of psychological and biological disturbances associated with MM may interfere with the accomplishment of secure attachment formation and other key stage-salient developmental tasks, thereby resulting in multidimensional impairments that may not manifest until later in life (Li & Godinet, 2014; Rogosch & Cicchetti, 2004). But is maltreatment a unique risk factor for the

development of attachment problems, or is it as similarly detrimental as other familial risk factors? This question has not been adequately answered. Thus, maltreatment along with diverse forms of adversity in the family context should be examined together.

Maltreatment and Other Adverse Childhood Experiences

Other familial risk factors besides maltreatment are related to negative outcomes (Felitti et al., 1998). The Adverse Childhood Experiences (ACE) Study, a collaboration between the Centers for Disease Control & Prevention and Kaiser Permanente's Health Appraisal Clinic, examined the impacts of family factors on long-term health outcomes (Anda, Butchart, Felitti, & Brown, 2010; CDC, 2015; Felitti et al., 1998). Dong et al. (2004) and Felitti et al. (1998) each found that ACEs tended to co-occur (e.g., household domestic violence, parental substance abuse, mental illness, separation, and incarceration). These variables exhibit a dose-response pattern with personal health outcomes, where higher ACE scores relate to a variety of chronic medical conditions. Specifically, experiencing four or more ACEs is linked to significantly increased risk of poor mental and physical health (e.g., depression, severe obesity, smoking, cardiovascular disease, etc.) (Felitti et al., 1998; Murphy et al., 2014). Therefore, researchers should also consider an array of family factors related to chaotic home environments when investigating the impacts of maltreatment.

Not surprisingly, ACEs tend to co-occur with child maltreatment. Individuals who experience childhood maltreatment also tend to report higher levels of household substance use, mental illness, incarceration, domestic violence, and/or parental separation than those who did not experience maltreatment in childhood (Corso et al., 2008).

Consistent correlations between separate ACEs suggest that studies focusing on single risk factors are neglecting the full context of childhood adversity (Anda et al., 2010). Children with poor familial functioning are more likely to become victims of maltreatment than are children with higher levels of family cohesion (Higgins & McCabe, 2000). Mackenzie, Kotch, and Lee (2011) also found that cumulative family adversity predicted the experience of childhood maltreatment. Thus, it may be that ACEs and MM co-occur and influence each other.

The literature is clear, however, in documenting that experiencing more ACEs is related to poorer relationship quality in adulthood (Walker, Holman, & Busby, 2009). Unfortunately, the previous studies investigating the links between ACEs and health outcomes tend to examine only middle-aged samples. Yet this demographic is under-utilized when investigating links between ACEs and stage-salient tasks, such as attachment quality. Thus, the current study examines both young and middle-aged adults.

Some research suggests that ACE scores may be associated with negative outcomes because experiencing more adversity in childhood increases the likelihood of being exposed to stressors that may impair physiological homeostasis as children develop during sensitive periods (Khan et al., 2015; Shonkoff, 2012). This concept of cumulative risk increasing the chances of both negative health and psychological outcomes has been a driving focus in understanding the impact of childhood trauma.

Cumulative Risk

The interrelated occurrences of various types of maltreatment and ACEs represent

an accumulation of adversity known as cumulative risk (CR). As previously discussed,

CR has been linked to poorer outcomes in both maltreatment and ACE research.

Multiple maltreatment (MM), compared to individual types of maltreatment, is related to

increased severity in a host of negative outcomes (e.g., poly-substance use) (Charak,

Koot, Dvorak, Elklit, & Elhai, 2015). The negative impacts of co-occurring ACEs are

also related to greater chances of developing negative health outcomes (Layne et al.,

2014).

Despite a growing recognition of the impacts of cumulative stressors on various

health and developmental outcomes, some scholars challenge the CR perspective.

Cumulative indices are critiqued for reducing continuous variables (e.g., severity of

adversity) into dichotomous (e.g., experienced vs. did not experience) variables (Evan, et

al., 2013). Some research has found that maltreatment outcomes can vary depending on

the severity of the abuse (English, Graham, Litrownik, Everson, & Bangdiwala, 2005;

Espeleta, Palasciano-Barton, & Messman-Moore, 2016; Evans, Steel, & DiLillo, 2013),

and that severity interacts with the number of risks experienced (Clemmons, Walsh, &

Messman-Moore, 2007). These findings suggest that CR indices may fail to

appropriately quantify risk for health and developmental consequences. Other research

aimed to predict general anxiety using a host of anxiety risk factors (e.g., cognitive

interpretive biases, judgment biases, behavioral inhibition, and anxiety sensitivity). The

authors found that accumulated anxiety risk factors predicted greater general anxiety;

however, each individual risk factor also uniquely predicted general anxiety (Viana,

Gratz, & Rabian, 2011). Although CR predicted generalized anxiety, the authors

suggested that the CR is not specific enough as it fails to identify how the severity of each individual risk factor may relate to specific outcomes.

However, counter claims have been made supporting the practical utility of CR. Evan et al. (2013) suggest that compositing adversities into a single variable may be a better method of assessing risk factors. Specifically, due to the probabilistic nature of risk factors, single adversities are often not enough to impede individuals' optimal development, while an accumulation of stressors of all kinds can cumulatively derail developmental milestones (Sameroff et al., 2004). Additionally, although single risk factors often significantly predict outcomes, effect sizes tend to be small compared to those of cumulative indices (Sameroff et al., 2004). Research linking single risk factors to single outcomes simplifies the complexity of the developmental process; thus, multiple risk assessments may be key in developmental research.

Furthermore, CR has noteworthy developmental implications. The neurodevelopment of the brain, including all mediated functions (e.g., attachment) is experience-dependent, where the brain organizes itself in a manner that is optimally-equipped to survive in the immediate environment (Perry, 2008). Additionally, Sameroff (2000) suggests that major adverse events may have drastic implications for one's future development and cumulative threats over time are more likely to foster experience-dependent negative outcomes (Shonkoff, 2012). Therefore, an accumulation of maltreatment and living in other household risks during one's early years may negatively impact the development of the brain, the mediating organ of every human function (Perry, 2008; Shonkoff & Garner, 2012). A fundamental function mediated by

experience-dependent organization of the brain is attachment formation, which is a key developmental process connected to the outcomes associated with both maltreatment and ACEs.

Attachment Theory

Although the exact developmental mechanisms responsible for negative outcomes associated with childhood adversity are still in need of further investigation, many believe that Bowlby's Attachment Theory (1977; 1982) provides a useful framework (Teicher et al., 2006). As noted by Bowlby (1977; 1982), attachment quality is largely contingent upon physical and emotional warmth and the availability of caregivers. The innate human need for attachment in childhood is thought to primarily serve as an evolutionary survival mechanism by which children learn to view their world as safe and secure or unpredictable, cold, or chaotic (Ainsworth, 1989). Perceptions about the nature of relationships in the larger world are constructed through a relational schema known as an internal working model (IWM). Children who experience maltreatment at an early age understand relationships to be inconsistent, cold, rejecting, or violent.

Attachment and maltreatment. Attachment formation is the primary developmental task of infancy (Bowlby, 1977). Evidence for this can be seen in the patterns of attachment quality in maltreated individuals. Maltreated people form attachments that are adaptive for their environmental circumstances (Cicchetti & Toth, 1995). These attachments tend to be more anxious and more avoidant than those of individuals who do not experience maltreatment (Baer & Martinez, 2006). These patterns prepare the child to survive in the family home by either avoiding attachment

behaviors or by increasing attachment bids if parents need caretaking themselves. IWMs that are organized out of unsupportive experiences with primary caregivers ultimately alter children's perceptions of their social environment (Mackenzie et al., 2011). This includes a lack of trust in others and hostile attributional biases that are transferred out of the family home into other social contexts (Dykas & Cassidy, 2011). Mackenzie et al. (2011) suggest these negative perceptions may be more damaging to children than the maltreatment itself.

If home environments are insecure, children may not outsource regulatory abilities to their parents when in need of comfort. Thus, maltreatment occurring within children's homes impacts attachment development, resulting in even more traumatization. Adults who experienced these stressors as children may also fail to develop skills necessary to meet the attachment needs of their future offspring, leading to intergenerational cycles of neglect (Lee, Taylor, & Bellamy, 2012).

However, if caregivers are able to meet their children's attachment needs, the protection of a warm family environment tends to buffer children from other types of stressors. For example, Bowes, Maughan, Caspi, Moffitt, and Arseneault (2010) found that children who shared a secure attachment with their caregivers tended to engage in more adaptive behavioral strategies over the course of two years after being bullied in elementary school. The authors suggest that parents teach coping skills to their securely attached children. Conversely, parents who maltreat their children tend to be less likely to role model effective strategies for emotion-regulation (Kim & Cicchetti, 2010), possibly precipitating the increased emotional dysregulation found in internalizing and

externalizing symptoms.

Individuals who develop clinical symptoms may be unsuccessful in establishing affectional bonds (Bowlby, 1977). Therefore, many theorists argue that investigating maltreatment through an attachment lens will illuminate some of the underlying developmentally foundational impairments that are associated with experiencing childhood maltreatment. Finzi et al. (2001) found that abused children tended to have avoidant attachment styles, while neglected children tended to have anxious attachment styles. Other research found that anxious attachment was related to physical and psychological abuse, as well as to abusing others (Henderson, Bartholomew, Trinke, & Kwong, 2005). Moreover, some individuals' IWMs are characterized by both high avoidance and high anxiety, a profile known as fearful attachment (Main & Solomon, 1990). This attachment style is often associated with increased childhood trauma and adversity.

Aspelmeier, Elliott, and Smith (2007) found that college women who experienced childhood sexual abuse tended to report more trauma symptoms (e.g., dissociation, avoidant behaviors, and intrusive cognitions) if they did not have secure attachments with their parents. In another study, a predominantly African American sample of mothers also exhibited insecure adult attachment if they had experienced childhood sexual abuse (Kwako, Noll, Putnam, & Trickett, 2010). Conversely, mothers who were victims of childhood sexual abuse and shared a secure attachment with their parents reported fewer trauma symptoms. A comparison group of mothers who did not experience maltreatment tended to have more secure attachments with their caregivers. Moreover, Lowell et al.

(2014) found that college students with secure attachments to mothers and peers had a decreased chance of developing internalizing and externalizing problems.

Unfortunately, studies examining maltreatment and attachment quality have examined limited sample populations of children, adolescents, or college students, with little research targeting adult populations who have navigated stage-salient tasks such as relationship and career development. The literature may benefit from incorporating middle-aged samples which have been over-represented in the research examining ACEs and health outcomes, but under-represented in MM research. Some research also suggests that middle-aged and older adults have less-secure IWMs compared to young adults (Magai, 2008); however, this is not consistently found (Diehl, Elnick, Bourbeau, & Labouvie-Vief, 1998; Segal, Needham, & Coolidge, 2009). Research using both young and middle-aged adults is needed to illuminate adult developmental patterns in IWM security when investigating the impacts of cumulative risks. Despite restricted samples, the literature clearly suggests a link between maltreatment and attachment formation; moreover, the relational damage associated with maltreatment often extends beyond the family into other social contexts.

Maltreatment and future relationships. Establishing peer relationships is an important stage-salient task as children progress through school (Cicchetti & Toth, 1995). Although attachment is primarily conceptualized as an affectional bond between caregiver and child, attachments are formed and maintained with diverse others throughout one's lifetime (Bowlby, 1977; Cicchetti & Tucker, 1994). Caregivers act as attachment figures across children's development (Ainsworth, 1989); however, the

outcome of negative affectional bonds formed in infancy with one's caregivers may

restrict the ability to form affectional bonds later in life (Bowlby, 1977). For example,

individuals who develop insecure IWMs as children are likely to develop insecure

affectional bonds with peers and partners because earlier schemata tend to heavily

influence perceptions of current relationships (Davis et al., 2001).

In heterosexual partners, poor relationship adjustment is associated with a history

of emotional abuse in at least one partner in the dyad (Riggs, Cusimano, & Benson,

2011), suggesting that past maltreatment is related to attachment quality in both infancy

and later in life (McCarthy & Taylor, 1999). Therefore, the insecure IWMs developed

after experiencing maltreatment or other adversities may have long-term impacts on

relationships that are established after childhood. Although the relationship between

maltreatment and attachment quality is well-established, past research addressing the

differential impacts of maltreatment versus other ACEs is limited. Understanding the

unique predictive strength of these two constructs in relation to attachment quality is

necessary to further understand the cumulative risk perspective of childhood adversity.

Differentiating Maltreatment and ACEs

Only two recent studies have examined the unique impacts of maltreatment versus

ACEs. Narayan et al. (2016) investigated potential differences between these two

constructs in children's socioemotional problems (e.g., emotion-regulation and peer

relations) within a sample of homeless mother-child dyads. The authors' primary aim

was to examine whether intergenerational transmission of adversity from transient

mothers to their children was different for maltreatment versus ACE patterns of

adversity. The authors found that children with maltreatment histories tended to have poorer conduct, attention, peer relations, and emotion-regulation than non-maltreated children; however, no significant differences in socioemotional problems were found in children with and without histories of other ACEs. This finding suggests that maltreatment and other household adversity may differentially predict developmental outcomes; however, these results may be limited by a restriction of sample range where the sample was uniformly more likely to consist of individuals with higher ACE profiles. Specifically, all of the children in the study were homeless as the sample's defining characteristic, a variable which may also be recognized as a childhood adversity but that wasn't assessed by the authors' ACE measure. This childhood adversity may be linked with other ACEs, meaning the authors' findings may not generalize to lower-risk populations.

Earlier work by Finkelhor et al. (2013) examined maltreatment and ACE impacts on socioemotional outcomes in a study with the main objective of revising the ACE assessment measure. Using a sample of over two-thousand children and adolescents (10-17 years old), the authors found that maltreatment and ACEs both predicted greater symptoms of depression, anxiety, and other signs of psychosocial distress. Even after accounting for chaotic household variables, experiencing maltreatment remained a unique predictor of socioemotional impairment. Therefore, Finkelhor et al. (2013) suggest that MM and ACEs are more detrimental to children than maltreatment or ACE variables considered individually. However, as previously mentioned, the aim of Finkelhor et al. (2013) was to test whether additional childhood adversities predicted socioemotional

outcomes after accounting for the variance explained by both maltreatment and other adversities captured by Felitti et al.'s (1998) ACE measure. Research has yet to examine a similar model where maltreatment and ACEs are entered into statistical models hierarchically to examine contributions to developmental outcomes.

The discrepancies between these studies necessitate the exploration of maltreatment versus ACEs in predicting developmental outcomes, in order to test the cumulative risk perspective. Narayan et al. (2016) suggest that the difference in findings may be due to demographic differences between their transient mother-child sample and Finkelhor et al.'s (2013) nationally representative sample. Finkelhor et al. (2013) also found that maltreatment was a unique predictor of psychological distress, likely stemming from impeded stage-salient task completion. This finding suggests that maltreatment and ACEs account for unique variance in developmental outcomes; however, testing for potential explanatory differences in other developmental outcomes (e.g., attachment quality) is needed to further explore the over-arching construct of ACEs.

Additionally, both Finkelhor et al, (2013) and Narayan et al. (2016) gathered maltreatment and ACE information from children's caregivers, which may have biased the findings. Future research attempting to differentiate the impacts of maltreatment versus ACEs should gather information about childhood adversity directly from participants to limit bias from sources who may be in part responsible for the children's adversity. Also, no studies have been completed examining these constructs in adult populations who have navigated stage-salient tasks for many decades after their original cumulative risks took place.

Moreover, neither Narayan et al. (2016) nor Finkelhor et al. (2013) assessed how maltreatment and other ACEs were related to adult attachment quality. A developmental perspective asserts that attachment quality partially lays the foundation for the externalizing and internalizing outcomes measured by these authors (Kim & Cicchetti, 2010); therefore, IWMs assessed in early and middle adulthood are an important next step.

The Current Study

The aim of the current study was to determine whether MM or ACEs account for more variance in adult attachment quality outcomes. As is evident from the previous literature review, MM and other ACEs can have long-lasting impacts on attachment quality; however, there are notable gaps in the literature that require further examination. The current study aimed to address these limitations.

Gaps in the Literature

The first gap involves the samples used in the maltreatment literature. Research consistently demonstrates that maltreatment is linked to the development of insecure IWMs in college, community, and clinical samples (Finzi et al., 2001; Fredrick & Goddard, 2008; Henderson et al., 2005; Higgins & McCabe, 2000; Muller, Thornback, & Bedi, 2012; Riggs et al., 2011). However, maltreatment and ACE research investigating threats to individuals' IWMs tends to utilize young adult samples, while middle-aged adult samples are over-represented in studies examining health-related outcomes and ACEs. Potential differences in IWMs between young and middle-aged individuals have not been considered in previous CR research.

Magai (2008) suggests that young adults tend to have less secure attachments compared to middle-aged and older adults. This finding may be explained by age-related experiences (e.g., experiencing more interpersonal loss) or even cohort differences (e.g., cultural childrearing practices). Conversely, Diehl et al., (1998) suggest the age-related differences in attachment quality only exists between young and elderly adults. In fact, the authors found no difference in attachment styles between young and middle-aged

adults. Ultimately, few studies have investigated differences in attachment styles between young and middle-aged groups. This gap in the literature makes the present sample of young (ages 18-29) and middle-aged (ages 30-60) adults noteworthy. To date, no known study has investigated attachment differences between these two groups when examining the impacts of CR. Middle-aged individuals are more likely to have experienced a greater number of adversities that collectively add to their CR profile, but they have also navigated the world and developed coping strategies to help them thrive.

The second gap involves a lack of research investigating the unique variance in attachment quality predicted by maltreatment versus other ACEs. Maltreatment and ACE variables characterizing chaos in the home may be crucial influences in developing insecure IWMs, but evidence is needed to determine whether collective childhood adversity is more influential than specific types of risk (e.g., MM or ACEs separately). Understanding how maltreatment and other ACEs uniquely or cumulatively predict attachment quality will provide increased clarity of the ACE construct as a whole and inform healthcare providers about the types of assessments that may be both parsimonious and helpful in predicting outcomes.

A final gap involves investigating differences in outcomes between specific MM profiles. As previously discussed, some argue that maltreatment subtypes differentially predict various outcomes; however, this must be replicated. Messman-Moore and Brown (2004) noted that sexual abuse, which was previously thought to be a better predictor of negative outcomes compared to other maltreatment subtypes, was not a strong predictor of negative outcomes until other maltreatment experiences were also used as predictors.

Specific subtypes of MM may reasonably differ in relation to attachment outcomes, and comparing different MM profiles may tease out noteworthy maltreatment experiences that are more detrimental to IWMs. Therefore, the current study aimed to expand on the previous literature by determining whether specific MM profiles relate to differences in attachment security.

Hypotheses

The following hypotheses were developed in line with the previous review of literature. First, multiply maltreated (MM) participants were hypothesized to have significantly higher levels of anxious, avoidant, and fearful attachment compared to participants who experienced single types of maltreatment or no maltreatment. Next, individuals with higher ACE scores were hypothesized to have higher levels of anxious, avoidant, and fearful attachment compared to individuals with lower ACE scores. Additionally, ACE scores were hypothesized to be positively correlated with higher levels of MM. Finally, Maltreatment was hypothesized to account for no additional variance in adult attachment quality, above and beyond what is explained by ACEs, supporting a cumulative risk perspective. This analysis was also conducted with the predictors reversed to assess how well ACEs explain variance in attachment outcomes after accounting for variance explained by MM.

Research Questions

A research question was proposed to determine if the fourth hypothesis differed by age group and gender. Exploratory analyses examined the above hypotheses by age groups and gender separately. Due to previously mixed findings, a research question was

proposed to examine whether or not attachment quality significantly differed between young and middle-aged adults. Due to previously mixed findings, a research question was also proposed to examine whether or not attachment quality significantly differed between males and females. Research suggests that maltreatment shares a dose-response relationship with attachment quality, but what is less clear is whether specific maltreatment combinations relate to different levels of attachment security. A research question was proposed to determine if people with specific MM profiles had significantly different levels of attachment insecurity.

Methods

Participants

The study used existing archival data collected on a low-risk community sample of 379 adults (Howe, et al., 2015). See Table 1 for participant demographics.

Procedure

The HSU IRB approved the study. Facebook and snowball sampling methods were used to obtain original data. Middle-aged participants were electronically sent a general call for participation on Facebook. These initial participants were invited to ask their middle-aged friends if they were interested in also participating. College student participants were recruited through the HSU participation pool. Responses were anonymously collected through Survey Monkey, with the opportunity for all participants (including those who failed to complete the survey) to enter a random drawing for one of sixty $20 iTunes gift cards.

Table 1

Participant Demographics

	n	%	*M*	*SD*
Racial/Ethnic Groupings				
European-American	246	64.91		
African American	9	2.40		
Latino/a-Hispanic	35	9.31		
Asian-American	5	1.33		
Native American	3	0.80		
Mixed Ethnicity	41	10.82		
Other Ethnicity	37	9.76		
Gender Groupings				
Male	110	29.02		
Female	267	70.45		
Participant Age			34.25	12.39
College Students	152	40.11	20.55	2.69
Middle-Aged	225	59.37	43.52	6.27
Total Participants	379			

Note. The following analyses do not all include 379 participants, as not all participants completed every measure.

Participants read the informed consent page and clicked *yes* or *no* to indicate their

willingness to proceed with the study. After completing the informed consent,

participants were asked to indicate their age. Individuals who were ages 30 to 60

completed the "middle-aged" version of the survey, which references time differently

than the age 18 to 29 year old version of the survey. For example, questions aimed at the

college participants stated "in your youth..." and questions aimed at middle-aged

participants stated "in the 1980s..." to prompt participants to answer questions based on

youth experiences. All participants were provided with printable information about free

and/or low cost counseling services if they felt the need to talk to a professional about

any unsettling emotions that may have arisen from the survey questions.

Instrumentation

Adverse childhood experiences (ACEs). A modified version of the Kaiser

Permanente health provider intake form was used to measure ACEs (e.g., family

domestic violence, parental substance abuse; Felitti et al., 1998). The modified ACE

questionnaire includes twelve dichotomous *yes* or *no* questions that assess each ACE

separately. Each ACE question was then summed to provide a cumulative "ACE Total"

score (0-12 ACEs). Some questions included "Did anyone in your household ever go to

prison?," "Was anyone in your household mentally ill?," and "Were your parents ever

divorced or separated?" The "ACE Total" measure demonstrated adequate reliability for

the young ($\alpha_{KR-20} = .66$) and middle-aged ($\alpha_{KR-20} = .68$) groups.

Child maltreatment and multiple maltreatment. Neglect, sexual abuse, and

physical abuse were assessed using selected questions from the Childhood Experiences of

Care and Abuse (CECQ; Bifulco, Brown, & Harris, 1994) scale. Neglect was measured using an eight-item CECQ subscale that is answered on a five-point scale from 1 (*No, Not At All*) to 5 (*Yes, Definitely*). Participants completed the measure separately regarding their mother's and father's behaviors, resulting in maternal and paternal neglect scores. Some sample questions include "[my parent] was difficult to please," "[my parent] would leave me unsupervised before I was 10 years old," and "[my parent] cared for me when I was ill." Total neglect summed scores were then created for both mother and father neglect. Those scoring above the sample mean on either scale were considered neglected.

Physical abuse was assessed by asking participants the following dichotomous, *yes* or *no* question: "When you were a child or teenager, were you ever hit repeatedly with an implement (such as a belt or stick) or punished, kicked, or burnt by someone in the household?" Participants who answered yes to this question were identified as having experienced physical abuse.

Questions assessing sexual abuse included: "Did anyone force you or persuade you to have sexual intercourse against your wishes before age 17?," "Were you ever strongly coerced or forced into having sex with someone when you did not want to?," and " Can you think of any upsetting sexual experiences before age 17 with a related adult or someone in authority (e.g., teacher)?" Participants who answered *yes* to any of these three questions were identified as having experienced sexual abuse. An additional question asked with whom they had their first sexual intercourse experience. Participants who identified this first experience to be an unwanted advance or molestation experience

were also identified as having experienced sexual abuse.

The MM variable was created by summing maltreatment type experiences (e.g., none, neglect, physical abuse, sexual abuse). Scores range from 0 (*No Maltreatment*) to 3 (*Multiple Maltreatment*).

Adult attachment quality. IWMs were assessed using the Experiences in Close Relationships Scale-Revised (ECR-R; Fraley, Waller, & Brennan, 2000). The ECR-R is comprised of two fifteen-item subscales that are answered on a five-point scale from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). The anxious attachment subscale includes statements like "When my romantic partners are out of sight, I worry that he or she might become interested in someone else" and "I often worry that my partners don't really love me." The avoidant attachment subscale includes statements like "I prefer not to show a partner how I feel deep down" and "I am nervous when partners get too close to me." This instrument is comprised of a stable two-factor anxious and avoidant factor structure and has been convergently validated for romantic relationships and discriminantly validated for family members/friends (Sibley, Fischer, & Liu, 2005). These psychometric properties make the ECR-R one of the most widely accepted measures of avoidant and anxious adult attachment constructs. The ECR-R anxious attachment subscale demonstrated good reliability for the young ($\alpha = .91$) and middle-aged ($\alpha = .92$) groups. The ECR-R avoidant attachment subscale also demonstrated good reliability for the young ($\alpha = .89$) and middle-aged ($\alpha = .90$) groups. A separate fearful attachment variable was created by summing participants' anxious and avoidant attachment subscales scores on the ECR-R and demonstrated good reliability for the young ($\alpha = .95$) and

middle-aged ($\alpha = .95$) groups.

Data Analysis

All analyses were conducted using Statistical Package for the Social Sciences (SPSS-Version 20), with the assumptions of each analysis being tested to ensure the proper use of statistical analyses and interpretation. Particular attention was paid to ensure the assumption of no multicollinearity was met due to the consistent associations found between maltreatment and ACEs. Hierarchical regression analyses tested whether maltreatment predicted additional significant variance in attachment quality after controlling for the effects of ACEs in the first model. This was calculated for avoidant, anxious, and fearful attachment outcomes. The research questions were explored by conducting ANOVAs to determine whether age, gender, or their interaction significantly predict differences in attachment quality. Also, the above hierarchical regressions were explored by examining whether results differ for these demographic groups.

Results

Assumption Checks and Variable Transformations

Assumptions of regression were analyzed to ensure appropriate utilization of

hierarchical regression techniques. There were no violations of linearity and

homoscedasticity, nor were there any multivariate outliers; however, residuals were

slightly non-normal. Multicollinearity did not interfere with the total sample regression

results as is evident by tolerance levels, variance proportions, and predictor correlations

being within acceptable ranges; however, the variance proportions in both the anxious

and avoidant attachment hierarchical models showed some evidence of multicollinearity

for male participants. The assumption of the absence of multicollinearity was not

violated in any of the other models, suggesting that factors such as small male sample

size may have contributed to this violation (York, 2012; $n = 67$ for the anxious

attachment analysis and $n = 93$ for the avoidant analysis). A Log_{10} transformation was

applied to participants' total ACEs to address the assumptions of regression in all

hierarchical models. Despite the Log_{10} transformation, normality of residuals still

slightly deviated from the 3.0 skew-kurtosis ratio in the regression models for all

participants. This small deviation means that the predictability of independent variables

may slightly differ across different levels of each predictor variable.

Correlational Analyses

See Table 2 and 3 for correlations between variables. The study's first hypothesis

predicted that participants who experienced MM would be more likely to have insecure

IWMs. This hypothesis was supported with positive correlations found between MM and

Table 2

Correlation Matrix of Key Variables

Variable	1	2	3	4	5
1. ACEs			.		
2. MM	.45**				
3. Avoidant	.22**	.12*			
4. Anxious	.19**	.12*	.90**		
5. Fearful	.22**	.12*	.97**	.98**	

*Note. N*s ranged from 306 to 378. * *p* < .05; ** *p* < .001

Table 3

Correlation Matrix of Key Variables by Gender

Variable	1	2	3	4	5	*M* (*SD*)
1. ACEs	--	.42**	.21**	.15*	.19**	2.09 (2.10)
2. MM	.53**	--	.12	.10	.11	1.27 (1.00)
3. Avoidant	.27**	.12	--	.91**	.97**	42.55 (13.67)
4. Anxious	.35**	.18	.91**	--	.98**	44.48 (14.61)
5. Fearful	.35**	.18	.97**	.98**	--	87.12 (27.63)
M (*SD*)	1.57 (1.72)	1.11 (0.99)	43.54 (12.53)	44.50 (13.61)	88.00 (25.31)	

Note. Correlations for women (*N*s = 220 - 267) are presented above the diagonal and correlations for men (*N*s = 85 - 109) are presented below the diagonal. * $p < .05$; ** $p < .001$

positive correlations between ACEs and anxious, avoidant, and fearful attachment quality. ACEs and MM were also positively correlated, supporting the third hypothesis that participants who experienced MM are more likely to have experienced more ACEs, and also supporting the cumulative risk model.

Descriptive Analyses

Nearly seventy percent of participants reported at least one ACE and one in five participants was exposed to four or more ACEs. Additionally, sixty-four percent of participants experienced at least one type of maltreatment. Out of individuals experiencing one type of maltreatment, neglect was the most common (50.7%), followed by sexual abuse (35.6%), and then physical abuse (28.5%). Over half of maltreated participants experienced more than one type of maltreatment with neglect and sexual abuse (35.2%) and neglect, sexual abuse, and physical abuse (33.6%) being the most common combinations of MM, followed by neglect and physical abuse (23.4%) and sexual abuse and physical abuse (7.8%). See Tables 4 and 5 for participant maltreatment prevalence. See Tables 6 and 7 for participant ACE frequencies. No significant differences were found between young and middle-aged adults' total ACEs; however, middle-aged adults were more likely than young adults to have experienced MM. Furthermore, females tended to experience slightly more ACEs than males; however, no significant gender differences in MM were found. See Table 8 for differences in MM and ACEs by age and gender.

Table 4

Participant Maltreatment Prevalence

	Total	Male	Female	Young	Middle-Aged
	n (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)
Maltreatment Subtype					
Physical Abuse	108 (29.7)	39 (37.5)	69 (26.7)	40 (26.5)	68 (32.2)
Sexual Abuse	135 (35.6)	20 (18.3)	114 (42.3)	44 (29.5)	91 (40.6)
Neglect	192 (50.7)	53 (54.6)	138 (57.0)	65 (44.8)	125 (64.4)
Multiple Maltreatment					
No Maltreatment	95 (28.2)	33 (34.0)	61 (25.6)	50 (35.2)	45 (23.3)
1 Subtype	114 (30.1)	29 (29.9)	85 (35.7)	53 (37.3)	59 (30.6)
2 Subtypes	85 (22.4)	26 (26.8)	58 (24.4)	25 (17.6)	60 (31.1)
3 Subtypes	43 (11.3)	9 (9.3)	34 (14.3)	14 (9.9)	29 (15.0)

Note. Percentages for maltreatment subtypes may exceed 100%, as they represent percent of participants who reported each type of maltreatment.

Table 5

Age and Gender Differences in Maltreatment Prevalence Rates

	χ^2	df	p
Maltreatment Subtype			
Physical Abuse			
Age	1.38	1	.239
Gender	4.10	1	.043
Sexual Abuse			
Age	4.77	1	.029
Gender	20.67	1	<.001
Neglect			
Age	12.95	1	<.001
Gender	0.16	1	.689
Multiple Maltreatment			
No Maltreatment			
Age	5.70	1	.017
Gender	2.40	1	.121
1 Subtype			
Age	1.68	1	.195
Gender	1.04	1	.308
2 Subtypes			
Age	7.85	1	.005
Gender	0.22	1	.641
3 Subtypes			
Age	1.95	1	.162
Gender	1.54	1	.214

Table 6

Frequency of ACEs

	Total n (%)	Male n (%)	Female n (%)	Young n (%)	Middle-Aged n (%)
0 ACEs	122 (32.3)	42 (38.5)	79 (29.6)	53 (34.9)	69 (30.8)
1 ACEs	74 (19.6)	19 (17.4)	54 (20.2)	30 (19.7)	44 (19.6)
2 ACEs	61 (16.1)	18 (16.5)	43 (16.1)	27 (17.8)	33 (14.7)
3 ACEs	42 (11.4)	16 (14.7)	27 (10.1)	15 (9.9)	28 (12.5)
4+ ACEs	78 (20.6)	14 (12.8)	64 (24.0)	27 (17.8)	50 (22.3)

Table 7

Age and Gender Differences in ACE Frequencies

	χ^2	df	p
0 ACEs			
Age	0.68	1	.433
Gender	2.84	1	.113
1 ACEs			
Age	0.00	1	1.000
Gender	0.39	1	.569
2 ACEs			
Age	0.62	1	.474
Gender	0.01	1	1.000
3 ACEs			
Age	0.62	1	.510
Gender	1.59	1	.215
4+ ACEs			
Age	1.16	1	.300
Gender	5.83	1	.017

Table 8

ANOVA Results by Age and Gender

	n	*M*	*SD*	*F*	*df*	*p*	η^2
Multiple Maltreatment							
Age				4.50	1	.035	.014
Young	142	1.02	0.96				
Middle-Aged	191	1.38	1.00				
Gender				1.29	1	.257	.004
Male	97	1.11	0.99				
Female	236	1.27	1.00				
ACEs							
Age				2.27	1	.133	.006
Young	152	1.76	1.90				
Middle-Aged	222	2.04	2.07				
Gender				5.38	1	.021	.014
Male	109	1.28	1.72				
Female	265	2.09	2.10				

Regression Analyses

The fourth hypothesis predicted that that maltreatment experience would not account for additional variance in adult attachment quality above and beyond what was already explained by ACEs. Hierarchical regression procedures examined the unique contributions of ACEs and MM on the outcomes of avoidant, anxious, and fearful adult attachment quality. See Table 9 for regression analyses. In step one of the model, ACEs accounted for 6.7% ($p < .001$) of the variance in avoidant attachment, 5.4% ($p < .001$) of the variance in anxious attachment, and 6.6% ($p < .001$) of the variance in fearful attachment. Adding participants' summed MM score in step two of the model did not significantly increase explained variance in any of the models. These results did not change when predictors were reversed by putting MM in the first step and adding ACEs in the second step of the model. In step one of the reversed analyses, MM accounted for 1.4% ($p = .041$) of the variance in avoidant, 1.4% ($p = .039$) of the variance in anxious attachment, and 1.5% ($p = .039$) of the variance in fearful attachment. Adding participants' total ACEs in the second step of each model significantly increased explained variance to 6.7% ($p < .001$) for avoidant, 5.5% ($p < .001$) for anxious, and 6.6% ($p < .001$) for fearful attachment. Therefore, participants' collective ACE scores predicted significant variance in attachment outcomes above and beyond what was predicted by their MM scores alone. Regression models were also run separately for gender and age groups, but results were similar for all groups.

Table 9

Multiple Maltreatment Hierarchical Regression

	Avoidant Step 1	Avoidant Step 2	Anxious Step 1	Anxious Step 2	Fearful Step 1	Fearful Step 2
ACEs	.26**	.26**	.23**	.23**	.26**	.26**
	(.07**)	(.05**)	(.05**)	(.04**)	(.07**)	(.05**)
MM		.00		.02		.00
		(.00)		(.00)		(.00)
R^2	.07	.07	.05	.06	.07	.07
Model F	21.68**	10.80**	17.29**	8.65**	20.46**	10.20**
R^2_Δ	.07	.00	.05	.01	.07	.00
F_Δ	21.68**	0.00	17.29**	0.06	20.46**	0.00
df	1, 301	2, 300	1, 301	2, 300	1, 289	2, 288

Note. Standardized regression values are presented for each variable with semi-partial squared correlations within parentheses.

* $p < .05$; ** $p < .001$

Age and Gender Differences in Attachment Quality

The third research question was regarding whether attachment quality differed between young and middle-aged adults. Similarly, the fourth research question asked whether attachment quality significantly differed between males and females. See Tables 10 and 11 for ANOVAs investigating attachment quality by age and gender. The ANOVAs revealed a main effect for age but not gender for anxious, avoidant, and fearful attachment styles, where young adults had more insecure attachments across IWM types. This supports the findings of previous research (Segal et al., 2009). The interaction between age and gender was not significant for any of the attachment styles, indicating that attachment security may become more secure by middle-age for both men and women.

Differences in Attachment Quality for Multiple Maltreatment Profiles

The study's final research question was regarding whether specific combinations of MM significantly differed in IWM security. See Table 12 for ANOVAs investigating MM subgroup differences in anxious, avoidant, and fearful attachment quality. ANOVAs revealed that there were no main effects for maltreatment type combinations regarding insecure attachment styles, indicating that all MM subtypes were equally detrimental to participants' attachment outcomes.

Table 10

Attachment Means and Standard Deviations Between Age and Gender

	n	*M*	*SD*
Avoidant Attachment			
Young & Male	31	49.39	13.63
Young & Female	112	46.37	14.40
Middle-Aged & Male	55	41.75	12.92
Middle-Aged & Female	119	42.60	14.73
Anxious Attachment			
Young & Male	34	47.71	12.76
Young & Female	109	44.08	13.59
Middle-Aged & Male	62	41.26	11.89
Middle-Aged & Female	113	40.96	13.71
Fearful Attachment			
Young & Male	31	97.03	25.88
Young & Female	109	90.98	26.99
Middle-Aged & Male	54	82.81	23.69
Middle-Aged & Female	109	83.03	27.99

Note. Displayed Means and standard deviations are not centered.

Table 11

Main Effects for Age and Gender on Attachment

	F	df	p	η^2
Avoidant Attachment				
Age Main Effect	8.23	1	.004	.026
Gender Main Effect	1.38	1	.240	.004
Anxious Attachment				
Age Main Effect	9.51	1	.002	.029
Gender Main Effect	0.34	1	.558	.001
Fearful Attachment				
Age Main Effect	9.98	1	.002	.032
Gender Main Effect	0.69	1	.406	.002

Table 12

Differences in Attachment Quality by Multiple Maltreatment Profile

	n	M	SD	F	df	p	η^2
Avoidant Attachment				1.95	3	.126	.05
Neglect & Sexual Abuse	37	46.43	12.49				
Neglect & Physical Abuse	26	42.09	13.85				
Physical & Sexual Abuse	10	36.90	9.68				
All Maltreatment Types	39	46.79	15.07				
Anxious Attachment				2.17	3	.096	.06
Neglect & Sexual Abuse	42	48.10	14.07				
Neglect & Physical Abuse	26	42.65	14.95				
Physical & Sexual Abuse	10	37.70	12.58				
All Maltreatment Types	28	48.32	15.02				
Fearful Attachment				2.03	3	.115	.06
Neglect & Sexual Abuse	36	94.42	25.78				
Neglect & Physical Abuse	25	85.76	28.17				
Physical & Sexual Abuse	10	74.60	21.36				
All Maltreatment Types	38	95.45	29.46				

Discussion

The present study investigated the unique predictive strength of multiple maltreatment (MM) experiences versus other ACEs in relation to anxious, avoidant, and fearful attachment outcomes. The present findings inform the debate over the importance of cumulative versus specific risk and support the utility of collective ACEs over singular maltreatment experiences when predicting socioemotional developmental outcomes. Additionally, the present study attempts to fill gaps in the literature by examining a sample of both young and middle-aged adults to examine potential age-related differences. Results supported all research hypotheses and illuminated answers to additional research questions.

Relationships Between Maltreatment, ACEs, and Attachment Quality

The study's first hypothesis predicted that participants who experienced MM would have more insecure IWMs. Additionally, the study's second hypothesis predicted that participants with higher ACE scores would also have higher levels of anxious, avoidant, and fearful attachment compared to participants with lower ACE scores. The positive correlations between participants' MM and ACE scores with anxious, avoidant, and fearful attachment is consistent with previous research (Riggs et al., 2011). As previously discussed, maltreatment and other ACEs often occur in chaotic home environments where children are not provided support to form secure attachments. Children in these circumstances often struggle to develop the skills necessary to form and maintain secure attachments later in life (Lee et al., 2012). Anxious and avoidant attachment styles are survival strategies in these environments, despite being related to negative outcomes across

the lifespan (Ainsworth, 1989; Dong et al., 2004; Felitti et al., 1998).

The study's third hypothesis predicted that participants with MM experiences would be more likely to have higher ACE scores than participants without MM experiences. The positive relationship between participants' maltreatment experiences and other ACEs also supports previous research (Corso et al., 2008). Specifically, children with poor familial functioning and increased familial adversity are more likely to experience maltreatment (Higgins & McCabe, 2000). In accordance with a neurodevelopmental model, these childhood environments may contribute to the association between childhood adversity and poorer physiological and psychological outcomes in an experience-dependent manner (Perry, 2008).

Prevalence of Maltreatment, ACEs, and Attachment Styles

The experience-dependent relationship between risks and outcomes necessitates the exploration of risk prevalence within the current sample. The present sample reported higher rates of ACEs and maltreatment than prior low-risk college student and community samples (e.g., Dube et al., 2005; Espeleta, Palasciano-Barton, & Messman-Moore, 2016; Felitti et al., 1998). Sixty-four percent of participants endorsed having experienced at least one type of maltreatment, with over half of these participants experiencing MM. Additionally, participants' attachment avoidance and anxiety were highly correlated ($r =$ .90). Previous research correlating attachment avoidance and anxiety have only documented moderate correlations (Chae et al., 2014; Espeleta et al., 2016). This high correlation may be explained by the present sample's higher than expected cumulative risk (CR) profile.

Consistent with this assumption, over 1/3 of participants were identified as fearfully attached, with both anxious and avoidant attachment quality scores ranking above the sample mean. Previous research on clinical samples suggests that the prevalence of fearful attachment is closer to 50% (Mason, Platts, & Tyson, 2005). Murphy et al. (2014) found a dose-response relationship between the number of ACEs experienced and attachment outcomes, with higher ACE profiles corresponding to more fearful attachment outcomes. Consistent with this previous finding, fearfully attached participants were more likely to have higher CR profiles, suggesting that the high CR profiles in the present sample may have inflated the proportion of participants identified as fearfully attached. Consequently, the present results should be interpreted within the context of a community sample with high CR profiles. These CR profiles may also be compared across demographic groups to explore differences in ACEs and maltreatment profiles.

Age differences in maltreatment and ACEs. There were no significant differences between young and middle-aged adults' in total ACEs; however, middle-aged adults were more likely than young adults to experience MM. Fewer MM experiences among young adults may be the result of legal and cultural shifts that promote child welfare which were not in place in the 1980s (Dahlberg & Mercy, 2009). For example, Zolotar and Puzia (2010) found that policies banning corporal punishment tended to decrease support for corporal punishment practices. The present study's findings and those of Zolotar and Puzia (2010) are also consistent with the Fourth National Incidence Study of Child Abuse and Neglect, which suggested that maltreatment rates have declined since the last national incidence

study in 1993 (Sedlak et al., 2010). Therefore, the present findings further support the general decrease in maltreatment occurrence among younger generations. These age differences in adversity rates highlight the importance of exploring other potential maltreatment and ACEs differences among other demographic groups, such as gender.

Gender differences in reports of maltreatment and ACEs. The current study found that females reported more ACEs than males; however, this gender difference was small. Previous research suggests that women are more likely to experience a variety of risks (e.g., household domestic violence, parental mental illness, separated parents), and have higher ACE scores (Cavanaugh, Petras, & Martins, 2015; Felitti et al., 1998; Katon et al., 2015). Greater ACE scores may increase women's risk for developing negative health and psychological outcomes compared to men; therefore, women may require more support and intervention. Despite a slight gender difference in total ACEs, no evidence was found for differences in males' and females' multiple maltreatment experiences. Previous research showed that males experience higher rates of physical abuse, while females often experience higher rates of sexual abuse (Dong et al., 2004; Walker et al., 2009). Additionally, research suggests that males and females experience similar levels of neglect (Mennen et al., 2010). Although males or females may be more likely to experience specific abuse subtypes, a shared likelihood of experiencing neglect may result in comparable likelihoods rates of MM, as shown in the current sample.

Predictive Utility of Maltreatment Versus ACEs

Results of the hierarchical models supported the fourth hypothesis, which predicted

that maltreatment experience would not account for additional significant variance in adult

attachment quality above and beyond what was already explained by ACEs. Although

maltreatment experience was independently related to attachment outcomes, as was

hypothesized, this association was far less significant after accounting for other childhood

adversities. Contrary to Finkelhor et al.'s (2013) findings, maltreatment did not predict

significant variance in outcomes in the second step of the regression model. These results

suggest that the ACE construct as a whole may be a better predictor of attachment outcomes

compared to specific adversities (e.g., maltreatment). This finding may be influenced by the

over-arching ACE construct's ability to account for multiple types of childhood adversity.

However, the ability of cumulative indices to predict attachment quality does support

Finkelhor et al.'s (2013) other finding that maltreatment and other ACEs collectively are

better predictors of developmental outcomes than either one alone.

Taken together with the positive correlation between maltreatment and ACEs,

maltreatment may better be conceptualized as simply another adversity that can be

considered under the collective ACE construct. Within this perspective, maltreatment

appears to be part of a general CR profile in that it does not carry unique weight in

predicting adult socioemotional outcomes. This finding lends credence to Sameroff et al.'s

(1993) cumulative risk model, suggesting that the types of ACEs matter less than the

accumulated experience of chronic risk when predicting outcomes. In support of the study's

first two research questions, these outcomes were consistent across gender and age groups,

supporting the inclusion of MM as another ACE, which may contribute to a host of negative

physical and psychological outcomes across demographic groups and the lifespan.

Although these findings support the utility of CR indices, other researchers continue to discuss the importance of risk severity when predicting outcomes. For example, maltreatment severity has been shown to predict increased insecure attachment and trauma symptoms (Espeleta et al., 2016; Evans et al., 2013); however, these authors did not conduct analyses with dichotomous "experienced" versus "did not experience" classifications of maltreatment exposure to predict attachment outcomes. Without a comparison of these two different predictors of maltreatment, there is no evidence to suggest that maltreatment severity offers additional predictive power above and beyond a simple CR or Total ACEs index. Earlier work by Clemmons et al. (2007) found that both the number of maltreatment subtypes experienced and maltreatment severity were independently related to trauma symptoms, but maltreatment severity was a stronger predictor. Additionally, participants' number of maltreatment experiences interacted with maltreatment severity, where the number of maltreatment types was more predictive of trauma symptoms when maltreatment was severe. These authors ultimately urge researchers to use both the number of experienced maltreatment subtypes and maltreatment severity as predictors of outcomes.

However, it should be noted that Clemmons et al. (2007) based their conclusions on small effect sizes, with only 1% additional variance in trauma symptoms being explained by the interaction of number of maltreatment types experienced and average maltreatment severity. Simpler dichotomous "experienced" versus "did not experience" assessments of adversities may encourage healthcare and social service professionals to engage in screening

efforts. Screening for risk severity, which may be defined and quantified differently across screeners, may result in additional complications with limited gain in additional predictive utility. The parsimonious nature of CR indices, plus the tendency for several risk factors to be necessary to derail typical development, suggest that risk severity may not be as important as Clemmons et al. (2007) and Espeleta et al. (2016) suggest. In addition to further exploring the specific vs. cumulative risk debate, the present study also sought to explore other gaps in the literature.

Demographic Analyses

      Age differences in attachment outcomes. In addition to the examination of cumulative versus specific risk, the current study expands on the previous literature by investigating attachment style differences between demographic groups. The third research question inquired about age group differences in attachment quality. Interestingly, young adults had significantly higher levels of attachment avoidance and anxiety, but no differences were found in fearful attachment. Previous findings comparing young and middle-aged adult attachment styles have produced mixed findings (Diehl et al., 1998; Magai, 2008; Segal et al., 2009); however, the current finding is supported by developmental theory. Middle-aged adults have navigated additional developmental tasks and other life experiences that may support more secure attachment outcomes over time compared to younger adults. Furthermore, the frontal cortex is not completely myelinated until the mid- to late-twenties (Asato, Terwilliger, Woo, & Luna, 2010). Increased myelination within the frontal cortex is associated to better IWM security, which also

supports the current findings (Serra et al., 2015). Failing to find an age-group difference in fearful attachment quality suggests that the disorganization of IWMs may be stable over time, likely due to compounding negative relational interactions across the lifespan (Weinfield, Whaley, & Egeland, 2004).

The present cross-sectional study cannot rule out cohort differences as an explanation for these age-group attachment style differences. If cohort differences significantly influence the attachment differences in the present sample of adults, than younger adults may maintain higher levels of insecure attachment qualities as they continue to age. Conversely, a lack of cohort differences would suggest that young adults will increase their attachment security over time. Exploring this facet of adversity and attachment quality between young and older adults may be a prime area for future longitudinal research.

Gender differences in attachment outcomes. The fourth research question inquired about whether gender differences existed in attachment security. Results showed no significant differences in anxious, avoidant, or fearful attachment between males and females. Previous research on this topic is mixed. While some research has failed to find gender differences in attachment quality (e.g., Velotti et al., 2016), other studies suggest that men tend to be more avoidant than women (Schmitt et al., 2003). However, Velotti et al. (2016) did not find significant gender differences in attachment avoidance or anxiety, but gender moderated the relationship between attachment quality and emotion-regulation. Specifically, women had more difficulty regulating their emotions, which may account for

gender differences found in other studies. The findings of Velotti et al. (2016) highlight the importance of examining different developmental stage-salient tasks to unpack potential mediating and moderating effects of these tasks on one another. Failing to examine these relationships may simplify complex developmental processes. Although the current study did not explore other stage-salient tasks, such as emotion-regulation strategies, attachment outcomes among different MM profiles were tested to further explore the question regarding cumulative versus specific risk.

Attachment Quality Differences Between Specific Multiple Maltreatment Profiles

The final research question examined whether attachment quality outcomes differed by specific MM profiles. Although Vachon et al. (2015) recently suggested that maltreatment subtypes are equally detrimental, other research suggests that specific maltreatment profiles may be differentially related to outcomes (Arata et al., 2005; Berzenski & Yates, 2011; Conroy et al., 2009; Lowell et al., 2014). However, as previously mentioned, Messman-More and Brown (2004) found that maltreatment subtypes in isolation are less predictive of outcomes as compared to collective maltreatment experiences. The present study did not find differences in attachment outcomes for various maltreatment profiles. Therefore, the present findings further suggest that neither specific subtypes, nor combinations of maltreatment, differentially relate to adult attachment security. This finding supports Vachon et al.'s (2015) work, which suggested maltreatment subtypes do not differentially relate to outcomes.

Implications

Collectively, these findings have theoretical and practical implications. Consistent with Sameroff et al.'s (1993) cumulative risk (CR) model, the present findings suggest that the sum of risk factors is more predictive of attachment outcomes than risk factors considered in isolation. Developmentalists suggest that attachment quality lays the foundation for all future developmental tasks (Kim & Cicchetti, 2010). Therefore, IWMs are mechanisms that may be altered by CR to impact negative health and psychological outcomes across the lifespan. In practice, these findings support the utilization of a modified version of the Felitti et al.'s (1998) ACE measure in healthcare and social service settings. The ACE instrument may better predict a variety of future outcomes by utilizing a wide array of adversities to predict outcomes instead of focusing on specific, less predictive risks. As noted by these healthcare and social service professionals, screening for ACEs is time consuming (Bright et al., 2015; Kalmakis, 2013). Employing a parsimonious screening tool that predicts numerous outcomes may result in more efficient screening, expediting clients' access to services or interventions. Moreover, the present findings should drive political conversation to establish national adversity screening guidelines in healthcare and social service settings that utilize more predictive cumulative indices.

Strengths, Limitations, and Future Research

The current study has several methodological strengths. First, the present study assessed adversity using composite measures to operationalize maltreatment experiences and ACEs. As previously mentioned, specific risks in isolation are often not enough to impede

developmental outcomes, making CR indices of adversity preferable for assessment (Sameroff et al., 2004). The present findings further support the utility of a CR perspective when predicting outcomes.

Second, the current study gathered information directly from individuals regarding their own childhood adversity. Personal reports of childhood maltreatment may be susceptible to suggestibility, bias, or be otherwise false. However, research suggests that maltreated children do not differ from non-maltreated children in memory-recall or suggestibility of traumatic events (Chae, Goodman, Eisen, & Qin, 2011; Chae et al., 2014). Conversely, the accuracy of maltreatment reports may be compromised if received from other individuals (e.g., parents and romantic partners) who may be perpetrators of the maltreatment. Therefore, the current study's sampling method may have enabled the collection of more valid information about personal experiences of childhood adversity to be gathered.

Finally, the current study utilized a sample of both young and middle-aged adults to examine potential age-related differences. Exploring the relationships between maltreatment, ACEs, and attachment outcomes in these populations allowed for an examination of how CR impacts attachment in middle-aged adults who have completed more stage-salient tasks compared young adults who have not yet undergone all of the same neurodevelopmental or socioemotional processes. The current study's cross-sectional exploration of adversity between these two age groups suggests that the negative developmental impacts of childhood adversity persist across the lifespan.

Despite the strengths of the current study, some limitations must be considered. First, the current study used snowball and other convenience sampling methods. A more representative sample is needed to increase generalizability to more diverse ethnic groups and clinical populations. Second, the present study was unable to discern whether the findings would apply across adulthood into old age. Finally, longitudinal studies are necessary to determine whether the age patterns shown here cross-sectionally also occur in the same individuals measured over time.

Although previous research (e.g., Finkelhor et al., 2013; Narayan et al., 2016) has examined the differential predictive value of maltreatment experience versus ACEs in relation to stage-salient tasks (e.g., socioemotional outcomes), the present findings cannot generalize to other stage-salient tasks (e.g., emotion-regulation and autonomy development) that build on attachment formation. Additionally, biologically-based research suggests that some individuals are more physiologically reactive to environmental stimuli than others (Obradović, 2016). Other researchers found that variables, such as education (e.g., academic achievement) mediate the outcomes of maltreatment (Herrenkohl, Jung, Lee, & Kim, 2017). Future research may benefit from exploring how individuals' physiological reactivity and other academic variables mediate the manner in which CR relates to developmental outcomes.

Finally, future research should continue expanding the ACE measurement to account for more childhood adversities that contribute to CR profiles. The present findings support a theoretical adjustment to the cumulative risks accounted for within the ACE construct.

Earlier work by Finkelhor et al. (2013) suggests that maltreatment experiences and ACEs uniquely predict developmental outcomes; however, considering them together makes these variables better predictors. For example, community violence, lack of close friendships, peer victimization, etc. are all suggested to be additional ACEs that merit recognition on the ACE screening tool (Finkelhor et al., 2013). Future ACE measure revisions will continue to expand recognition of additional risks that were not incorporated within Felitti et al.'s (1998) original ACE measure, reinforcing the previously described practical utility of the instrument in healthcare and social service settings to screen for numerous health-related and psychological outcomes.

Conclusion

Collectively, participants' maltreatment experiences did not predict attachment outcomes after accounting for their other experienced childhood adversities. Additionally, specific cumulative maltreatment profiles did not differentially relate to attachment quality outcomes. These findings suggest that individual, and even specific combinations of risk, are less important than the overall accumulation of adversity when predicting adult attachment outcomes.

Ultimately, these results suggest that screening for a variety of ACEs may be best practice for predicting individuals' developmental outcomes. Healthcare and social service settings are encouraged to incorporate a parsimonious ACE measure within their screening practices to better predict health and psychological outcomes. Utilizing the ACE measure to enhance screening may improve service provision and intervention to bolster individuals'

navigation of further developmental milestones. Although the ACE construct requires

further investigation, the present study overwhelmingly supports the notion that cumulative

rather than specific risks in childhood are salient threats to secure attachment formation.

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