

DISSERTATION

THE INTERGENERATIONAL TRANSMISSION OF TRAUMA:
ATTACHMENT, ADVERSE CHILDHOOD EXPERIENCES, AND CURRENT LIFE STRESS

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ABSTRACT

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Attachment theory highlights the importance of the quality of the relationship between an infant and his or her primary caregiver. However, caregivers with unresolved trauma or loss may behave in frightening ways and foster a disorganized (D) attachment style with their infant. This attachment style poses a significant risk for later psychopathology. However, challenges remain in identifying D attachment through observation. The Emotional Availability (EA) system may help to elucidate the indicators of disorganization. Study 1 represents the first step in validating the EA system in identifying D attachment and provides guidelines to assist EA coders in coding D attachment. Next, adverse childhood experiences (ACEs) negatively affect adults' mental health and their child's development. Despite theoretical links among caregivers' ACEs, current life stress, attachment, and child psychopathology, few studies have examined these pathways. This is particularly important in American Indian/Alaska Native (AIAN) populations, for which a history of systemic oppression has contributed to high rates of trauma. Study 2 tests whether parent mental health and parent-child EA mediates the relation between parent ACEs and child social-emotional functioning in a largely American Indian sample. The indirect effect is not significant, suggesting a strong direct effect from ACEs to child functioning. Study 2 also examines a moderation model to determine whether high parent-child EA buffers against parents' current life stress. Results demonstrate a strong link between parents' stress and child social-emotional problems, but the moderation effect is the opposite of what was expected.

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Comprehensive Literature Review

Disorganized Attachment

Attachment strategies. Human infants depend on their adult counterparts for their survival, and the attachment system, in which a primary caregiver protects and cares for an infant, helps to ensure their survival (Bowlby, 1969; 1973). Within this dyadic system, infants develop attachment strategies, and they use these strategies to meet their needs, relieve distress, and resolve fear (Main, 1990). An individual infant's attachment strategy generally falls within three styles: secure, insecure-resistant/anxious, and insecure-avoidant (Ainsworth, Blehar, Waters, & Wall, 1978; Main, 1990). Secure infants have learned that their caregiver will respond to their distress appropriately and consistently, and they need only communicate this distress to the caregiver to have it relieved. Insecure-resistant/anxious infants have learned to express distress even when it is not warranted in order to increase the likelihood that an inconsistent caregiver will respond when needed. Insecure-avoidant infants, in contrast, have learned to suppress the expression of negative emotions in order to maintain proximity to an attachment figure who withdraws or rejects in response to distress (Ainsworth et al., 1978; Main, 1990).

These strategies, or styles, are most salient when attachment needs are high, during high-stress contexts, such as a separation from the caregiver. For that reason, the most common measure of attachment style is the Strange Situation Procedure (SSP; Ainsworth et al., 1978), which consists of a series of separations and reunions between a caregiver and the infant. The infant's behavior upon the caregiver's return offers insight into the way in which he uses the caregiver to relieve his distress, i.e., his attachment strategy. Each of these three attachment strategies that are evident in the SSP vary in their predictive value, with secure infants generally

experiencing more positive social-emotional outcomes than insecure (Groh, Roisman, van IJzendoorn, Bakermans-Kranenburg, & Fearon, 2012; Kochanska & Kim, 2013; Sroufe, 2000). Regardless, infants of these three styles are able to meet their attachment needs through a predictable and coherent strategy.

In contrast, infants who experience frightening, threatening, chaotic, or severely insensitive parenting are unable to formulate a coherent strategy with which to get their attachment needs met, and this contributes to a disorganized (D) attachment style (Cassidy & Mohr, 2001; Main & Solomon, 1986). During the SSP or other contexts of distress, D infants are not able to successfully use their caregiver to coregulate. Instead, they are faced with a paradox in which they feel driven to seek comfort from their attachment figure, yet simultaneously feel frightened of him or her (Main & Hesse, 1990). Their behavior reflects this paradox, for during the SSP, D infants may show contradictory behavior patterns of approach and avoidance, appear fearful, freeze in place, or seem disoriented (Main & Solomon, 1986).

Just as organized attachment strategies predict later developmental outcomes, a disorganized attachment style during infancy holds relevance for a child's later social and emotional health, serving as a major risk factor for later psychopathology (Fearon, Bakermans-Kranenburg, van IJzendoorn, Lapsley, & Roisman, 2010; Groh, Fearon, van IJzendoorn, Bakermans-Kranenburg, & Roisman, 2017; van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999). D attachment style is stable over time (van IJzendoorn et al., 1999), and it puts children at a significantly elevated risk for externalizing behavior problems (Fearon et al., 2010; Groh et al., 2012; Groh et al., 2017; Madigan, Moran, Schuengel, Pederson, & Otten, 2007; van IJzendoorn et al., 1999), aggression, (Lyons-Ruth, 1996), problematic stress

management (Cook et al., 2005; van IJzendoorn et al., 1999), decreased social competence (Groh et al., 2017), and dissociative symptoms (Liotti, 2004; van IJzendoorn et al., 1999).

Additionally, during early and middle childhood, D children demonstrate storytelling and play that is characterized by chaos, violence, lack of control, and lack of resolution (DeOliviera, Bailey, Moran, & Pederson, 2004). Further, a majority of these children develop into a disorganized childhood style that represents controlling behavior toward the caregiver, either a punitive stance toward a parent or an overly solicitous stance (Lecompte & Moss, 2014; Main & Cassidy, 1988; Main & Hesse, 1990). Both types of controlling styles during childhood predict externalizing symptoms during adolescence, but the punitive style predicts greater maladaptation (Lecompte & Moss, 2014). Therefore, it is clear that a disorganized attachment signifies not only a disruption in a child's attachment relationship with his or her caregiver, but also a severe disruption in a child's social and emotional development.

Context of disorganized attachment. Given the wide-reaching implications of a disorganized attachment style for a child's development, it is important to examine the predictors and qualities that contribute to its formation. In the original conceptualization of disorganized attachment, it was hypothesized that the caregiver is "at once the source and the solution" of the infant's fear and alarm (Main & Hesse, 1990, p. 163), which leaves the infant in an unresolvable paradox of fright without solution (Liotti, 2004; Main & Hesse, 1990). However, what has been more difficult to determine is what can be classified as "frightening" caregiver behavior.

It is no surprise that maltreatment certainly qualifies as frightening behavior and significantly elevates the risk of D attachment, with over 80 percent of maltreated infants showing this style (Cyr, Euser, Bakermans-Kranenburg, & van IJzendoorn, 2010; Lyons-Ruth & Jacobvitz, 2008). Children who directly experience abuse, witness intimate partner violence, or

do not receive adequate protection and care, as in the case of neglect, are certainly left in fear without solution (Cyr et al., 2010). Further, the fear evoked in the context of maltreatment goes beyond direct exposure to violence or neglect. Caregivers at risk for engaging in maltreatment often have unresolved loss and trauma (Madigan et al., 2006). Unresolved loss or trauma, in specific contexts, can lead to environmental cues eliciting feelings of vulnerability in a caregiver. These feelings may cause him or her to seem frightened, to dissociate, or to display extreme lapses in responsiveness and engagement (Hesse & Main, 2006; Main, Kaplan, & Cassidy, 1985). This behavior is frightening to an infant, for it indicates a caregiver's inability to remain emotionally available, to facilitate healthy affective communication, to respond when needed, and, ultimately, to protect the infant (Beebe et al., 2012; Jacobvitz, Leon, & Hazen, 2006; Lee, Kaufman, & George, 2009). Indeed, unresolved states of mind predict such maladaptive affective interactional patterns, which, in turn, predict disorganized attachment (Beebe et al., 2012; Goldberg, Benoit, Blokland, & Madigan, 2003; Madigan, et al., 2006; Main et al., 1985).

Alternately, caregivers with unresolved trauma may also demonstrate extremely disconnected and insensitive parenting as a result of their unresolved trauma. This can appear as sudden behavioral or emotional shifts, excessive withdrawal, or over-intrusive and aggressive behavior (Lyons-Ruth & Jacobvitz, 2008). This behavior also increases the likelihood of maltreatment. A final risk factor for maltreatment is when a caregiver has low reflective functioning, lacking the capacity to fully take their child's perspective. This can lead to the caregiver attributing hostile thoughts and feelings to their infant (e.g., "my baby hates me") (Allen, Fonagy, & Bateman, 2008).

However, even in low-risk contexts where maltreatment does not occur, between 15 and 20% of infants express a D attachment style (Carlson, Cicchetti, Barnett, & Braunwald, 1989;

van IJzendoorn et al., 1999). In these studies, approximately 50-60% of infants were classified as secure, 10-15% of infants were insecure-avoidant, and 10-20% were insecure-anxious (Carlson et al., 1989; van IJzendoorn et al., 1999). It is likely that, even outside the context of maltreatment, a caregiver may have an unresolved state of mind in regard to attachment, leading to the dissociative, frightened, or insensitive parenting described above (Madigan et al., 2006; Main et al., 1985). However, there remain caregiver-infant dyads that display a disorganized attachment even without the presence of maltreatment or unresolved states of mind (George & Solomon, 2008). In fact, it is possible that unresolved state of mind may not be the true cause of D attachment, but, rather a caregiver's helplessness is at the core of these relationships (Lyons-Ruth, Yellin, Melnick, & Atwood, 2003; Solomon & George, 2006). Such helplessness likely derives from a caregiver's childhood history of abuse, neglect, or household dysfunction. These adverse experiences can render caregivers helpless in caring for and comforting their own children, especially when they are most needed (Lee et al., 2009).

Therefore, although fear is certainly the primary source of a child's disorganization in relation to a primary attachment figure, this fear can derive from a variety of caregiver behaviors and emotions (Lee et al., 2009; Main & Hesse 1990). Certainly, obviously frightening behaviors, such as maltreatment or other hostile and threatening actions, will elicit fear without solution in a young infant (Main & Hesse, 1990). Alternately, an infant's fear may instead derive from the caregiver's more subtle behavioral and emotional cues, such as helplessness, dissociation, fear, or severe misattunement (George & Solomon, 2008; Lee et al., 2009). This can also include a caregiver's failure to repair lapses in responsiveness (Lyons-Ruth, Bronfman, & Parsons, 1999). Given the purpose of the attachment system is to provide a safe haven that helps to ensure the survival of a vulnerable infant (Bowlby, 1969; 1973), it makes sense that, if a caregiver

continually fails to meet the infant's attachment needs, the infant is left in a state of fear and disorganization.

It is important to note that, whereas certain broader family characteristics, such as socioeconomic risk and the presence of maltreatment (Cyr et al., 2010), elevate the risk for D attachment, it is well-established that behaviors and characteristics of the specific caregiver with which a child is disorganized are the greatest contributor to a child's D status. There is low correspondence between infant-mother disorganization and infant-father disorganization, suggesting that the development of D attachment occurs within a specific relationship (van IJzendoorn & De Wolff, 1997). Additionally, although compromised emotional regulation as a newborn, as well as certain genetic predispositions, may increase the risk for D status (Bernier & Meins, 2008; Padrón, Carlson, & Sroufe, 2014), it is generally well-established that other facets of a child's temperament do not predict D status or attachment style more generally (van IJzendoorn et al., 1999; Vaughn, Bost, & van IJzendoorn, 2008). Further, neither a child's sex nor the presence of physical problems increases the likelihood of developing a D attachment (van IJzendoorn et al., 1999), although some studies (Beebe et al., 2012) have found that male infants are overrepresented among D infants. In the context of neurological disabilities, children are at a heightened risk for disorganization, yet this is likely due to mothers' unresolved grief regarding the congenital problem (Barnett et al., 1999). Therefore, it is essential to consider characteristics of the specific caregiver-child relationship within which a D attachment has formed.

Broader family contexts, such as high conflict divorce, can also pose a risk for disorganization (Lee et al., 2009). Overnight visitation with a father following divorce elevates the risk of a child having a disorganized attachment with his or her mother, and divorce, in general, elevates the risk of a child having a disorganized attachment with his or her father.

However, these risks are most salient in the context of high interparental conflict and low psychological support for the child, indicating that this conflictual context serves to disrupt the quality of the parent-child relationships (Solomon & George, 1999). A deeper and more nuanced understanding of the developmental history of disorganization, as well as the behavioral and emotional indicators of disorganized attachment can help both researchers and practitioners to identify dyads at risk for maladaptive outcomes.

Unresolved loss and trauma. The experience of maltreatment, other relational trauma, or significant loss by death contributes to the development of an unresolved state of mind during adulthood (Bailey, Moran, & Pederson, 2007; George et al., 1996; Murphy et al., 2014). The Adult Attachment Interview (AAI; George, Kaplan, & Main, 1996) is the most well-established assessment of states of mind in relation to attachment and early caregiving experiences. The AAI consists of a semi-structured interview focused on childhood caregiving experiences and current relationships, as well as relational trauma and significant loss. The interviewee's attachment style is determined based on the quality of content and the coherence of responses. Analogous to infants' attachment strategies, the categories assigned – autonomous, dismissing, or preoccupied – reflect an organized state of mind regarding attachment. However, adults who express odd and unpredictable lapses in speech, particularly when discussing attachment traumas, reflect a disorganized or disoriented state of mind, referred to as “unresolved” in the AAI (George et al., 1996). An unresolved attachment status, therefore, reflects an adult's ongoing inability to develop a coherent state of mind regarding relational trauma or loss.

However, not all individuals who experience relational trauma or loss display an unresolved state of mind during the AAI, indicating that the association is indirect. It is likely that dissociative cognitive processes mediate this relation by restricting an adult's capacity to

integrate one's sense of self, as well as one's emotional experiences (Bailey et al., 2007; Fraiberg, Adelson, & Shapiro, 1975). This dissociation, thus, represents a lack of integration of self and one's experience. This lack of integration is evident in the unresolved adult's difficulty in providing coherent responses during the AAI (George et al., 1996).

Due to this lack of integration, a caregiver with an unresolved state of mind is likely to develop a disorganized attachment style with his or her infant (Madigan et al., 2006; Main & Hesse, 1990). Subtle environmental or relational cues can trigger subconscious emotions or traumatic memories for an unresolved caregiver. These mental states, then, lead to anomalous behavior, such as fear expressions, severe lapses in responsiveness, or subtly threatening actions. Such behavior elicits fear, disorientation, and confusion in the infant, leading to a D attachment strategy and its associated behavioral indicators (Madigan et al., 2006; Main & Hesse, 1990).

Signs of disorganized attachment. The behaviors shown by disorganized infants serve as external indicators of their inner paradox, reflecting their drive to seek a caregiver who is at the same time a source of fear. Main & Solomon (1986; 1990) developed a set of behavioral themes that infants in disorganized relationships display. Infants often behave in contradictory ways that can be simultaneous or sequential. A simultaneous contradictory behavior could be a child who moves toward the caregiver by scooting backwards. Alternately, a sequential contradictory behavior could be the child moving toward a caregiver and then immediately moving away. In addition, D infants show undirected, misdirected, incomplete, or interrupted movements. They may seek out the stranger for comfort during the Strange Situation Procedure, rather than the caregiver, or they may suddenly slump onto the floor. Infants may also show odd movements or postures, asymmetrical movements, or mistimed movements, such as an infant pulling on her hair when distressed. Freezing, stilling, and slowed movements or expressions

also indicate that an infant is disorganized. Further, infants may show clear signs of fear or apprehension of their caregiver, such as wide eyes or putting their hand in their mouth when reunited with a parent (van IJzendoorn et al., 1999). Finally, infants may show clear signs of disorganization and disorientation in the presence of the caregiver, such as aimlessly wandering around the room or blankly staring in a dazed manner (Hesse & Main, 2000; Main & Solomon, 1986; 1990). All these behaviors signify the infant's lack of a coherent strategy with which to interact with and seek comfort from their behavior.

It is also important to recognize the behavioral and emotional indicators of disorganized attachment shown by a caregiver, for some D infants may not show obvious signs of disorganization (Lyons-Ruth & Spielman, 2004). Overtly threatening, abusive, neglectful, or hostile actions by a caregiver certainly may indicate disorganization (Cyr et al., 2010). However, the behaviors shown by unresolved or helpless caregivers can be subtler. Hesse and Main (2000) described that unresolved D parents display three kinds of behaviors: threatening, frightened, or dissociated, and these are referred to and coded as FR behaviors (Main & Hesse, 1992). FR behaviors are hypothesized to arise as a result of environmental cues that are unconsciously associated with traumatic experiences. Threatening behavior consists of serious movements that resemble a hunt/pursuit sequence, such as a mother who chases her infant son in a non-playful manner. Frightened behavior can manifest as a disproportionate startle response, backing away from the infant, or flinching when the child reaches to the caregiver. Dissociated behavior may consist of freezing, a dazed appearance, or unusual vocal tonation (Hesse & Main, 2000; Main & Hesse, 1992). All these realms of behaviors are alarming and frightening to the infant, for they represent the caregiver's inability to respond to infant cues and repair lapses in engagement (Hesse & Main, 2000; Main & Hesse, 1992).

Such frightening and frightened behaviors likely represent only a portion of the indicators of disorganized attachment relationships. In fact, even without considering fear-based behaviors, it is possible to differentiate among organized and disorganized infants (Lyons-Ruth & Spielman, 2004). Thus, it has been proposed that frightening or frightened caregiver behaviors are situated within a “broader context of disrupted affective communication between mother and infant,” (Lyons-Ruth & Spielman, 2004, p. 320), and it is this quality that leads to and signifies disorganization. Disrupted affective communication occurs when a caregiver demonstrates affective errors or fails to help the child coregulate distress, particularly when attachment needs are activated. Further, it seems to be as important as frightening behaviors and actions in predicting D status (Beebe et al., 2012; Lyons-Ruth & Spielman, 2004). Such disrupted communication leads the infant into a state of “*not being sensed and known* by their mothers” (Beebe et al., 2012, p. 352, italics in original), which contributes to disorganization.

Given the importance of affective engagement, a coding instrument, AMBIANCE, was developed to identify qualities of a caregiver’s affective communication during play interactions or the SSP (Bronfman, Parsons, & Lyons-Ruth, 1993). Qualities coded using this instrument include: affective communication errors, negative-intrusive responses, parental withdrawal responses, role-confused responses, and disoriented responses (Bronfman et al., 1993; Lyons-Ruth & Spielman, 2004). Affective communication errors are when a caregiver displays simultaneous contradictory affective cues or fails to respond appropriately to the child’s affective cues (Lyons-Ruth & Spielman, 2004). The AMBIANCE measure expands upon the original fear-based behaviors identified by Main & Hesse (1992; Hesse & Main, 2000), helping to explain many of the disorganized caregiver behaviors that are not fear-related (Lyons-Ruth et al., 1999).

Caregivers who display disrupted affective communication can be categorized into two broad profiles: hostile/self-referential and helpless-fearful regarding attachment, with corresponding infant profiles (Lyons-Ruth, 2003; Lyons-Ruth & Spielman, 2004). The hostile/self-referential caregiver group is characterized by a mix of rejecting behaviors and attention-seeking behaviors. Caregivers with this profile tend to be more intrusive, push their own ideas, and engage in role-confusion. At other times, though, they may be avoidant and resistant of connection. Role-confusion, or self-referential statements, may include phrases such as, “didn’t you miss me?” or “help me, I’m your mommy.” The infants of such caregivers, labeled *disorganized-insecure* or *disorganized-avoiding/resisting* (D-avoid/resist), tend to display high levels of distress, actively avoid the caregiver, and behave in a resistant manner (Lyons-Ruth, 2003; Lyons-Ruth & Spielman, 2004).

The caregivers in the helpless-fearful group are characterized not by intrusiveness and hostility, but instead by a fearful, sweet, fragile, or hesitant demeanor. These caregivers tend to be more withdrawn, avoid initiating contact, and deflect the infant’s bids for engagement (Lyons-Ruth, 2003; Lyons-Ruth & Spielman, 2004). Further, they may seem warm and kind during low stress contexts, yet become more disorganized in responsiveness when the attachment system is activated (Lyons-Ruth & Spielman, 2004). Infants of the helpless-fearful group, labeled *disorganized-secure* or *disorganized-approaching* (D-approach), tend to express distress, yet also approach the mother and seek physical contact. However, they also may display odd postures, signs of apprehension, and simultaneous approach-avoid behaviors. These helpless-fearful dyads are more challenging to detect than those with the hostile/self-referential style, partly because caregivers may seem “fine” during non-stressful contexts. Also, the D-approach infants continue to approach the caregiver, even as they show signs of disorganization in other

ways (Lyons-Ruth & Spielman, 2004). However, infants of helpless-fearful caregivers represent over half of all disorganized infants, and they are at equal risk for later negative developmental outcomes (Lyons-Ruth & Spielman, 2004; NICHD Early Child Care Research Network, 2001).

Differentiating disorganization from other forms of insecure attachment. Much of the research on behavioral and emotional cues associated with disorganized attachment has been conducted in relation to secure attachment (e.g., Beebe et al., 2012). However, it is also important to differentiate between the predictors and signs of disorganized attachment and those of the other two insecure attachment styles, resistant/anxious and avoidant. Caregivers who foster an insecure-avoidant attachment tend to demonstrate low emotional engagement, provide care in a cursory manner, and behave in overstimulating ways. Further, they are likely to rebuff a child who is seeking connection or physical contact (Isabella, 1993; Sroufe, 2005). As the insecure-avoidant attachment style develops, infants display greater avoidance, seek closeness less often, and explore in place of connection (Ainsworth, Blehar, Waters, & Wall, 2015; Fraley & Spieker, 2003). Such behaviors are seen as organized to the caregiving context, for infants avoid expressing attachment needs or distress as a way to prevent what they expect the caregiver to do – rebuff or withdraw. Instead, insecure-avoidant infants displace proximity-seeking with exploration as a way to manage their attachment-related anxiety (Ainsworth et al., 2015). The relationship, thus, becomes characterized by emotional disengagement.

Caregivers who foster an insecure-resistant/anxious attachment are thought to be inconsistently responsive, meaning they are at times sensitive, but at other times are rejecting or unresponsive (Isabella, 1993; Sroufe, 2005). This contributes to insecure-resistant/anxious infants viewing their mother as unavailable and unpredictable, which drives them to maintain contact and express ambivalence and anger in an attempt to evoke consistent engagement

(Isabella, 1993). Infants who develop this attachment style explore minimally, instead seeking frequent connection from the caregiver and maintaining such contact (Ainsworth et al., 2015; Fraley & Spieker, 2003; Sroufe 2005). They may also demonstrate angry and/or resistant behavior, such as pushing the caregiver away or throwing toys (Ainsworth et al., 2015). These behaviors suggest a relationship that is inconsistent, yet infants are able to form a strategy that helps them to maintain connection with the attachment figure.

Although caregiver insensitivity is also an indicator of disorganized attachment, several behavioral and emotional cues set this insecure style apart from the others (Beebe et al., 2012; Bernier & Meins, 2008; Lyons-Ruth & Spielman, 2004). Among dyads with a disorganized attachment style, caregiver insensitivity overlaps with other atypical interactional behaviors, such as high levels of intrusiveness, affective errors, or fear-based behaviors (Bernier & Meins, 2008; Sroufe, 2005). For example, a parent fostering an avoidant attachment style may ignore a child's distress signals, whereas a parent fostering a disorganized attachment style may appear frightened or surprised by distress signals. On the child side, disorganized or disoriented behaviors, such as wandering, contradictory actions, and signs of fear, set infants with a disorganized style apart from other insecure infants (Fraley & Spieker, 2003). However, as a group, D infants do not appear much different from infants with other attachment styles in terms of their overall avoidance or proximity-seeking (Fraley & Spieker, 2003). Given that a wide variety of relational and contextual variables contribute to the development of disorganized attachment (Bernier & Meins, 2008; Cyr et al., 2010; Lee et al., 2009), it is no surprise that, as a group, disorganized infants appear quite heterogeneous in their attachment behaviors. This further contributes to the challenges in identifying D infants (Lyons-Ruth & Spielman, 2004;

Madigan et al., 2006). Thus, it is important to continue examining the behavioral and emotional cues that distinguish disorganization from other forms of insecure attachment.

Expanding attachment concepts to better detect disorganization. It has long been presumed that an infant's attachment style is a direct outcome of the caregiver's sensitivity to cues (Ainsworth, 1973; 1969). However, recent studies have found that the association between maternal sensitivity and child attachment security is moderate to low (van IJzendoorn, Vereijken, Bakermans-Kranenburg, & Riksen-Walraven, 2004). Further, the link between sensitivity and disorganization is even smaller (van IJzendoorn, 1995). Therefore, it is important to turn to other characteristics of the caregiver-child relationship that may lead to disorganization. The behavioral themes listed above, fear-based behaviors and disrupted affective communication, offer a deeper understanding of the predictors and indicators of D status (Hesse & Main, 2000; Lyons-Ruth & Spielman, 2004). However, given that unresolved states of mind and anomalous caregiver behavior only predict disorganization moderately, it is important to continue identifying predictors and signs of D attachment (Madigan et al., 2006).

Moreover, in the most valid and reliable attachment assessment tool, the Strange Situation Procedure (SSP; Ainsworth et al., 1978), interrater reliability, even among expert coders of the SSP, is only moderate for disorganized attachment (van IJzendoorn et al., 1999). Additionally, several studies have found that observed caregiver behavior during low-stress contexts predicts infants' D status (Abrams, 2000; Madigan et al., 2007; True, Pisani, & Oumar, 2000). For example, Madigan et al. (2007) coded anomalous maternal behavior with the AMBIANCE coding system during a play context and found that it mediated the relation between mothers' unresolved status and infant D attachment. In fact, observing dyads in low-stress, non-SSP contexts seems to reveal higher associations between caregiver behavior and

infant D status than observations from the SSP (Madigan et al., 2006). Specifically, a meta-analytic review by Madigan and colleagues (2006) found an effect size of $R = .30$ ($p < .001$) from SSP observations and an effect size of $R = .41$ ($p < .001$) in non-SSP contexts. This may be, in part, due to the SSP's tendency to focus on and primarily film infant behavior.

Finally, studies linking caregivers' fear-based or anomalous behaviors during the SSP and infant D status show mixed results, regardless of whether the FR coding system (Main & Hesse, 1992) or the AMBIANCE coding system (Bronfman et al., 1993; Lyons-Ruth et al., 1999) is used. Taken together, these findings indicate that, whereas the SSP may provide valuable insight into an infant's attachment status, it is less informative regarding the caregiver's behaviors. Therefore, it is important to assess attachment-relevant behaviors and disorganized indicators in a wider range of contexts. This can help to accurately detect disorganized relationships, as well as better understand the indicators of disorganization.

The Emotional Availability system. The Emotional Availability (EA) system consists of the EA Scales and the Emotional Attachment Zones Evaluation (EA-Z, previously EA Clinical Screener; Biringen, 2008, Biringen, Robinson, & Emde, 1998). This system provides a broad perspective on the emotional quality of a caregiver-child relationship, as well as measurement tools that can be used in a variety of observational contexts. The EA Scales consist of six dimensions to assess both caregiver and child behaviors and emotional expressions. Two dimensions, adult sensitivity and child responsiveness, are directly tied to attachment-relevant concepts and are informative in coding an individual's attachment style on the EA-Z. The other scales – adult structuring, adult non-intrusiveness, adult non-hostility, and child involvement – are also relevant to the attachment relationship, as well as to the overall quality of the relationship, as evidenced by links to developmental outcomes, such as caregiver stress and child

social-emotional development (see review by Biringen, Derscheid, Vliegen, Closson, & Easterbrooks, 2014).

Whereas the EA Scales provide a broad and multifaceted view on the emotional quality of the relationship, the EA-Z is an attachment-specific measure. The EA-Z uses information from the EA Scales and from direct observation of attachment-relevant behaviors to score both the adult and child using a continuous attachment security score that ranges from zero to 100. The EA-Z also assigns the adult and child to one of four categorical attachment “zones” that correspond to the four attachment styles (Ainsworth et al., 1978; Biringen, 2008). With a continuous description, changes following intervention may be more evident (Bakermans-Kranenburg, van IJzendoorn, & Juffer, 2003). For example, an adult in the “detached” zone may become more emotionally engaged as a result of an intervention, yet still be categorized as “detached.” Moreover, a continuous measure of attachment can reveal such incremental changes, even if they do not represent a categorical shift.

The EA system, therefore, provides a multifaceted perspective on the quality caregiver-child relationships, as well as a targeted and versatile measure of attachment style. This system also has the potential to be useful in identifying and studying disorganized attachment. First, the EA Scales code behaviors that are directly relevant to D indicators, such as adult hostility and intrusiveness, as well as behaviors that have been mentioned in D literature, yet not explicitly measured, such as adult structuring (Biringen, 2008; Lyons-Ruth & Spielman, 2004). Next, the EA Scales and EA-Z can be coded in any observational context. Finally, the system codes both caregiver and child behaviors and emotions, allowing coders both perspectives on the quality of the relationship. Therefore, given its multidimensional perspective and utility in a wide variety of

contexts, the EA system may be poised to serve as a valuable tool for identifying and describing D attachment relationships.

Although the EA System has been validated in distinguishing between secure and insecure caregiver-child dyads (Saunders & Biringen, in press; Ziv, Aviezer, Gini, Sagi, & Koren-Karie, 2000), to our knowledge, no study to date has attempted to successfully distinguish among all four attachment styles. Further, few studies have attempted to successfully identify D relationships (Saunders & Biringen, in press, Ziv et al., 2000), although one study found that EA scores predicted D attachment during middle childhood (Easterbrooks, Bureau, & Lyons-Ruth, 2012), and another found an association between non-intrusiveness and disorganization (Swanson, Beckwith, & Howard, 2000). Further, many studies using the EA Scales or EA-Z categorize few dyads into the problematic zone (Saunders & Biringen, in press). Although some may argue that this is due to limited research in high-risk contexts, undersampling of high-risk families cannot fully account for this, for between 15 and 20% of children in low-risk families display a D style (van IJzendoorn et al., 1999).

Therefore, it is possible that EA coders do not assign the D zone due to limited understanding of the behavioral and emotional indicators or due to limitations of the context. Specifically, many studies use brief, free play contexts to code EA, whereas D attachment may be most evident in longer or more stressful observational contexts (Biringen et al., 2014). Given that the EA Scales are currently the most widely used observational tool of parent-infant interactions (Lotzin et al., 2015), and D attachment poses significant risk for later child maladaptation (Fearon et al., 2010) it is important to validate the EA Scales in identifying D attachment. Further, there is a need for guidelines that can provide EA coders with descriptions of D relationships from the EA framework. Not only will this provide greater clarity to

researchers and practitioners who use the EA system in academic and applied settings, but it also has the potential to provide the broader field of attachment research with a deeper and more nuanced understanding of D relationships, and by implication, traumatic relationships, given the multidimensional perspective of the EA system.

Risk and Resilience in American Indian Communities

As a result of centuries of systemic oppression and historical trauma, American Indian and Alaska Native (AIAN) individuals in the United States face a variety of social and economic disparities (Sarche & Spicer, 2008; Gone 2007). AIAN communities experience the highest rate of poverty among any other race in the U.S., as well as limited educational opportunities and high unemployment (CDC, 2013; U.S. Census Bureau, 2007; National Center for Educational Statistics, 2016; Sarche & Spicer, 2008). Also, in part due to community violence and trauma and limited access to healthcare, AIAN individuals and families experience disproportionate rates of physical and mental health problems (CDC, 2013; Sarche & Spicer, 2008). Such socioeconomic and health disparities often contribute to higher levels of life stress for AIAN individuals and families. Chronic stress can also lead to poorer mental health outcomes for adults, as well as compromised parenting practices that negatively impact child development (Danese & McEwen, 2012; Guajardo, Snyder, & Peterson, 2009; Gutermuth Anthony et al., 2005; Yates, Egeland, & Sroufe, 2003).

Although young children are especially vulnerable to these risk factors and disparities, various cultural beliefs and practices that are shared across AIAN tribes can provide protection against such risk (Best Start, 2010; Sarche, Tafoya, Croy, & Hill, 2016). Most AIAN cultures believe that children are sacred gifts from the creator (Sarche & Spicer, 2008). As such, throughout their lifespan, many AIAN children experience practices and beliefs that ground them

in their culture and community, offer guidance, and create a sense of belonging and cultural identity (Markstrom, 2008; Peacock, 2002; Sarche et al., 2016).

Further, research among AIAN communities has identified several other protective factors for individuals and families who have experienced adversity. These include: extended family ties, warm and supportive parent-child relationships, community support, a future orientation, traditional values, and identification with one's native culture (Evans-Campbell, 2008; Harrison, Wilson, Pine, Chan, & Buriel, 1990; LaFromboise, Hoyt, Oliver, & Whitbeck, 2006). Nevertheless, much of this research has been conducted among adolescents or adults. In order to have the greatest impact on child and family resilience, it is important to understand the protective factors that can be fostered early in life (Nation, 2003; Masten & Gewirtz, 2006). Therefore, this study will examine some of the developmental processes that contribute to positive or negative adaptation among AIAN families with young children.

Adverse childhood experiences. The experience of multiple traumatic events during childhood poses a significant risk for physical and mental health problems during adulthood, as well as an unresolved state of mind (Chapman et al., 2004; Danese & McEwen, 2012; Edwards, Holden, Felitti, & Anda, 2003; Felitti et al., 1998; Murphy et al., 2014). The Adverse Childhood Experiences (ACEs) survey (Felitti et al., 1998) asks participants about the direct experience of abuse or neglect and other forms of relational trauma, including witnessing substance abuse or interpersonal violence. Participants receive an "ACE score" ranging from zero to ten, based on the number of experiences they report on the survey (Felitti et al., 1998).

In a mostly Caucasian, large community sample, over 60 percent of participants reported experiencing at least one ACE, and approximately 10% reported four or more ACEs (Felitti et al., 1998). Despite limited research on ACEs in AIAN communities, there is significant diversity

in the prevalence of early trauma, as well as how it is defined. A study with adolescents and young adults from one remote plains reservation used a modified ACEs questionnaire, which included two culturally-relevant experiences: perceived discrimination and symptoms related to historical loss (Brockie, Dana-Sacco, Wallen, Wilcox, & Campbell, 2015). With this questionnaire and in this sample, almost 75% of individuals experienced one or more ACEs, and almost 25% had experienced four or more (Brockie et al., 2015). In another study among AIAN women who were incarcerated, 81% had experienced at least two ACEs (De Ravello, Abieta, & Brown, 2008). Finally, a study that sampled older AIAN adults living in Midwestern states found that approximately 75% of individuals experienced at least one ACE and over 30% experienced four or more ACEs (Roh et al., 2015). Therefore, despite variability among communities, in general, the rate of ACEs is higher for AIAN individuals than of other races.

A wide body of literature demonstrates links between an individual's ACE score and later health outcomes. A higher score increases the risk for physical health problems during adulthood, including heart disease, cancer, obesity, and lung disease (Felitti et al., 1998). Further, a high ACE score elevates the risk for adulthood mental health problems, including depression, suicide, drug abuse, alcoholism, and risky sexual behaviors (Chapman et al., 2004; Edwards et al., 2003; Felitti et al., 1998). Among AIAN individuals, ACEs increase the risk for alcohol dependence, multiple drug use, depressive symptoms, post-traumatic stress symptoms, and suicidality (Brockie et al., 2015; Koss et al., 2003). A higher ACEs score also elevates the likelihood of ongoing relational challenges during adulthood (Bailey et al., 2007; Murphy et al., 2014). Individuals who have experienced more ACEs are likely to have an unresolved state of mind in regard to attachment, as well as a disorganized attachment relationship with their own

child (Madigan et al., 2006; Murphy et al., 2014). Overwhelming evidence, therefore, points to the long-lasting impacts of adversity during childhood.

Recent studies have demonstrated that parents' ACEs predict their own child's social-emotional challenges (Brown & Ash, 2017; Schleuter et al., 2017). However, further research is needed to replicate these effects, as well as to elucidate the specific pathways from caregiver trauma to child maladaptation. In line with the attachment perspective, it is possible that caregivers' childhood trauma contributes to an unresolved state of mind, which, in turn, leads to disorganized caregiver-child attachment and subsequent maladaptation (Madigan et al., 2006; Main & Hesse, 1990). Alternately, it is possible that ACEs contribute to poorer caregiver mental health, which in turn, may affect child development (Chapman et al., 2004; Edwards et al., 2003; Field, 2010). However, the relation between caregiver mental health and child social-emotional problems is often moderated by caregiver sensitivity or caregiver-child attachment style (Feldman et al., 2009; Milan, Snow, & Belay, 2009). Therefore, further research is warranted in order to determine whether caregiver-child relationship quality serves as a mediator or moderator of the relation between caregivers' early life trauma and child social-emotional maladaptation. This line of study is particularly important within AIAN communities, due to the elevated risks for trauma, stress, and mental health problems.

Current life stress. Due to social, economic, and health disparities, AIAN communities experience heightened levels of ongoing life stress and mental health problems. First, AIAN individuals and families are at risk for experiencing or witnessing community violence, homicide, suicide, motor vehicle accidents, domestic violence, or child abuse (CDC, 2003; 2013; Sarche & Spicer, 2008). Additionally, AIAN individuals are at an elevated risk for mental health disorders and social problems, including substance abuse, posttraumatic stress disorder, and

suicidality (Gone & Trimble, 2012). Family and community-level stress also have implications for child development. In non-Native samples, poverty and caregiver stress are significant risk factors for children's negative mental health outcomes (Dearing, McCartney, & Taylor, 2006; Evans & English, 2002). Therefore, it is unsurprising that, in comparison to a national sample, young AIAN children demonstrate lower social-emotional competence (Frankel et al., 2014; Sarche, Croy, Big Crow, Mitchell, & Spicer, 2009). Further, poorer child social-emotional functioning is associated with maternal stress, substance abuse, and depressed affect, as well as lower household income.

However, in some of these same studies, mothers who reported higher levels of social support and a strong identification with their tribal culture had children with greater social-emotional functioning (Frankel et al., 2014; Sarche et al., 2009). This suggests that cultural and social factors may serve as protective factors, buffering against risk. Additionally, other supports within the broader family and community contexts, as well as cultural values and practices, can serve as protective factors for families and individuals (Evans-Campbell, 2008; Harrison et al., 1990; LaFromboise et al., 2006).

It is clear that AIAN communities often face high levels of risk, yet also possess unique resources and strengths to offset such risks. Less is known, however, about the specific processes that lead to positive or negative adaptation in the face of stress. In line with previous literature in non-Native samples (Evans, Boxhill, & Pinkava, 2008; Mistry, Biesanz, Taylor, Burchinal, & Cox, 2004), it is possible that current life stress and associated mental health challenges contribute to lower caregiver responsiveness, which, in turn negatively affects child social-emotional development. However, other research has found that positive caregiver-child interactions can serve to buffer the influence of family stress and caregiver mental health

problems on child development (Belsky & Fearon, 2002; Edwards, Eiden, & Leonard, 2006; Feldman et al., 2009; Milan, Snow, & Belay, 2009). Thus, it is important to examine whether the quality of caregiver-child interactions serves as a mediator or a moderator of the association between caregivers' ongoing life stress and child social-emotional functioning. This line of research is particularly important in AIAN communities, given relatively higher levels of contextual stress and mental health, as well as gaps in our understanding of these developmental processes (Sarche & Spicer, 2008).

Caregiver-child relationship quality. Given the importance of caregiver-child attachment security to child social-emotional development (Groh et al., 2017), it is likely that the quality of caregiver-child relationships plays a significant role in the transmission of caregiver trauma or current stress to child social-emotional outcomes. However, research is mixed regarding whether relationship quality serves as a mediator or as a moderator of the associations between caregiver's trauma or stress and children's outcomes. Among parents with childhood histories of abuse and neglect, attachment seems to play a mediating role (Berthelot et al., 2015). Specifically, mothers who experienced early life trauma are more likely to demonstrate an insecure attachment style during adulthood, and their child is also more likely to have an insecure style (Berthelot et al., 2015). This intergenerational transmission of attachment can be partially explained by parents' unresolved trauma and limited reflective functioning (Berthelot et al., 2015; Madigan et al., 2006). Therefore, it is likely that a parent's early adversity is transmitted to their child through unresolved trauma and the quality of the parent-child relationship.

Caregivers' experience of chronic or severe current life stress also negatively impacts child functioning. First, poverty predicts both internalizing and externalizing child symptoms,

and the relation between poverty and externalizing symptoms is mediated by negative parenting practices (Grant et al., 2003). Similarly, low income predicts poorer cognitive functioning in preschool-age children, and this effect is mediated by the learning environment families provide in the home (Yeung, Linver, & Brooks-Gunn, 2002). Among AIAN samples, there seems to be high occurrence of resilience despite financial risk (LaFromboise et al., 2006). In one study on a sample of American Indian adolescents living on reservations in the Midwest, a majority of participants had few problem behaviors and demonstrated success in school, despite a high rate of adversity and poverty. In this study, perceived discrimination seemed to be the stronger risk factor for negative outcomes. In line with prior research on AIAN populations, enculturation and parental support served as protective factors (LaFromboise et al., 2006). Further research can help elucidate whether similar processes and patterns exist for young children as well.

Another important indicator of stress is family conflict or discord. In one study on a non-Native sample, parent-child attachment security was both a mediator and a moderator of the association between marital conflict and young children's social competence (Lindsey, Caldera, & Takersley, 2009). Further, a separate indicator of relationship quality, positive parent-child emotional reciprocity, also served as both a mediator and a moderator of this relation. That is, whereas marital conflict had negative effects on parent-child relationship quality, it also was buffered by secure attachment and positive parent-child emotional reciprocity (Lindsey et al., 2009). Similarly, Frosch and Mangelsdorf (2001) found that parental behavior moderated the relation between marital conflict and child behavior problems. In another study, mother-child relationship quality moderated the associations among maltreatment, emotion regulation, and psychopathology (Alink, Cicchetti, Kim, & Rogosch, 2009). Specifically, maltreatment only contributed to lower emotion regulation and subsequent psychopathology in the context of

insecure attachment (Alink et al., 2009). Therefore, the extant literature is mixed regarding whether parent-child relationship quality serves as a mediator or a moderator of the relation between ongoing family stress and risk and child outcomes (Alink et al., 2009; Formoso, Gonzalez, & Aiken, 2000; Frosch & Mangelsdorf, 2001; Lindsey et al., 2009; Wyman et al., 1992).

These unclear conclusions may be because a parent's capacity to foster a secure attachment seems to be based more in intergenerational processes, rather than current stress and mental health (Belsky, Conger, & Capaldi, 2009; Bretherton, 1990). Parents who experienced warm, sensitive caregiving are likely to provide the same kind of care to their children, whereas parents who experienced harsh or insensitive caregiving are likely to pass on this style (Belsky et al., 2009; Kerr, Capaldi, Pears, & Owen, 2009; Neppl, Conger, Scaramella, & Ontai, 2009). Thus, some research suggests that a parent's early relationship experiences, rather than current stress and risk factors, may be more important in predicting parent-child relationship quality. Further research can help to elucidate the pathways among parents' early life trauma, parents' current stress, parent-child relationship quality, and child developmental outcomes.

Study 1: Identifying Disorganized Attachment with the EA-Z

Introduction

Attachment strategies. Human infants depend on their adult counterparts for their survival, and the attachment system, in which a primary caregiver protects and cares for an infant, helps to ensure their survival (Bowlby, 1969; 1973). Within this system, infants develop attachment strategies, and they use these strategies to meet their needs and relieve distress (Hesse & Main, 2000). An individual infant's attachment strategy generally falls within three styles: secure, insecure-resistant/ ambivalent, or insecure-avoidant (Ainsworth, Blehar, Waters, & Wall, 1978; Hesse & Main, 2000). Secure infants have learned that their caregiver responds to their distress consistently, and, therefore, they need only communicate this distress to have it relieved. Insecure-resistant/ambivalent infants have learned to express distress even when it is not warranted in order to increase the likelihood that an inconsistent caregiver will respond when needed. Insecure-avoidant infants have learned to suppress the expression of negative emotions in order to maintain proximity to an attachment figure who withdraws in response to distress (Ainsworth et al., 1978; Hesse & Main, 2000).

These strategies, or styles, are most salient when attachment needs are high, which occurs in a stressful situation. For that reason, the most common measure of attachment style is the Strange Situation Procedure (SSP; Ainsworth et al., 1978), which consists of a series of separations and reunions between a caregiver and infant in an unfamiliar setting. The infant's behavior upon the caregiver's return offers insight into the way in which he uses the caregiver to relieve distress. Each of the three attachment strategies that are evident in the SSP vary in their predictive value, with secure infants generally experiencing more positive social-emotional

outcomes than insecure-resistant/ambivalent or insecure-avoidant infants (Groh, Roisman, van IJzendoorn, Bakermans-Kranenburg, & Fearon, 2012; Sroufe, 2000). Regardless, however, infants of these three styles are able to meet their attachment needs through a predictable and coherent strategy.

In contrast, infants who experience frightening, threatening, chaotic, or severely insensitive parenting are unable to formulate a coherent strategy with which to meet their attachment needs (Cassidy & Mohr, 2001; Hesse & Main, 2000; Main & Solomon, 1986). During the SSP or other contexts of distress, infants with this style, referred to as disorganized, are not able to successfully use their caregiver to co-regulate. Instead, they are faced with a paradox in which they feel driven to seek comfort from their attachment figure, yet simultaneously feel frightened of him or her (Hesse & Main, 2000). Their behavior reflects this paradox, for, during the SSP, disorganized infants tend to show contradictory behavior patterns of approach and avoidance, appear fearful, freeze in place, or seem disoriented (Main & Solomon, 1986; 1990).

Disorganized attachment. Just as organized attachment strategies predict later developmental outcomes, a disorganized (or D) attachment style during infancy holds relevance for a child's later social and emotional health, serving as a major risk factor for later psychopathology (Fearon, Bakermans-Kranenburg, van IJzendoorn, Lapsley, & Roisman, 2010; van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999). A disorganized attachment style puts children at a high risk for externalizing behavior problems (Fearon et al., 2010; Groh et al., 2012;), aggression, (Lyons-Ruth, 1996), problematic stress management (Cook et al., 2005; van IJzendoorn et al., 1999), and dissociative symptoms (Liotti, 2004).

During early and middle childhood, children with a D attachment tend to demonstrate storytelling and play that is characterized by chaos, violence, lack of control, and lack of resolution (DeOliviera, Bailey, Moran, & Pederson, 2004). Further, a majority develop a disorganized childhood style that is characterized by controlling behavior toward the caregiver, either a punitive stance toward a parent or an overly solicitous stance (Lecompte & Moss, 2014; Main & Cassidy, 1988; Main & Hesse, 1990). Both types of controlling styles during childhood predict externalizing symptoms during adolescence, yet the punitive style predicts greater maladaptation (Lecompte & Moss, 2014). However, with the help of preventive interventions, many D infants can develop a secure attachment (Cicchetti, Rogosch, & Toth, 2006; Toth, Rogosch, Manly, & Cicchetti, 2006).

The stability of disorganized attachment over time is unclear, however. Among at-risk samples, most infants who are disorganized remain disorganized throughout infancy and are classified as unresolved in late adolescence (Main, 2001; Weinfield, Whaley, & Egeland, 2004). In contrast, in normative samples, disorganized attachment style appears to be less stable over time, with most infants who were classified as disorganized at 15 months having organized attachment styles later in childhood and resolved states of mind by adulthood (Groh et al., 2014). Nevertheless, a D attachment signifies not only an overall disruption in an infant's attachment relationship with his or her caregiver (Hesse & Main, 2000), but it also serves as a risk factor for maladaptive social and emotional development (Fearon et al., 2010; Groh et al., 2012).

Identifying disorganized attachment. For these reasons, it is important to identify the behavioral indicators of D attachment in infants. During the SSP, infants with a D style often display (a) contradictory behaviors; (b) undirected, misdirected, incomplete, or interrupted movements; (c) odd movements or postures, asymmetrical movements, or mistimed movements;

(d) freezing, stilling, and slowed movements or expressions; (e) clear signs of fear or apprehension of the caregiver; or (f) clear signs of disorganization and disorientation (Main & Solomon, 1990). All these behaviors signify the infant's lack of a coherent strategy in interacting with and seeking comfort from their caregiver (Hesse & Main, 2000). However, approximately half of D infants remain difficult to identify, for they continue to approach the caregiver for comfort, even as they show other signs of disorganization, such as apprehension and odd postures (Lyons-Ruth & Spielman, 2004). Therefore, it is important to continue examining the behaviors that D infants demonstrate and the contexts in which these behaviors are most salient.

Caregivers who have an unresolved state of mind in regard to relationships, whether due to past trauma or recent or unresolved loss of a loved one, are at an elevated risk for developing a disorganized relationship with their infant (Madigan et al., 2006; Schuengel, Bakermans-Kranenburg, & van IJzendoorn, 1999). Obvious behaviors that these caregivers may exhibit include overtly threatening, abusive, neglectful, or hostile actions (Cyr et al., 2010). However, some D caregivers, especially those who have unresolved states of mind in regard to attachment, may instead show more subtle behaviors that are frightening to an infant, and these also lead to disorganization (Madigan et al., 2006).

Unresolved D caregivers were originally hypothesized to display three kinds of behaviors: threatening, frightened, or dissociated. These behaviors, Hesse and Main (2000; 2006) argued, arise as a result of environmental cues that are unconsciously associated with the caregiver's own trauma or loss. Such cues are alarming and frightening to the infant, for they represent the caregiver's inability to respond to cues and repair lapses in engagement (Hesse & Main, 2000; 2006). These behaviors are further situated in a broader context of disruptive affective communication between the caregiver and the infant (Lyons-Ruth & Spielman, 2004).

Such a disruption occurs when a caregiver is unable to help an infant regulate emotions, particularly when attachment needs are high, and it is as important as frightening behaviors in predicting D status (Beebe et al., 2012; Lyons-Ruth & Spielman, 2004). However, challenges still remain in identifying caregiver indicators of D attachment, particularly because neither fear-based behaviors nor traditional attachment concepts can fully explain such behaviors (Lyons-Ruth & Spielman, 2004; van IJzendoorn et al., 1999).

Expanding attachment concepts. It has long been presumed that an infant's attachment style is a direct outcome of the caregiver's sensitivity to cues (Ainsworth, 1973; 1969). However, recent studies have found that the association between maternal sensitivity and child attachment security is moderate to low (van IJzendoorn, Vereijken, Bakermans-Kranenburg, & Riksen-Walraven, 2004). Further, the link between maternal sensitivity and infant disorganization is even smaller (van IJzendoorn, 1995). Therefore, it is important to turn to other characteristics of the caregiver-child relationship that lead to infant disorganization. The behavioral themes listed above, fear-based behaviors and disrupted affective communication, offer a deeper understanding of the predictors and indicators of an infant's D status (Hesse & Main, 2000; Lyons-Ruth & Spielman, 2004). However, given that unresolved states of mind and anomalous caregiver behavior only predict infant D status moderately, it is important to continue identifying predictors and signs of D attachment (Madigan et al., 2006).

Moreover, the traditional attachment assessment tool, the SSP has only moderately high interrater reliability (van IJzendoorn et al., 1999). Evidence for the stability of attachment style is mixed, and it is unclear whether this is due to changes in measures or true changes in attachment style (Groh et al., 2014; Solomon & George, 2008). Also, research linking caregiver behavior during the SSP and infant D status is mixed (Madigan et al., 2006). Finally, caregiver behavior in

low-stress contexts can help to predict disorganization during the SSP (Abrams, 2000; True, Pisani, & Oumar, 2000). Therefore, it may be important to also assess a wide range of caregiver-infant behaviors in multiple contexts, using the same assessment tool. Such expansion of attachment concepts can help researchers accurately detect disorganized attachment, better understand the indicators of disorganization, and examine its trajectory over time.

The Emotional Availability system. The Emotional Availability (EA) System consists of the EA Scales and the Emotional Attachment Zones Evaluation (EA-Z, previously EA Clinical Screener; Biringen, 2008, Biringen, Robinson, & Emde, 1998). This system provides a broad view of caregiver-child behaviors, as well as measurement tools that can be used in a variety of observational contexts across age groups. The EA Scales consist of six dimensions to assess caregiver and child behaviors and emotions. These dimensions include behaviors and emotions that are directly relevant to D attachment, such as sensitivity, hostility, and intrusiveness, as well as behaviors that have been mentioned in the D literature, yet not explicitly measured, such as adult structuring (Biringen, 2008; Lyons-Ruth & Spielman, 2004). The EA-Z uses information from the EA Scales to classify caregivers and children into one of the four attachment styles, referred to as “zones” in the EA-Z. Given the multidimensional perspective and utility in a wide variety of contexts and ages, the EA system may be poised to serve as a valuable tool for identifying, describing, and studying D attachment relationships.

Although the EA System has been validated in distinguishing between secure and insecure caregiver-child dyads (Kim, Chow, Bray, & Teti, 2017; Saunders & Biringen, submitted; Ziv, Aviezer, Gini, Sagi, & Koren-Karie, 2000), no study to date has attempted to successfully distinguish among all four attachment styles. Further, few studies have used the EA System to successfully distinguish D attachment from other styles (Saunders & Biringen,

submitted, van den Dries et al., 2012; Ziv et al., 2000). However, one study did find that EA scores predicted D attachment during middle childhood (Easterbrooks, Bureau, & Lyons-Ruth, 2012), and another found an association between non-intrusiveness and disorganization (Swanson, Beckwith, & Howard, 2000). Some may argue that the failure to successfully differentiate D attachment with the EA System could be due to limited research in high-risk contexts. This cannot fully account for this, however, for 15-20% of children in low-risk families display a D style (van IJzendoorn et al., 1999) and numerous studies have used the EA system in high-risk populations (Biringen et al., 2014; van den Dries et al., 2012).

Therefore, it is likely that EA coders do not assign the D zone due to limited understanding of the behavioral and emotional indicators or due to limitations of the low-stress contexts in which the system has typically been utilized (Biringen et al., 2014). Specifically, many studies use brief, free play contexts to code EA, whereas D attachment may be most evident in longer or more stressful observational contexts (Biringen et al., 2014). Given that the EA Scales are currently the most widely used observational tool of parent-infant interactions (Lotzin et al., 2015), and D attachment poses significant risk for later child maladaptation (Fearon et al., 2010) it is important to validate the EA Scales in identifying D attachment. Further, there is a need for guidelines that can provide descriptions of D relationships from the EA perspective. Not only will such expanded descriptions offer greater clarity to researchers and practitioners who use the EA System in academic and applied settings, but they also have the potential to provide a deeper understanding of D relationships, due to the multidimensional nature of the EA System.

Current study. The present study aims to validate the EA System in coding disorganized attachment. A secondary aim is to derive qualitative themes regarding maternal and child behavior and emotional expressions that occur in the context of disorganized attachment. By doing so, this study can serve several purposes. First, it will help researchers and practitioners who are using the EA System identify disorganized caregiver-child dyads. Such identification can aid prevention and intervention efforts, given the high risk associated with disorganized attachment (Fearon et al., 2010). Next, the multidimensional and versatile nature of the EA System (Saunders & Biringen, submitted) lends itself to expanding the field's understanding of the behavioral and emotional indicators of disorganized attachment. Thus, three hypotheses are presented:

1. The EA System, consisting of the EA Scales and the EA-Z, will demonstrate convergent and predictive validity with the Strange Situation Procedure coding system.
2. A problematic, or disorganized, attachment style, assessed by the EA-Z at 15 months, will be associated with greater behavioral problems when children are 36 months old.
3. Themes regarding disorganized mothers' and infants' behavior and emotional expressions will emerge and will inform the identification of D attachment using the EA System.

Method

This study utilizes a subset of data from the NICHD Study of Early Child Care and Youth Development (SECCYD). The NICHD SECCYD was a comprehensive longitudinal study that aimed to study how differences in child care related to children's development, growth, and health. Data were collected in four phases between 1991 and 2007 at 10 sites across the U.S.

(Little Rock, AR; Irvine, CA; Lawrence, KS; Boston, MA; Morgantown, NC; Philadelphia, PA; Pittsburgh, PA; Charlottesville, VA, Seattle, WA, and Madison, WI). The present study uses data from Phase I only.

Participants.

Original study. Families were recruited in 1991 during hospital visits following the birth of a child. Recruitment procedures and selection criteria are described in detail in publications and online ([NICHD ECCRN, 1997](#); [2002](#); www.nichd.nih.gov/crmc/secc). Mothers were invited to participate if they were over the age of 18, had a singleton birth, lived near the research site, lived in a neighborhood that was not deemed unsafe to visit by police, and spoke conversational English. Of 8,986 mothers contacted at the hospital, 5,416 (60%) agreed to be called and met the eligibility requirements. A conditionally random sample was selected in order to ensure adequate representation of the population and at least 10% of the participants were of an ethnic minority, single mothers, and did not have a high school degree. Families were excluded if the infant had stayed in the hospital over 7 days after birth, if the infant had a severe disability from birth, could not be reached after three phone calls, or if the family planned to move in the next three years. From this conditional random sample of 3,015 families, 1,364 became study participants.

The full sample was representative of the recruiting hospital's demographics in terms of ethnicity and socio-economic status. Eleven percent of mothers had less than a high school degree, 24% reported as an ethnic minority, and 14% were single mothers. The average family income was 3.6 times the poverty threshold at the time, and mothers had an average of 14.4 years of education.

Sample selection. The present study uses a subset of the original full sample, 50 families who provided data on the key variables studied: the Strange Situation Procedure (SSP; Ainsworth et al. 1978; Phase I, 15 months), the Three-Bag task (Phase I, 15 months), and the Child Behavior Checklist (Achenbach, 1992; Phase 1, 36 months). Of the full sample, 25 were selected randomly from the entire study sample's subset of mother-child dyads coded as "secure," "insecure-avoidant," or "insecure-anxious/resistant" based on the SSP. These were grouped together as "organized." An additional 25 were selected randomly from the subset of mother-child dyads from the entire sample who were coded as "disorganized" on the SSP at 15 months. To randomly select these subsamples from the full dataset, any cases that did not have full data on the key variables ($n = 194$) were deleted. Next, cases coded as "unclassified" by the SSP ($n = 30$) also were deleted. Following this step, the entire dataset was divided into two files, "organized" ($n = 731$) and "disorganized" ($n = 133$), based on the SSP coding system. Using the SPSS random sampling tool, 25 cases were randomly selected from each of these datasets. Finally, the dataset was combined and organized based on ID numbers so that coding (of EA Scales and EA-Z) could be blind to SSP classifications.

Present study participants. Participating mothers responded to a demographic questionnaire when their child was one month old. Of the subsample of 50 dyads used for this study, 46% of the children were female. In regard to ethnicity, 86% of children were Caucasian, 8% African American, 4% Asian or Pacific Islander, and 2% other. Additionally, 8% of children were Hispanic. Forty-six percent of children were firstborn.

Mothers ranged in age from 18 to 42 years ($M = 28.48$, $SD = 5.53$). The majority, 82%, lived with their child's father, and 76% were married. In regard to education, 46% of mothers had a bachelor's degree or beyond, 26% had completed some college, 24% had a high school

degree or GED, and 4% had no high school diploma. When their child was 1 month old, 34% of mothers reported they were not employed, 10% were working, and 56% were employed but on leave. Annual total family income ranged from \$2,500 to \$162,500 ($M = 37,819.15$, $SD = 33,910.12$). Based on a ratio of annual income to needs, 28% of families were considered poor, and 20% of families received public financial assistance (e.g., food stamps, WIC).

Procedure.

Original study. Data were collected in four phases, between when children were one month old and in sixth grade. When infants were one month old, mothers were interviewed during home visits. Measures of family characteristics, parenting behavior, and child development were collected during home and laboratory visits when children were 6, 15, 24, 36, and 54 months. These data were collected via questionnaires, observations, and interviews. Teachers, mothers, and children provided data on children's language development, academic achievement, social-emotional functioning, and behavior between first and sixth grade. Additional details about data collection, study instruments, and procedures can be found in the Manuals of Operation of the study at <http://secc.rti.org>.

Current study. The current study uses data collected at 15 and 36 months from home and lab data collection sites. At 15 months, mothers and infants participated in the Three-Bag task during a home visit. After this home visit, they came into the lab to complete the Strange Situation Procedure (SSP; Ainsworth et al., 1978). When the children were 36 months of age, mothers filled out the Child Behavior Checklist (CBCL; Achenbach, 1992). Additionally, at 36 months, mothers and children returned to the lab and completed the modified Strange Situation, (Cassidy & Marvin and the MacArthur Working Group on Attachment, 1992).

The Three-Bag task consists of a 15-minute videotaped observation of mother-child interaction during semi-structured play. The procedure was adapted from Vandell (1979). Mothers were given three numbered cloth bags and told that they were for her and her child, and that the assessment would last 15 minutes. Each of the bags contained different items: (1) a book, (2) a set of toys intended to elicit symbolic play, and (3) another set of toys. More detailed information on the Three-Bag protocol can be found at:

http://www.acf.hhs.gov/programs/opre/ehs/ehs_resrch/instruments/videobooklet_2year/videotaped_booklet_2yrs.pdf.

The SSP is a standardized 20-minute laboratory procedure that consists of a series of separations and reunions between mother and her infant that are designed to activate the attachment system of the infant between 15 and 24 months of age (Ainsworth et al., 1978). First, the mother and child are in a room on their own, with toys. After three minutes, a female stranger enters the room. Next, the mother leaves the child alone with the stranger, and after three minutes the mother returns to the room. If the child appears highly distressed, the mother may re-enter the room sooner. During the second separation, both the stranger and the mother exit the room, leaving the infant alone. Finally, the mother enters the room for the second reunion. As with the first separation-reunion, the child is typically left alone for three minutes, unless he or she is highly distressed, in which case the mother may return sooner. The SSP was administered according to standard procedures laid out by Ainsworth et al. (1978), and research assistants who administered the procedure were centrally trained and certified according to a priori criteria. The procedure was videotaped through a one-way mirror, and videos were sent to a central location for traditional coding (for more detail, see NICHD Early Child Care Research Network, 1997).

In addition to the above, the videotaped observations from both the Three-Bag task and the SSP were coded using the Emotional Availability (EA) Scales (4th edition; Biringen, 2008) and the Emotional Attachment Zones Evaluation (EA-Z) (Biringen, 2008; Saunders & Biringen, submitted). The videotaped mother-child interactions were coded on-site at one of the original study locations. First, the Three-Bag task was coded using the EA Scales and EA-Z codes. Once these codes were finalized, the SSP for the same dyad was coded using the EA Scales and EA-Z. This procedure, therefore, resulted in two sets of codes for each dyad: EA Scales and EA-Z codes from the Three-Bag task alone, and EA Scales and EA-Z codes from the SSP, informed by the prior coding of the Three-Bag task. Throughout coding, detailed notes were taken on the mothers' and children's behaviors and emotional expressions, based on the Emotional Availability perspective. Additionally, in order to improve reliability and validity, videos that were particularly difficult to code were flagged and detailed notes were written especially on these cases. Upon returning to Colorado State University, these detailed notes on flagged cases were used during supervision from coding advisers, Dr. Biringen to finalize EA and EA-Z codes for the Three Bags and SSP and Dr. Fariñas (who is an experienced SSP coder) to finalize EA-Z codes for the SSP.

Measures.

Attachment style from the SSP. As part of the original SECCYD study, videos of the SSP were coded at a central location by a team of three coders. Each coder had a minimum of four years experience coding the SSP in a variety of high- and low-risk samples. Coders also underwent supplemental training and received supervision throughout the coding process. They double-coded the videos, and disagreements were viewed as a group and discussed to reach

consensus. Across coder pairs, prior to conferencing, agreement was 83% ($\kappa = .70$). For more detail on training and reliability processes, see NICHD Early Child Care Network (1997).

Coders categorized children into one of five groups: A, B, C, D, or U. Children who appeared happy upon reunion, greeted their mother, and returned to play quickly were coded as secure (Group B). Children who sought comfort from their mother upon reunion, but despite the comforting, remained distressed, angry, or clingy, were coded as insecure-resistant/ambivalent (Group C). Children who did not seek the mother upon reunion or avoided her presence were classified as insecure-avoidant (Group A). Children also received a subcategory within their classification; within the secure (B), category, a child could be categorized as B1, B2, B3, or B4. Within the insecure-avoidant, children can be A1 or A2, and within insecure-resistant/ambivalent, children can be C1 or C2. B3 is generally considered the most secure, based on research from Ainsworth et al. (1978) that children classified as B3 have the most sensitive mothers. The remaining B children are considered slightly less secure, followed by A2 and C1, and finally A1 and C2 (Ainsworth et al., 1978; Bretherton, Bates, Benigni, Camaioni, & Volterra, 1979; Bretherton, Biringen, Ridgeway, Maslin, Sherman, 1989).

Children showing signs of disorganized or disoriented behavior were coded as insecure-disorganized (Group D; Ainsworth et al., 1978; Main & Solomon, 1990). Indices included: sequential or simultaneous displays of contradictory behavior patterns, stereotypes and anomalous postures, freezing and stilling, and apprehension of the parent. When coders gave a child a score of 6 or above on a 9-point scale (Main & Solomon, 1990), the “D” classification was assigned. Children who did not fit into any of the A, B, or C groups, but were also not classifiable as disorganized, were given a primary “U,” or unclassifiable, classification. For this

study, the subsample was selected so that 50% of children were coded as disorganized, and 50% were coded as A, B, or C. Cases classified as U were excluded from this subsample.

In addition to categorizing children into one of five groups, coders rated children on four continuous behavioral scales: proximity and contact seeking, contact maintaining, resistance, and avoidance. These scales are correlated in expected ways with the A, B, and C attachment groups. A infants demonstrate high avoidance; C infants demonstrate high resistance, proximity seeking, and contact maintenance; and B infants show low resistance, low avoidance, and moderate proximity-seeking (Fraley & Spieker, 2000). The SSP is widely used as a valid and reliable tool for assessing infant attachment style, including disorganized attachment (Ainsworth et al., 1978; Main & Solomon, 1990).

Emotional Availability Scales. The Emotional Availability (EA) Scales (Biringen, 2008; Biringen, Robinson, & Emde, 1998) consist of six dimensions that assess qualities of an adult-child interaction. Four scales assess behaviors and emotional expressions of the adult – sensitivity, structuring, non-intrusiveness, and non-hostility – and two scales assess the child’s side – responsiveness and involvement. Each scale is scored on a 7-point semi-continuous scale, where higher indicates a more optimal style (Biringen 2008).

The adult sensitivity scale assesses the adult’s tendency to display positive, genuine, and positive emotional expressions. It also encompasses the adult’s responsiveness to child cues, including consistency, timing, and flexibility. The structuring scale measures the adult’s ability to guide and support child learning, which includes scaffolding, proactive guidance, setting appropriate limits, and using both nonverbal and verbal ways of teaching. Non-intrusiveness refers to the capacity of the adult to follow the child’s lead and grant age-appropriate autonomy, without interfering unnecessarily. The final adult scale, non-hostility, assesses the adult’s ability

to regulate negative emotions and prevent their expression in the presence of the child. This includes both overt expressions of hostility, such as aggression or ridiculing, and covert expressions, such as impatience or frustration. The child responsiveness scale assesses the child's range of affective expression and capacity to successfully use the adult for emotional regulation. It also encompasses the balance the child shows between responding comfortably to the adult and pursuing age-appropriate levels of autonomy. Finally, child involvement refers to the child's tendency to initiate contact with the adult, such as through vocalizing or physical touch, as well as the elaboration shown in such exchanges (Biringen, 2008; Biringen et al., 1998).

Evidence for the construct validity, predictive validity, and reliability of the EA Scales can be found in Biringen et al. (2014). A researcher who has been centrally trained and certified by the developer of the EA Scales coded the EA Scales independently. Training for the EA Scales consists of a 3-day seminar, followed by a reliability check during which trainees code a series of cases until they are reliable. The researcher had coded EA on four prior studies, totaling approximately 300 cases, and over a 4-year span. In prior studies, interrater reliability was established on five to ten cases at the beginning of coding, and intraclass correlations between two coders were maintained above $r = .80$ throughout the study (Saunders, Sarche, Morse, Trucksess, & Biringen, in preparation). For this study, double coding was not possible since only one coder could travel to have access to the videos. Thus, challenging cases were discussed in depth with the coder's supervisor, the developer of the scales.

Emotional Attachment Zones Evaluation. The Emotional Attachment Zones Evaluation (EA-Z; Biringen, 2008; Saunders & Biringen, submitted) provides an attachment classification, called a "zone," separately for the adult and child, as well as a continuous/ dimensional attachment score. The attachment zones are: emotionally available, complicated, detached, and

problematic. These zones correspond to each of the four attachment styles (see Table 1). The continuous/dimensional attachment score ranges from 0 to 100, where higher indicates greater attachment security.

The EA-Z is coded using information from the EA Scales, primarily adult sensitivity and child responsiveness, because these scales provide the most attachment-relevant information. For the 4th edition of the system, coders may also incorporate other important information from the other EA Scales and from observed behaviors. For example, high levels of parent hostility and intrusiveness can indicate a disorganized attachment (Lyons-Ruth, Melnick, Bronfman, Sherry, & Llanas, 2004), so coders will take this into consideration when scoring and categorizing dyads in the EA-Z. Additionally, other information, such as a child's response to a stressful situation, can affect a coder's decision in coding the EA-Z (Saunders & Biringen, submitted).

The EA-Z is associated with other indicators of attachment style, including the Adult Attachment Interview (George, Kaplan, & Main, 1985), the Attachment Q-Sort (Waters & Deane, 1985), and the SSP (Ainsworth et al., 1978; Saunders & Biringen, submitted). Further, the EA Scales, especially sensitivity and responsiveness, consistently correspond to attachment style (Biringen et al., 2014; Kim et al., 2017). The EA-Z was coded by a centrally trained coder, under the supervision of the developer of the EA Scales and EA-Z. See section on EA Scales for details on training and the coder's previously established reliability.

Child Behavior Checklist/2-3. The Child Behavior Checklist/2-3 (CBCL/2-3; Achenbach, 1992; Achenbach, Edelbrock, & Howell, 1987) is a questionnaire filled out by parents or child care providers regarding a child's behavior problems, and it can be used for a child between the ages of 2 and 3 years. Respondents read 99 behavior descriptions, such as "afraid to try new things" or "easily frustrated" and select a response that describes the child's

behavior in the past two months. Response options are 0 (*not true [as far as you know]*), 1 (*somewhat or sometimes true*) or 2 (*very true or often true*). Scores are then added up and categorized into six scales—*anxious/depressed*, *withdrawn*, *sleep problems*, *somatic problems*, *aggressive*, and *destructive*. The first two scales, *anxious/depressed* and *withdrawn* encompass the internalizing domain, and the final two scales, *aggressive* and *destructive* encompass the externalizing domains. Scale and domain scores are transformed into age-normed T scores and percentiles. T-scores above 70 are considered clinically significant, and those between 65 and 70 are considered borderline (Achenbach, 1992). Evidence of the validity and reliability of the CBCL-2/3 can be found in Achenbach et al. (1987) and in Koot, Van Den Oord, Verhulst, and Boomsma (1997). Mothers completed the CBCL in regard to the target child's behavior when the child was 36 months old.

Modified Strange Situation. At 36 months, mothers and children came into the lab to complete a modified Strange Situation, lasting approximately 20 minutes (Cassidy et al., 1992). A researcher invited mother and child to make themselves comfortable in a room with toys, a beanbag chair, and a chair for the mother. After three minutes, the mother exited the room. She returned after three minutes. If the child was highly distressed, she could return earlier. After a 3-minute reunion, the mother left again, this time for five minutes, unless the child was highly distressed. The second reunion lasted for three minutes, after which the procedure ended.

The modified Strange Situation was coded by trained and certified research assistants according to standardized procedures (Cassidy et al., 1992). The procedure resulted in attachment classifications: *secure (B)*, *insecure-ambivalent (C)*, *insecure-avoidant (A)*, or *insecure-controlling/insecure-other (D)*. *Secure* children remained calm and comfortable when interacting with the mother and overcame the stress of the separation. *Insecure-ambivalent*

children sought contact from the mother but remained upset or unsatisfied. They also behaved in helpless, whiny, fussy, and/or resistant ways toward the mother. Insecure-avoidant children appeared extremely neutral and rarely expressed positive or negative emotion toward the parent, even after the reunion. Finally, insecure-controlling/insecure-other children behaved in a controlling manner toward the mother that was either punitive or caregiving. D children may also have showed a combination of avoidance, ambivalence, and controlling behavior during reunions (Cassidy et al., 1992).

In addition to categorical classifications, children were coded on two continuous attachment scales. Coders assigned a global 9-point attachment security rating, from 1 (*very insecure*), to 9 (*very secure*). They also coded the child's distress during the two separations on a scale of 1 (*low distress*) to 5 (*high distress*). The mean of distress scores was taken to create an average distress score for both separations.

Analytic Plan

Chi square analyses and correlations were used to establish convergent validity of the EA-Z with the SSP. First, chi square tests of independence compared binary EA-Z attachment classifications to SSP classifications. Eight 2x2 models were tested, and an alpha correction ($k = 8, \alpha = .006$) protected against Type I error. Four models compared the EA-Z coded during the Three Bag Context to the SSP coding system, both for mother and child. Two examined disorganized versus organized (i.e., secure, insecure-avoidant, insecure-avoidant), and two examined secure vs. insecure. Then, four models did the same, but with the EA-Z coded during the SSP to the SSP coding system. and Three-Bag task combined context EA-Z classifications.

Next, continuous EA-Z scores were compared to the four continuous SSP scales—proximity and contact seeking, contact maintaining, resistance, and avoidance—and continuous

attachment security from the SSP (Bretherton et al., 1979; 1989) using bivariate correlations. Again, the SSP scales will be compared to both EA-Z scores from the Three Bags task and EA-Z scores from the combined SSP and Three Bag Task contexts. To examine predictive validity, bivariate correlations were used to examine relations between the EA System and the modified Strange Situation from 36 months.

Next, ANOVA and bivariate correlations were used to predict 36-month old CBCL domain and subscale scores from the EA-Z and EA Scales. ANOVA was used to predict CBCL scores based on disorganized vs. organized group membership, as well as secure vs. insecure group membership, as coded from the EA-Z. Finally, correlations were used to examine relations between CBCL scores and EA-Z continuous scores, as well as the CBCL and EA Scale scores.

Finally, qualitative themes were derived from the detailed notes taken during coding. I examined the notes from cases that were coded as disorganized using both the SSP and EA-Z coding systems and extracted themes that occurred commonly among cases. Themes were then organized based on the EA Scale under which they best fit.

Results

Convergent validity.

EA-Z differentiates between disorganized and organized attachment. First, cross-tabs between the SSP coding system and the EA-Z coding system were created for both contexts and for both mother and child across all four attachment styles (see Tables 2 through 5). Next, eight chi square tests of independence were used to compare binary EA-Z attachment classifications to SSP classifications, and an alpha correction was applied to avoid Type I error ($k = 8, \alpha = .006$). The first four tested concordance between SSP coding from the SSP context and the EA-Z coding based on the Three-Bag context. First, a chi square analysis tested child EA-Z zone

(organized vs. disorganized) based on the Three Bag context against SSP-coded attachment style (organized vs. disorganized). The result was significant, $X^2(1, 50) = 9.19, p = .002$. The same test for mothers (organized vs. disorganized, Three-Bag EA-Z vs. SSP system codes) was not significant when an alpha correction was applied, $X^2(1, 50) = 7.22, p = .007$. Next, the same analyses were run with the classifications of secure and insecure, comparing Three-Bag coded EA-Z to SSP-coded attachment style. Neither test was statistically significant, with or without an alpha correction. These results suggest that the EA-Z can be used to accurately distinguish infants with a disorganized attachment from infants with organized attachment styles, and this distinction can be made based on a low-stress, play-based context.

Next, four chi square tests examined concordance between the SSP coding and the EA-Z coding based on the SSP context. First, a chi square analysis tested the correspondence between child EA-Z zone and SSP-coded attachment style (binary organized vs. disorganized) based on the SSP context. The chi-square test was significant, $X^2(1, 50) = 25.96, p < .001$. Second, the test was run for mother organized vs. disorganized status during the SSP context, and it was also significant, $X^2(1, 50) = 25.96, p < .001$. Next, a chi square analysis tested child EA-Z zone compared to SSP-coded style (secure vs. insecure) based on the SSP context. The chi-square test was not significant when an alpha correction was applied, $X^2(1, 50) = 7.21, p = .007$. The same analysis was run for mothers (secure vs. insecure), and it also was not significant with an alpha correction, $X^2(1, 50) = 4.93, p = .026$.

These results suggest that the EA-Z coded from the SSP context can differentiate disorganized infants from infants with other attachment styles. Further, the EA-Z coded from the SSP seemed to be more accurate in differentiating disorganized versus organized dyads than did the EA-Z coded from the play context. It is important to note that the SSP for each dyad was

coded immediately after the Three-Bag task, so the coder could consider information from both contexts when coding the SSP. Further, it makes sense that the EA-Z coded from the SSP would align better with the SSP system, given they were coded from the same context. In this study, the EA-Z did not differentiate secure from insecure, although prior research has used the EA-Z and/or the EA Scales to do so (Kim et al., 2017; Saunders & Biringen, submitted). This may be, in part, due to the relatively low proportion of insecure-avoidant and insecure-ambivalent/resistant infants in this study (see Table 3).

Continuous EA-Z scores relate to continuous SSP scores. Next, bivariate correlations were used to examine the relations among EA-Z continuous scores and five continuous SSP scales: distress, avoidance, resistance, proximity-seeking, and contact maintenance. Both child and mother EA-Z score coded from the SSP correlated significantly with SSP-coded resistance, $r = -.407, p = .003$, $r = -.404, p = .004$, respectively. No other correlations with the coded SSP continuous scales were significant. In other words, infants with higher EA-Z scores and whose mothers had higher EA-Z scores were coded as less resistant during the SSP. Resistant behavior is commonly seen among insecure-ambivalent/resistant infants (Ainsworth et al., 1978), yet some infants with a disorganized attachment style also show resistant behavior (Lyons-Ruth & Spielman, 2004). Thus, it makes sense that EA-Z scores and resistance would be related. This is also consistent with other research utilizing this dataset (Groh et al., 2014), in which resistance was also related to disorganization. It is possible that the other SSP scales were not related to EA-Z scores due to variability in D infants' behaviors. For example, some D infants still approach their caregivers, whereas others are highly avoidant (Lyons-Ruth & Spielman, 2004).

Finally, continuous EA-Z scores were compared to two broader continuous SSP scales. First, the SSP subcategories were transformed into continuous attachment security scores using a

method from Bretherton and colleagues (1979; 1989). Using this method, scores range between one and five, where one is disorganized and five is the most secure; specifically, B3 = 5, B1/B2/B4 = 4, A2/C1 = 3, A1/C2 = 2, and D = 1. Mother SSP-coded EA-Z score was significantly related to SSP continuous attachment security, $r = .442, p = .001$, as was child SSP-coded EA-Z score, $r = .429, p = .002$. The relations between Three-Bag coded EA-Z scores and SSP continuous attachment security were not significant. Next, mother and child EA-Z scores coded from the SSP were significantly correlated with Main and Solomon's (1990) SSP disorganized scale, $r = -.406, p = .003$, and $r = -.385, p = .006$, respectively. Again, these same results were not found based on Three-Bags coded EA-Z scores. These results provide further evidence of the concurrent validity of the EA-Z in identifying disorganized attachment, particularly when coded from the SSP.

Predictive validity.

Disorganized attachment demonstrates low stability over time. Next, the predictive validity of the EA-Z was tested by examining how it related to the modified Strange Situation at 36 months. Table 6 displays the concordance between SSP-based EA-Z zones at 15 months and attachment classifications based on the 36-month modified Strange Situation (Cassidy et al., 1992). Surprisingly, only two of the 25 children who were originally classified as disorganized in the 15-month SSP were coded as insecure-controlling/insecure-other (D) at 36 months, and those were the only children classified as D at 36 months. Moreover, a majority ($n = 17$) of the 25 infants coded at 15 months as disorganized were coded as secure in the modified Strange Situation. Thus, because so few children remained disorganized, it was not possible to compare the concordance between 15- and 36-month attachment classifications. In the full sample ($N = 882$), a similar pattern emerged; of 130 infants coded by the SSP as D at 15 months, only 26

(20%) were also coded by the modified Strange Situation as D at 36 months, and 75 (58%) were coded as secure at 36 months.

This suggests that, in this sample, disorganized attachment was relatively unstable over time, with many children becoming not only organized, but secure, by 36 months. The reasons for this lack of continuity are unclear, yet prior studies on the SECCYD dataset, which included other attachment measurement tools and statistical analyses, have also found that both attachment security and attachment disorganization demonstrate weak stability over time (Groh et al., 2014). It is possible that attachment style changes in lawful ways that are associated with changes in the caregiving environment, particularly among normative, low-risk samples (Groh et al., 2014). Protective factors, such as high quality child care (Burchinal, Roberts, Zeisel, Hennon, & Hooper, 2006; NICHD Early Child Care Research Network, 1997; Spieker, Nelson, Petras, Jolley, Barnard, 2003) may also play a role in helping children to develop a more adaptive attachment pattern. Alternately, it may be due to differences in methodology, for the SSP must be modified to effectively assess attachment style among children older than 24 months (Cassidy et al., 1992). Future studies should continue to examine the EA-Z in relation to attachment style, particularly in longitudinal studies, in order to help determine the extent to which changes in attachment style are due to lawful discontinuity versus changes in measurement tools.

EA Scales predict continuous attachment scores at 36 months. Although the EA-Z did not relate to continuous measures of attachment at 36 months, two EA Scales did. Structuring and non-hostility, coded from the Three-Bag task, were correlated with both continuous scales, security and distress, from the modified Strange Situation at 36 months. Adult structuring was negatively correlated with distress at 36 months, $r = -.37, p = .009$, and it was positively correlated with security, $r = .35, p = .013$. That is, in this study, a mother's success in guiding

learning and setting age-appropriate limits was more strongly related to her child's later attachment security and attachment-related distress than was the mother's sensitivity. Other studies have also demonstrated the relative importance of structuring (Howes & Hong, 2008; Saunders et al., in preparation), and this is a quality that is sensitive to change following intervention (Biringen et al., 2010; Biringen et al., 2012).

Adult non-hostility was also negatively correlated with distress, $r = -.30$, $p = .037$. That is, children of mothers who displayed more negative emotions and/or made hostile statements at 15 months were more likely to be coded as distressed during separation/reunion episodes at 36 months. This relation may have emerged, in part, due to the high incidence of disorganized dyads in this study, for mothers of disorganized infants tend to show more hostility (Lyons-Ruth et al., 2004). This suggests that, even if children are no longer classified as disorganized at 36 months, parental hostility may still play a role in their attachment behaviors. Taken together, these results demonstrate the relevance of examining adult behaviors other than sensitivity, as well as the utility of play contexts for providing insight into the parent-child relationship.

Predicting later outcomes.

Neither SSP nor EA-Z predict behavioral problems at 36 months. Next, the extent to which the EA-Z predicted scales and domains of the CBCL-2/3 at 36 months was tested. The EA-Z was not related to any of the CBCL scales or domains, whether tested as a categorical or as a continuous predictor. However, the SSP, used as a categorical measure, also did not predict CBCL outcomes at 36 months, both in this subsample and in the full sample of participants ($N = 948$). Further, neither the continuous measure of attachment security (Bretherton et al., 1989) nor the disorganization scale of the SSP (Main & Solomon, 1990) were associated with CBCL scores at 36 months. This null result is contrary to findings from a large meta-analysis by Fearon and

colleagues (2010), in which disorganized attachment was strongly associated with later externalizing symptoms.

It should be noted that, within the subsample used in this study, very few children were reported to have T-scores in the clinically significant range at 36 months. Specifically, only one mother reported her child in the clinically significant range for the internalizing domain, and no mothers reported clinically significant externalizing behaviors. The mean T score for the internalizing domain was $M = 49.58$, $SD = 9.57$, and the mean T score for the externalizing domain was $M = 50.04$, $SD = 8.41$.

Further, this sample was normative and relatively low-risk, and the stability of disorganization was low. In high-risk samples, there may be greater stability in attachment style, as well as other contextual variables that lead to externalizing behavior, such as family stress, low income, or maltreatment (Dearing et al., 2006; Kim & Cicchetti, 2010). Indeed, Fearon and colleagues (2010) found a stronger effect size for the relation between D attachment and externalizing symptoms among low-SES samples. This calls to question whether attachment style itself predicts later behavioral problems, or whether confounding variables are more relevant, and attachment style is a moderator (Belsky & Fearon, 2002; Edwards et al., 2006).

EA Scales predict later somatic problems. Turning to the EA Scales overall, the scales related to only one CBCL scale at 36 months. A composite score of maternal EA Scales during the Three-Bag task was negatively correlated with child somatic problems at 36 months, $r = -.30$, $p = .033$. A composite of maternal non-hostility from both contexts was also correlated with somatic problems at 36 months, $r = -.28$, $p = .048$. This suggests that infants of mothers with lower overall EA at 15 months, particularly non-hostility, were more likely to demonstrate somatic problems at 36 months. Somatic problems consist of aches and abdominal or digestive

problems (Achenbach, 1992). This correlation is interesting, given the physical dysregulation often seen in the context of disorganized attachment (Fariñas, 2015; Main & Solomon, 1990). However, these results should be interpreted with caution, given the high number of statistical tests that were run, which may have elevated the risk of Type I error.

Qualitative themes. Finally, Table 7 displays themes that emerged from the coding of the EA Scales and the EA-Z, specifically those displayed by disorganized mothers and infants during both the play and SSP contexts. Each theme is described and specific examples of behaviors and phrases are presented. These themes can serve as guidelines for EA coders, as well as descriptors for other researchers or practitioners who want to screen parent-infant dyads for disorganized attachment.

Discussion

This study had three aims, the first of which was to validate the EA-Z in detecting disorganized attachment in mother-infant dyads. Next, this study intended to examine how problematic/disorganized attachment at 15 months related to children's behavioral problems at 36 months. Finally, it aimed to derive qualitative themes regarding maternal and child behavior and emotional expressions that occur in the context of disorganized attachment. These themes can help EA coders, as well as other researchers and practitioners who work with families of young children, in identifying disorganized caregiver-child dyads.

Validity of EA system.

The EA-Z and EA Scales demonstrate concurrent validity. The results of this study support the concurrent validity of the EA-Z in identifying disorganized attachment, particularly for the EA-Z coded during the SSP context. Prior studies have demonstrated the validity of the EA System in distinguishing secure from insecure attachment in a variety of observational

contexts (Kim et al., 2017; Saunders & Biringen, submitted). This suggests that the EA-Z may be most accurate in identifying D dyads in contexts of high-stress. This makes sense, given that the SSP was design to activate attachment strategies, and that some D dyads may appear organized during low-stress contexts (Ainsworth et al., 1978; Lyons-Ruth et al., 2004). However, the EA system was designed for use in a wide variety of contexts, especially those that reflect the “everyday” interactions between adult and child (Biringen, 2008; Biringen et al. 1998; Biringen et al., 2014). In fact, some EA Scales, such as structuring and non-intrusiveness, are difficult to code in highly structured contexts, such as the SSP. Moreover, in this study, qualities that were coded during play, particularly structuring and non-hostility, ended up being more relevant for children’s later outcomes than were attachment-related qualities coded during the SSP.

Thus, it is generally recommended that the EA and EA-Z be coded in a context that contains both unstructured, low-stress situations and high-stress situations (Saunders & Biringen, submitted). An example of this could be a play interaction with a separation-reunion paradigm at the end. By doing so, researchers can both adequately assess a child’s attachment style and gain an understanding of the overall quality of the parent-child relationship, beyond sensitivity and responsiveness. Without an adequate context, it may be difficult or impossible to detect disorganized attachment, for some D dyads may only be recognizable when attachment needs are high (Lyons-Ruth & Spielman, 2004). Carefully planning the observational context will also allow researchers to examine broader indicators of parent-child relationship quality that are relevant to children’s development, such as the parent’s ability to effectively structure learning.

However, it remains unclear what length of observation is necessary to accurately code the EA-Z. It seems that, in general, longer is better. For example, van den Dries and colleagues (2012) compared EA Scales coded from 8-minute free play observations to SSP classifications

and found no concordance. Another study using 10-minute free play contexts also failed to link EA-coded sensitivity with child attachment styles (Swanson et al., 2000). It may be that short observational periods are not sufficient to gain a thorough understanding of a child's attachment style. This is problematic, for approximately 30% of the EA studies reviewed in Biringen et al. (2014) used observations of 10 minutes or fewer. Future research should continue examining which types of contexts and length of observations are best to use with the EA System.

Nevertheless, the concordance between the EA and the SSP systems in classifying disorganized parent-child dyads during the SSP is important, for it supports the validity of the EA-Z as a measure of attachment style. This adds to other literature, which has successfully used the EA System to differentiate among secure and insecure parent-child dyads (Biringen et al., 2014; Kim et al., 2017; Saunders & Biringen, submitted). Future studies should extend this line of work by testing the validity of the EA-Z in differentiating among the insecure attachment styles, especially insecure-avoidant and insecure-resistant/ambivalent. Additionally, although the EA Scales are validated for use in a wide variety of countries, cultures, and subgroups (Biringen et al., 2014), the work validating the EA-Z as an attachment construct is limited and has been with fairly homogenous samples (Saunders & Biringen, submitted). Thus, ongoing research should replicate this work in culturally and socio-economically diverse samples.

Attachment style was unstable over time. In this sample, disorganized attachment was very unstable over time. Approximately 20% of children in both the subsample and full sample of study participants who had been coded as disorganized at 15 months were also coded as disorganized at 36 months. Moreover, a majority ($n = 17$, or 68%) had moved into the secure category by 36 months. This finding was unexpected and surprising, for prior studies have found that D attachment is stable over time (LeCompte & Moss, 2014; van IJzendoorn, 1999), and that

it predicts externalizing behavior problems later in childhood (Fearon et al., 2010). However, as described above, this is consistent with other previous studies that used this dataset, though the reasons for this lack of stability are not yet well understood (Groh et al., 2014). It may be due to the fact that the SECCYD study sample was fairly normative and low-risk. There may be a stronger continuity in attachment-related risk among high-risk samples, thus contributing to greater stability in attachment style.

Further, all children in this study attended child care, which may have served as a confounding variable, or even a protective factor. Children form an attachment relationship with any caregiver with whom they spend a significant amount of time (Benoit, 2004). Moreover, a child's attachment style will be specific to that caregiver; it develops based on that caregiver's interactive behavior with that specific child (Benoit, 2004; Cugmas, 2007; van IJzendoorn & De Wolff, 1997; Vaughn, Bost, & van IJzendoorn, 2008). In addition, high-quality child care and secure attachment relationships with child care providers can serve as protective factors against parent-child insecure attachment, as well as broader family risk (Burchinal et al., 2006; NICHD Early Child Care Research Network, 1997; Spieker et al., 2003). Thus, it is possible that, in this sample, children's experiences in child care helped to buffer them against the risks that had contributed to D attachment in infancy. Future studies should continue to examine the stability of and outcomes associated with disorganized attachment in infancy, in order to better understand these complex pathways.

Finally, it is possible that the apparent instability in disorganized attachment is not due to true changes in attachment style, but rather to changes in the measurement tool (Groh et al., 2014). The modified Strange Situation may not function to activate the attachment system of young children in the same way that the SSP does during infancy. In fact, other longitudinal

studies have found that attachment style measured by the SSP is stable and predicts later outcomes when attachment is measured with other tools during childhood (Sroufe, 2005). Specifically, in the Minnesota Longitudinal Study, the SSP consistently predicted representational measures of attachment, which assess children's attachment-related stories and pictures, rather than their observed behaviors. Representational measure of attachment, in turn, predicted later developmental outcomes. (Carlson, Sroufe, & Egeland; Sroufe, 2005). Thus, future studies should continue to examine the stability of attachment style during childhood, as well as the utility of various measurement tools to assess this stability.

The EA-Z does not predict later outcomes. Next, neither the EA-Z nor the SSP predicted behavioral problems at 36 months. This may be due to the fact that a majority of infants coded as disorganized at 15 months appeared to have developed a more adaptive attachment style by 36 months. As described above, child care may have served as a protective factor in these processes. Moreover, although the SECCYD study recruited a diverse and nationally representative sample, the sample was still fairly normative and low-risk. In samples that are high-risk, there may be a stronger continuity in attachment style, as well as a greater presence of other variables that contribute to externalizing behavior, such as family stress, low income, or maltreatment (Dearing et al., 2006; Kim & Cicchetti, 2010). Indeed, Fearon and colleagues (2010) found a stronger effect size for the relation between D attachment and externalizing symptoms among low-SES samples. Additionally, Fearon et al., (2010) reported that the relation between disorganized attachment and externalizing problems was strongest for boys, non-SSP attachment tools, and observational measures of behavior. This study used the SSP and a parent report measure of behavior, and the sample was too small to examine differences by gender.

The EA Scales predict later outcomes. Although the EA-Z and the SSP, measured at 15 months, were not predictive of 36-month attachment or behavioral outcomes, the EA Scales did relate to later outcomes. This suggests that, whereas attachment style often serves as a predictor of later social-emotional outcomes (Groh et al., 2017), other characteristics of parent-child relationship are also relevant (Bernier, Carlson, & Whipple, 2010; Biringen et al., 2014; Grolnick & Pomerantz, 2009; Rubin, Burgess, Dwyer, & Hastings, 2003; Saunders et al., in preparation; Taylor, Eisenberg, Spinrad, & Widaman, 2013). This finding was particularly interesting because, although half of this sample was classified as disorganized at 15 months, qualities other than attachment were more relevant for later development. This suggests that, even if attachment style changes over time, certain qualities of the early parent-child relationship may be significant for later development.

Specifically, in this study, maternal structuring, non-hostility, and overall EA seemed to be more relevant in predicting children's later outcomes. These findings are consistent with other recent research using the EA Scales, in which structuring and non-hostility related to child social-emotional functioning (Howes & Hong, 2008; Martins, Soares, Martins, Terenod, & Osóriof, 2012; Saunders et al., in preparation). Additionally, they demonstrate the value of examining multiple indicators of parent-child relationship quality. When studying how children's early relationships contribute to their development, it may not be sufficient to only examine parental sensitivity (van IJzendoorn, 1995; van IJzendoorn et al., 2004), or even a child's attachment style based on one time point (Groh et al., 2014). Instead, considering multiple indicators of parent-child relationship quality can add important information when examining pathways to adaptive or maladaptive child development. Ongoing research should continue to examine multiple indicators of parent-child relationship quality, particularly in the context of

disorganized attachment. This can help deepen the field's understanding of the broader context of disorganized attachment, and its implications for child development.

Themes for EA coding. Disorganized attachment is commonly described as a breakdown of the attachment system, in which the child cannot formulate a consistent strategy with which to get his attachment needs met (Cassidy & Mohr, 2001; Hesse & Main, 2000; Main & Solomon, 1986). However, the specific precursors to and indicators of this style have, at times, been difficult to identify (Lyons-Ruth & Spielman, 2004; Madigan et al., 2006). Although D attachment is highly prevalent in the context of maltreatment or other relational trauma (Cyr et al., 2010), it also occurs in low-risk contexts (Carlson et al., 1989; van IJzendoorn et al., 1999). In either context, it is hypothesized that an infant's unresolvable fear and distress contribute to a breakdown in the attachment system (Main & Hesse, 1990). This develops when the primary caregiver is overtly frightening or hostile, as in the context of abuse, or when the caregiver has unresolved trauma of her own and thus displays severe lapses in engagement and responsiveness (George & Solomon, 2008; Lee et al., 2009; Lyons-Ruth et al., 1999; Lyons-Ruth et al., 2004; Main & Hesse, 1990). Indeed, Lyons-Ruth and colleagues (2004; Lyons-Ruth & Spielman, 2004) have identified two distinct profiles of disorganized parents: hostile/self-referential and helpless-fearful.

Researchers have also focused closely on the importance of dyadic emotion regulation in the context of attachment, and how this regulation breaks down in the context of disorganization (Beebe et al., 2012; Bronfman et al., 1993; DeOliviera et al., 2004; Lyons-Ruth & Spielman, 2004). For example, DeOliviera and colleagues (2004) explain, "infants with mothers who are consistently, profoundly unresponsive or unavailable learn that it is ineffective and potentially disorganizing to attempt to communicate their emotions directly to their caregiver" (p. 13). Thus,

the caregiver's inability and failure to respond contingently and predictably to a child's distress contributes to a breakdown in the child's ability to co-regulate and, ultimately, to self-regulate. Affective communication is also the primary focus of the AMBIANCE coding system (Bronfman et al., 1993; Lyons-Ruth et al., 2004), which focuses on affective errors displayed by the primary caregiver that are potentially disorganizing to the infant.

This focus lends itself well to the Emotional Availability framework, in which affective expression and emotion regulation are also centerpieces (Biringen, 2008; Biringen et al., 1998; Biringen et al. 2014). What follows is a summary of the qualitative themes derived from observing disorganized dyads in both contexts, free play and the SSP. Themes are organized by EA Scale in order to provide dimension-specific guidance to EA coders.

Sensitivity. Mothers of disorganized infants demonstrated distinct profiles of affective expression and emotion regulation. Consistent with the two profiles identified by Lyons-Ruth and colleagues (2004), these mothers tended to be either withdrawn, dissociative, and helpless-seeming or hostile, angry, and tense. For example, some mothers appeared ghostly-still and statue-like, whereas others were easily irritated and angry-seeming. However, not all D mothers fit cleanly into either of these categories. Some did not show either withdrawn/ dissociative or hostile/angry patterns of emotions. Thus, it is important to also consider other affect-related indicators of disorganized attachment.

Many D mothers displayed affective errors, and this finding is consistent with other literature and coding systems (Beebe et al., 2012; Bronfman et al., 1993; Lyons-Ruth & Spielman, 2004). Affective errors fall into two broad categories: (1) overt failures to respond to clear affective signals from the infant and (2) simultaneous contradictory emotional cues toward the infant (Lyons-Ruth & Spielman, 2004). An example from this study that was seen several

times was mothers laughing or smiling in response to infant fear, distress, or pain. Other common examples were a mismatch between the mother's face and voice—such as a flat face with a sugary-sweet vocal tone—and quick, unpredictable shifts among emotional expressions—such as a mother's face shifting among positive, annoyed, and flat frequently. Frequent affective errors are strongly related to infant disorganization, for a child finds such lack of appropriate engagement and regulation disorganizing and frightening (Lyons-Ruth & Spielman, 2004).

Next, mothers of disorganized infants were often intolerant of their child's distress. This intolerance could manifest in several ways. Mothers sometimes expressed anger or hostility in response to the child's crying, such as one mother who glared at her child and said, "oh, you're okay" in an irritated tone. Other mothers appeared confused, uncomfortable, and uncertain when faced with their child's distress, such as one who said, "I just don't understand, I just don't understand." Such intolerance was often paired with an urge to divert the child away or to distract him with toys. Although some mothers did pick up the child and offer cursory comfort, they frequently set the child down very quickly and redirected him toward toys, either in words or in actions. Similarly, even in situations of low stress, mothers often rebuffed their child's approach or carefully enforced physical distance. This could be seen in a mother who, when her child approached for a hug, turned the child around to face away from her and handed her a toy.

This theme is consistent with findings by Lyons-Ruth and colleagues (2004), in which they point out that helpless/fearful mothers tend to become helpless and withdrawn in response to their child's distress. They also report that these mothers often direct their child away from themselves and toward toys, respond in a cursory manner, or withdraw and create distance (Lyons-Ruth et al., 2004; Lyons-Ruth & Spielman, 2004). Similarly, Beebe and colleagues (2012) describe that mothers of D infants are likely to appear surprised in response to their

child's distress, and they argue that this represents a "denial" of infant distress" (p. 357). These failures to respond appropriately are thought to arise from the mother's own unresolved trauma (Lyons-Ruth & Spielman, 2004). Mothers with histories of abuse, abandonment, harsh treatment, or other forms of trauma may become overwhelmed by their child's distress. This can lead to a role inversion, in which the mother feels herself like the wounded child and either retreats to avoid the emotional pain or becomes angry with the child (Lyons-Ruth & Spielman, 2004).

Next, D mothers sometimes displayed odd postural movements, including restricted or unnatural physical touch, "looming" movements, and attack-like postures. For example, one mother sat with her arms encircling the child for several minutes as they played, yet she never made physical contact with him. This is consistent with findings from Beebe et al. (2012), who describe that D mothers show low coordination of touch with their infant, which results in low overall physical contact. Lyons-Ruth and colleagues (2004) also found that D mothers may avoid physical contact, such as holding their infant at arms length. Further, odd movements are also consistent with prior research, in which mothers of D infants were more likely to show spatial dysregulation, looming toward their child in an unpredictable and frightening manner (Beebe et al., 2012; Bronfman et al., 1993; Main & Hesse, 1992). Finally, as another example, a mother crouched next to her child in a "ready to pounce" position. This is consistent with the AMBIANCE coding instrument (Bronfman et al., 1993; Lyons-Ruth et al., 2004), which describes an attack-like posture as an example of physical negative-intrusive behavior.

Finally, some D mothers displayed unpredictable, disruptive, and jarring shifts in their vocal tone or volume. At times, this manifested as repeating the same phrase in different intonations and volumes. At others, mothers spoke in a high-pitched, anxious-sounding tone of

voice. This theme is also coded in the AMBIANCE system as an indicator of a parent's disorientation, confusion, or fear (Bronfman et al., 1993; Lyons-Ruth & Spielman, 2004).

Structuring. Mothers of D infants displayed unpredictable responsiveness or severe lapses in engagement. This theme can be coded within both the Sensitivity and Structuring scales. For example, some mothers appeared to use a “trial and error” strategy of engaging the child, in which the mother energetically attempted to engage the child by offering a variety of toys in quick succession, then backed out and became disengaged when she failed to receive a positive response. This is consistent with the hostile/self-referential subtype of D mothers, who tend to override their infant's cues in favor of their own desires (Lyons-Ruth & Spielman, 2004). A more extreme example of this theme was mothers who dissociated or became trance-like, such as one mother who sat perfectly still, startled when a child swung a toy, and then returned to sitting perfectly still. Dissociation, lapses in engagement, and generally unpredictable engagement are common in the context of disorganization, particularly for the helpless/fearful subtype of mothers (Bronfman et al., 1993; Hesse & Main, 2006; Lyons-Ruth et al., 2004; Madigan et al., 2006; Main & Hesse, 1992).

Structuring was limited not only by caregivers' inconsistent engagement, but also by the content of structuring. Many D mothers appeared limited to questions, direct commands, parallel play, simple actions that lacked verbal explanation, or imitating the child. For example, one mother imitated the child's actions in play without speaking or adding anything new. This was limiting, for such structuring attempts “failed to build” and did not contribute to a coherent storyline or consistent structure. Although other studies have focused more on emotional responsiveness, rather than structuring or play behaviors, this can be viewed as a failure to repair, which is consistent with other literature (Beebe et al., 2012; DeOliviera et al., 2004; Madigan et

al., 2006). Altogether, such failure to remain consistently engaged and to serve as the “older and wiser” adult (Bowlby, 1969) appears to leave the child with the bulk of responsibility for structuring the interaction and maintaining connection with the adult. This is consistent with the AMBIANCE coding system, which flags “vacating parental role” (Lyons-Ruth et al., 2004; p. 74), characterized by minimal parental direction, authority, and collaboration.

Finally, D mothers sometimes engaged in actions or statements that served to flip the parental hierarchy or to enforce role reversal. This was subtle in some cases, such as a mother sitting on the floor looking up at a child on a chair. In other cases, it was more obvious, such as a mother making self-referential statements like, “you don’t want anything to do with me, do you?” These role-confused behaviors and statements are consistent with prior research, and they are explicitly coded as part of the AMBIANCE system (Bronfman et al., 1993; Lyons-Ruth et al., 2004). The AMBIANCE system also considers signs of role reversal, such as a caregiver who seeks assurance from an infant. Although this study did not record specific examples of this, such behaviors are consistent with this theme.

Non-intrusiveness. As described under Structuring, some D mothers were disengaged in one moment and suddenly overbearing and overstimulating in the next moment. This was also seen in some forms of verbal intrusiveness, in which mothers asked questions or made frequent commands without noting the child’s response, or lack thereof. This lack of consistency and failure to tune into the child’s wants/needs is also consistent with non-intrusiveness. Verbal intrusiveness is also coded in the AMBIANCE system (Bronfman et al., 1993), yet this instrument highlights negative-verbal intrusiveness, such as mocking or teasing. This is described below, under “Non-hostility.” Nonetheless, intrusiveness that is paired with hostility should also be coded under this scale.

In this study, physical intrusiveness was often utilized in an attempt to control behavior, and it was sometimes paired with hostility. For example, one mother, after her child stood up, angrily said “come here,” with a clenched jaw and grabbed the child by the arm to pull him toward her. Another mother pulled her child by his shirt, and another pulled her child by her legs. This kind of behavior has been attributed most frequently to the hostile/self-referential subtype of caregiver, and it represents extreme attempts to control child behavior (Bronfman et al., 1993; Lyons-Ruth et al., 2004).

Next, in D dyads, distance appeared to be created intentionally, rather than organically through exploration and autonomy-seeking. Exploration is developmentally appropriate, and highly non-intrusive caregivers permit such autonomy (Biringen, 2008; Biringen et al., 2014). However, the “flavor” of the distance seen between D mothers and infants is much different. When D infants created distance, it was often in response to extreme intrusiveness, in an attempt to avoid, based in fear, or due to disorientation. For example, children who hid behind chairs (non-playfully) or wandered around the room were certainly not engaging in that behavior as a way to pursue autonomy. Such behaviors are indicators of fear or disorientation, and they are strong signs of disorganized attachment (Main & Solomon, 1990). Caregivers may enforce distance, as well, by rebuffing a child’s approach or directing the child away. For example, one mother repeatedly threw toys away from her feet when the child brought them to her.

Non-hostility. Hostility is a commonly-described indicator of disorganization (Bronfman et al., 1993; DeOliviera et al., 2004; Lyons-Ruth et al., 2004), and some argue that frightening caregiver behavior, whether overt or covert, is the primary source of disorganization (Main & Hesse, 1990). Although not all of the D mothers in this study showed signs of hostility, some distinct themes were seen that align with other existing literature.

Some D mothers engaged in mocking or ridiculing statements or behaviors (Bronfman et al., 1993; DeOliviera et al., 2004; Lyons-Ruth et al., 2004). For example, one mother, in response to her child's distress, called him a "grumpy grump." Another, in a low mocking tone, said, "look at those tears, oh those tears." At other times, mocking was through the mother's behavior, such as a mother who laughed at a child's fear, or another who grimaced when wiping her child's nose. Mocking or ridiculing may reflect the caregiver's own difficulty in regulating her own emotions (Biringen, 2008; Lyons-Ruth & Spielman, 2004). Similarly, some mothers were critical toward the child or complained about the child's behavior, such as, "you're just making a big old mess, huh?" Mocking, ridiculing, or critical actions or statements, when left unrepaired, place a caregiver in the lower zones of the non-hostility scale. It should also be noted, however, that caregivers in nearly all zones of the EA-Z may show overt hostility, so this alone should not be used to code a mother as problematic.

Disorganized mothers sometimes also attributed negative intentions or malice to their child, such as one mother who said, "now you're gonna reprimand me, aren't you?" Another said, "look at those crocodile tears," as if the child was crying with the intent to coerce the mother. These statements can be viewed as a form of self-referential behavior (Lyons-Ruth & Spielman, 2004), yet they also represent a distorted image of the child, or even fear of the child (Hesse & Main, 2000). Parents at risk for abuse will also often attribute hostile thoughts or feelings to their infant (Allen et al., 2008). Similarly, Solomon and George (1999) have found that some unresolved mothers describe their disorganized child as having supernatural powers or connections to deceased persons.

Next, some mothers of D infants showed difficulty with self-regulation, showing flashes of anger, glowering, and seeming displeased. Although detached, complicated, and emotionally

available mothers may also, at times, display covert hostility, the expressions seen by problematic mothers were, in general, more extreme. Rather than frustration or impatience, D mothers tended to glower, glare, and appear genuinely angry with the child. Further, these expressions were often unprovoked, or they were in response to the child's distress. Examples included looking at the child with daggers in eyes, glowering at the child, or facial shifts from flat to sinister. The result of such extreme covert hostility was that the coder herself felt on-edge, uneasy, and tense.

Finally, frightening or frightened behaviors are a strong indicator that a mother is disorganized (Hesse & Main, 2000; 2006; Main & Hesse, 1990). This can be seen in a mother intentionally scaring a child, such as one who pushed a toy toward a child, knowing the toy had previously frightened her. Hesse and Main (2006) describe other frightening and threatening behaviors, such as engaging in non-playful predatory-like behaviors toward the child. Subtle behaviors, such as severe dissociation, can also be frightening to the child (George & Solomon, 2008; Hesse & Main, 2006; Lee et al., 2009). Finally, a caregiver appearing frightened herself can indicate disorganization, such as a mother startling or using a high-pitched, anxious-sounding tone of voice (Hesse & Main, 2006).

Child responsiveness. Emotion regulation has been identified as a key area of breakdown that occurs in the context of disorganized attachment (DeOliviera et al., 2004). Therefore, it was no surprise to find that many of the child themes observed revolved around emotion regulation. These observations included unpredictable shifts in affect, sustained crying, lack of positive shared affect, dissociated or fearful affect, and an inability to be soothed.

Some infants who were coded as disorganized displayed rapid shifts in affect, and these shifts ranged from extreme to more subtle. They were often random or incongruent with the

situation, and most striking were those that occurred in response to contact with the mother (Main & Solomon, 1990). For example, post-reunion during the SSP, one child ran away from his mother to the door, collapsing on the way and beginning to cry. He then hit his hands repeatedly on his legs, gave several short loud shrieks, and put a toy in his mouth. Another infant showed a more subtle, yet still maladaptive, profile of emotion regulation. During play, he growled, shrieked, fussed, giggled, and shrieked in fear, all in fairly quick succession. Other researchers (Beebe et al., 2012; Main & Solomon, 1990) have also noted that D infants display multiple, rapid changes in affect, as well as generally greater distress and more discrepant affect (e.g., smiling while expressing vocal distress).

Next, some D infants, when distressed, cried for extended periods of times without being soothed. Often this crying left the coder with an impression of the child as vulnerable or helpless. Additionally, infants who displayed this behavior often seemed to cry “to the room,” or without any clear direction (Main & Solomon, 1990). This can help to distinguish D infants from insecure-anxious/resistant infants, who also tend to cry excessively, yet usually direct their sadness or anger to the mother in an attempt to elicit a response (Ainsworth et al., 1978).

Third, D infants rarely shared positive affect with their mothers; this theme was most evident during the play context, where both mother and child face were frequently visible. This theme appeared as a “mismatch,” in which a mother would smile or laugh, yet the child would not join in this joy. Children in the detached (i.e., insecure-avoidant) zone of the EA-Z also demonstrate restricted affective expressions, particularly negative ones, (Biringen, 2008; Biringen et al., 2014; Saunders & Biringen, submitted), yet in these dyads, the caregiver usually also has a shut-down affect. Further, mothers of avoidant children do not usually ignore or rebuff positive emotional expressions (Goldberg, Mackay-Soroka, & Rochester, 1994). In contrast, D

infants may still express negative emotions, yet they rarely matched their mother's expressions of positive emotions. This, in combination with the prior themes, likely reflects the fundamental emotional dysregulation that occurs in the context of D attachment (DeOliviera et al., 2004)

Next, some infants demonstrated dissociation, fear-based behaviors, or fear-based emotions. Examples included children who hid from the mother during play, a child with a dazed look as his mother brushed his hair, and a child who backed away from her mother, eyes wide. These observations are consistent with indices identified by Main and Solomon (1990), and they reflect one of the key underlying processes of disorganized attachment: fear of the caregiver (Hesse & Main, 2006). Such clear signs of fear should be taken as a strong indicator of D attachment, particularly if they occur repeatedly (Main & Solomon, 1990).

Finally, D infants often did not seek soothing from the caregiver, could not be soothed for a long period of time, or could only be soothed by a stranger. For example, some D infants, despite being extremely upset by the separation, would not fully approach their mother upon reunion. In other situations, this inability to be soothed was more extreme, such as infants who remained highly dysregulated for long periods of time, infants who actively avoided their mother despite being upset, or infants who sought out the stranger when upset. This is consistent with prior research (Main & Solomon, 1990), and it fundamentally represents a lack of an attachment strategy, for in a moment when attachment needs are high, infants are unable to utilize their primary caregiver to relieve their distress (Hesse & Main, 2000). It is important to note, however, that some D infants *will* still approach their caregiver when distressed (Lyons-Ruth & Spielman, 2004). Thus, an infant who still approaches her caregiver should not be ruled out.

In addition to a profile of maladaptive emotion regulation (DeOliviera et al., 2004), D infants often showed physical dysregulation in response to distress or to contact with their

mothers. For example, several infants arched their back in response to being pulled onto their mothers' laps. During the SSP, some D infants collapsed when distressed or when moving toward their mothers. Main and Solomon (1990) also described similar behaviors, such as approaching the mother then falling, stereotypies (e.g., rocking, pulling hair), and mistimed movements. Further, Fariñas (2015) argues that the trauma experienced by infants in D relationships is actually organized by the infant's body as somatic coping strategies. From this perspective, indices of physical dysregulation (e.g., arching the back when in contact with mother) or attempts at physical self-soothing (e.g., rubbing eyes), are strong indicators of disorganization. Indeed, coding these somatic indicators accurately distinguishes D infants from secure infants (Fariñas, 2015).

Finally, some infants protested or actively resisted physical contact or proximity with their mothers. For example, several D infants squirmed off of their mothers' laps, often with accompanying physical or emotional dysregulation, such as arching their backs, kicking their legs, or crying. Other, more subtle, examples, included a child who turned his head away when offered a kiss and another child who shook her head, "no," when the mother reached toward her. These observations are consistent with Lyons-Ruth and Spielman (2004), who describe infants of hostile/self-referential mothers as showing a combination of avoidance and resistance. They are also consistent with Main and Solomon (1990), although they describe these in the context of contradictory behavior patterns, such as a child avoiding the parent while being held or avoiding while also expressing stress or anger. Contradictory behavior patterns, especially when observed multiple times, are strong indicators of disorganized attachment (Main & Solomon, 1990), and they will be discussed in further detail below, under "child involvement."

Child involvement. Infants who were coded as D tended to receive low scores on child involvement, yet the nature of their involvement could vary. Some infants, but not all, actively avoided their mother and created distance between the two of them. This could manifest as attempting to leave the room, running away from the mother, backing away from the mother, or a child frequently playing with her back to the mother. This kind of behavior is consistent with descriptions of avoidance described by Lyons-Ruth and Spielman (2004), and according to their profiles, it is most common among infants of disorganized hostile/self-referential mothers.

Next, some D children were observed aimlessly wandering, rather than engaging with their mothers. This often replaced settling into play, and it took on many forms. One child walked in circles near his mother, whereas another ran back and forth between her mother and the door. Wandering behavior was also identified as Main and Solomon (1990), and they view it as an indicator of disorientation. Along with active avoidance and wandering behaviors, D infants generally engaged in little nonverbal involvement. They rarely made sustained eye contact or sought age-appropriate physical contact. Although some infants certainly sought out their mother when distressed, they often stopped short of a full approach, as described above under “child responsiveness.”

As has been described in detail by Main and Solomon (1990), D infants were observed engaging in both simultaneous and sequential approach/avoid behavioral patterns. An example of a simultaneous contradictory behavior pattern is a child who crawled away from his mother backwards. A sequential contradictory behavior pattern could be a child walking toward his mother and orbiting away once getting close. Such contradictory behavioral patterns are often seen as a hallmark of disorganization, for a parent’s frightening behavior is thought to evoke conflicting drives for the infant (DeOliviera et al., 2004; Hesse & Main, 2000). Specifically,

when distressed, a D infant experiences an arousal of his attachment system and is motivated to seek the caregiver, yet he also is frightened of the caregiver, which motivates him to avoid the caregiver (Hesse & Main, 2000). Thus, when an infant shows contradictory patterns of approach and avoid, this is an indicator of disorganization.

In regard to elaborative involvement, D infants rarely elaborated exchanges with their mothers. For example, one infant rolled a toy bus toward his mother, then stopped playing, stood up, and walked around to her back. This lack of elaboration appeared to be due to a few potential reasons. First, some mothers were intrusive and showed minimal structuring, which made it difficult for children to elaborate. Next, some D infants seemed to struggle to become fully engrossed in play, possibly due to high internal stress (Beebe et al., 2012; Spangler & Grossman, 1999). Finally, many D infants also actively avoided their mothers, which limited possibilities for involvement and playful elaboration. All of this makes sense, given that D mothers struggle to respond contingently to their infants (Beebe et al., 2012; Lyons-Ruth & Spielman, 2004).

Another theme seen within child involvement was aggressive behaviors. Some D infants swatted or hit at toys, especially when the mother offered them. Another child raised his hand to throw a toy, looked at his mother, and then threw it near her. Later, he was observed driving a toy truck into a wall repeatedly. Some of these behaviors can be considered resistant behavior toward the caregiver (Lyons-Ruth & Spielman, 2004), and these may overlap with some of the resistant behavior seen in insecure-anxious infants (Ainsworth et al., 1978). However, other behaviors appeared to have more of a ritualistic quality to them, such as the child driving a truck into a wall repeatedly (Hesse & Main, 2000). Such ritualistic behaviors seem to overlap with some indicators of physical dysregulation, such as a banging his head on the wall or rolling around on the floor.

Finally, some D infants involved other adults *at the expense* of interacting with their own mothers. For example, during the SSP, one child repeatedly showed toys to the stranger in the room, yet never brought toys to her mother. This pattern of behavior was particularly problematic when the child was also distressed by the stranger leaving the room, or when a child could be soothed by the stranger but not his mother (Main & Solomon, 1990).

Suggestions for coding. The themes presented in Table 7 and described here are intended to help coders using the EA Scales and EA-Z identify disorganized dyads. Some D coding systems, such as that used in conjunction with the SSP (Ainsworth et al., 1978; Main & Solomon, 1990), use a threshold system, in which a certain number of D behaviors leads to a child being classified as disorganized. However, the EA system, as a whole, does not rely on behavior counts when coding adult and child scales or attachment zones. Thus, these themes are meant to provide clues to the overall quality of the caregiver-child relationship and attachment. EA coders should *not* rely entirely on specific themes to assign a problematic EA-Z zone, for such a micro-analysis could lead to “losing sight of the forest for the trees.” Rather, the coder should examine the relationship as a whole, considering all the themes observed holistically. A coder may ask the question, “is this relationship functioning in a way that meets the child’s attachment needs?” or “can this child use his/her caregiver to resolve his/her distress?”

Nevertheless, there are certain behaviors that provide strong evidence of disorganized attachment, such as a child hiding from the caregiver upon reunion (Main & Solomon, 1990). The final portion of Table 7 describes some of the stronger indicators seen in this study, and many of these overlap with those described by Main and Solomon (1990). However, this study did not have a large enough sample to reliably identify these strong indicators. Therefore, coders should also study other D coding systems, such as that by Main and Solomon (1990), the

AMBIANCE coding system (Bronfman et al., 1993), and the FR coding system (Hesse & Main, 2006; Main & Hesse, 1992) in order to gain a more in-depth understanding of disorganized attachment and its signs.

Finally, as described above, an observational context that combines both play and a stressful situation may be most conducive to identifying disorganized/problematic caregiver-child dyads. Stressful situations activate the attachment system (Ainsworth et al., 1978), which allows coders to observe a child's ability to effectively use this system. Play contexts, however, offer more detailed information about the adult's ability to structure and permit autonomy, and they may offer clues as to the development of a child's attachment zone (Abrams, 2000; True et al., 2000). Thus, whenever possible, researchers and practitioners using the EA system should observe dyads in both types of contexts or a combined context.

Limitations. This study contains some notable methodological limitations. First, the sample size used was fairly small, with only 50 mother-child dyads observed. This may have restricted power, making it difficult to identify long-term relations between attachment at 15 months and child outcomes at 36 months. Next, the data used were from the early 1990s. Cohort effects, cultural changes in parenting styles, and research methodologies may have changed since then. Also, a large majority of families were Caucasian. These two limitations make it difficult to generalize these findings to the current population of parents and children in the U.S. Despite this, a notable strength was geographical and economic diversity; the cases used in this study came from seven sites across the U.S., and the SECCYD investigators intentionally recruited socioeconomically diverse participants.

Further, all videos were single-coded by the first author over the course of one week, and double-coding was not possible. Although the coder conferenced challenging cases with

supervisors, it was not possible to check reliability with only one coder. Fatigue and bias may have negatively impacted the validity of the EA-Z and EA Scale codes. Nevertheless, it should be noted that the coder is highly experienced in the EA Scales, having coded over 300 videos in a wide range of cultural contexts and age groups. In general, studies using the EA Scales and EA-Z should always attempt to establish inter-rater reliability, and whenever possible, should use double coding to ensure the validity and reliability of codes. Finally, the SSP was coded immediately following the Three-Bag task for that same dyad. This design was chosen in order to see whether a play observation could aid the coding of the SSP. It means, however, that this study cannot speak to the value of coding the SSP as a standalone context.

Conclusions and implications. Despite a wealth of research on disorganized attachment and its deleterious effects on child development (e.g., Beebe et al., 2012; Fearon et al., 2010; Lyons-Ruth et al., 2004; Madigan et al., 2006; Main & Solomon, 1986; 1990; van IJzendoorn et al., 1999), there remain challenges in accurately identifying D attachment (Lyons-Ruth & Spielman, 2004; Madigan et al., 2006). The EA system focuses on emotional expressions, dyadic affect regulation, and multiple indicators of relationship quality (Biringen, 2008; Biringen et al., 2014). Thus, the system is well-equipped to describe and identify D attachment, which can be considered a profound breakdown in parent-child emotion regulation (DeOliviera et al., 2004).

However, few studies, to date, have successfully used the EA Scales or the EA-Z to identify disorganized attachment and its subsequent developmental outcomes (Saunders & Biringen, submitted). The present study serves as a starting point for validating the EA-Z in classifying D children and caregivers. It also provides EA coders with a set of guidelines for recognizing D attachment so that researchers and practitioners alike can gain a better understanding of this phenomenon. As the EA Scales and EA-Z continue to be validated for this

purpose, these tools can serve multiple purposes. Researchers using the EA system will be better equipped to examine disorganized attachment in their own studies. Also, practitioners can use the EA System in everyday assessment contexts in order to screen for insecure or disorganized attachment in order to target mental health services to families, as needed. Thus, continued research is warranted to continue examining these questions and to use such findings to inform such research, prevention and intervention programs, and clinical practices.

Tables

Table 1. *EA Scales, EA-Z, and Corresponding Attachment Styles*

Sensitivity/Responsiveness	EA-Z Score	EA-Z Zone	Attachment Style
6.5 – 7	100	Emotionally Available	Secure
6 – 6.5	95		
5.5 – 6	90		
5 – 5.5	85		
5 – 5.5	80	Complicated	Insecure-Resistant/Ambivalent
4.5 – 5	75		
4 – 4.5	70		
3.5 – 4	65		
3 – 3.5	60	Detached	Insecure-Avoidant
3	55		
2.5 – 3	50		
2.5	45		
2.5	40	Problematic	Insecure-Disorganized
2 – 2.5	35		
2	30		
1.5	25		
1 – 1.5	15		
1	10		

Table 2. *SSP-based child EA-Z attachment zone and SSP-coded attachment style*

Attachment Style from SSP Coding	EA-Z Attachment Zone from SSP				
	Emotionally Available	Complicated	Detached	Problematic	Total
Secure	7	2	2	3	14
Insecure-Anxious	0	6	0	1	7
Insecure-Avoidant	0	0	4	0	4
Insecure-Disorganized	5	1	0	19	25
Total	12	9	6	23	50

Table 3. SSP-based mother EA-Z attachment zone and SSP-coded attachment style

Attachment Style from SSP Coding	EA-Z Attachment Zone from SSP				
	Emotionally Available	Complicated	Detached	Problematic	Total
Secure	6	4	2	2	14
Insecure-Anxious	0	5	0	2	7
Insecure-Avoidant	0	1	3	0	4
Insecure-Disorganized	5	1	0	19	25
<i>Total</i>	11	11	5	23	50

Table 4. Three-Bag-based child EA-Z attachment zone and SSP-coded attachment style

Attachment Style from SSP Coding	EA-Z Attachment Zone from Three-Bag Task				
	Emotionally Available	Complicated	Detached	Problematic	Total
Secure	4	2	6	2	14
Insecure-Anxious	1	3	2	1	7
Insecure-Avoidant	1	1	2	0	4
Insecure-Disorganized	7	2	3	13	25
<i>Total</i>	13	8	13	16	50

Table 5. *Three-Bag-based mother EA-Z attachment zone and SSP-coded attachment style*

Attachment Style from SSP Coding	EA-Z Attachment Zone from Three-Bag Task				
	Emotionally Available	Complicated	Detached	Problematic	<i>Total</i>
Secure	4	7	2	1	14
Insecure-Anxious	0	5	0	2	7
Insecure-Avoidant	0	3	0	1	4
Insecure-Disorganized	6	5	1	13	25
<i>Total</i>	10	20	3	17	50

Table 6. *SSP-based child EA-Z Zone and 36 month Modified SS attachment style*

Attachment Style: Modified SS at 36 months	EA-Z Attachment Zone from SSP 15 months				
	Emotionally Available	Complicated	Detached	Problematic	<i>Total</i>
Secure	8	8	5	16	37
Insecure-Ambivalent	1	1	1	4	7
Insecure-Avoidant	2	0	0	1	3
Insecure-Controlling/Other	0	0	0	2	2
<i>Total</i>	11	9	6	17	49

Table 7. Themes derived from observations of disorganized mother-infant dyads, organized by EA Scales.

Scale	Description of Theme	Examples
Adult Scales		
Sensitivity	<i>Low affect</i> ; shut-down, helpless, depressed, withdrawn, stony, still, wooden, dissociative	<p>Mother sounds flat, interaction seems deadened. Cannot see mom’s eyes because she looks down.</p> <p>Mother sits still like a statue, dissociates (zones out)</p>
	<i>Hostile affect</i> ; angry, tense, hostile, on edge, stressed, irritated, cold	<p>Mother backs up suddenly with a cold look on her face, her face starts to form into a snarl but stops herself upon noticing camera.</p> <p>Mother rolls her eyes, calls child grumpy, pouts, smirks, and appears annoyed.</p> <p>Mother glowers at child, appears angry from start.</p>
	<i>Affective errors</i> ; face and vocal tone do not match, shifts in affect, fails to match child’s affective expressions.	<p>Mother laughs or grins when child cries or is afraid.</p> <p>Vocal tone is sweet but mother’s face shifts into annoyance.</p> <p>Face is flat, yet voice is sweet-sounding. Face slips into harsh or annoyed, then back into neutral frequently.</p> <p>Mother smiles with mouth but eyes are flat or angry.</p> <p>Raises voice toward child angrily, then smiles at him.</p> <p>Mother seems pleased at evoking child distress – smiles when told to leave room, says goodbye happily.</p> <p>Mother says “good girl” with flat facial expressions.</p> <p>Mother appears angry yet pulls child in for a kiss.</p> <p>Mother’s face appears “contorted,” smile has grimace-like quality.</p> <p>When child is upset, mother offers peekaboo, smiling. Then she suddenly backs her face away and her eyebrows raise,</p>

		<p>face turns stone cold flat. She sets the child down and walks away.</p>
	<p><i>Overtly rebuffs approach, enforces physical distance</i></p>	<p>Child, distressed, approaches mother for a hug. Mother turns the child around and hands her a toy. Child brings a toy to the mother, who says, “wow, this is for me?” and then immediately sets it down. Child reaches to mother to be picked up, mother turns him around. Mother places child on her lap facing away, or on edge of lap. When child gets close, mother redirects her toward a toy.</p>
	<p><i>Intolerant of distress; when child expresses distress, caregiver may seem uncomfortable, flinch, show anger, be confused, glare.</i></p>	<p>Mother distracts child with toys when child is crying and does not offer physical or verbal comfort. Mother glares at child when he fusses, and says “oh, you’re okay.” Mother flinches when child whines. Mother says, “what’s wrong?” and rolls her eyes when child cries. Mother says, “Now what was so traumatic about that, exactly?” Mother calls child grumpy when he cries. When child is distressed post-separation, mother says, “what’s wrong? There are so many toys to play with” Following separation, mother picks child up and says “come on,” impatiently, then sets him down, saying “go play, go play.” Post-separation, child cries, and mother says in a confused tone, “I just don’t understand, I just don’t understand.”</p>

		<p>Mother waits a beat to pick up child when child is crying, and she appears hesitant to offer direct soothing</p> <p>Child fusses and mother says, “come on” and pats his back. She sets him down, gently pushes him away, and tells him to play.</p> <p>“Oh my goodness, how horrible, can you play with the toys?”</p> <p>Post-separation, mother says, “You all better? Goodness, I just walked out of the door for a minute, sleepyhead.”</p> <p>Child is crying, and the mother gives a fake pout and says “oh my” with lips pursed. She looks annoyed and sets the child down.</p>
	<p><i>Unpredictable responsiveness or lapses in engagement; random or erratic, uncertain about what child needs/wants, lapses in engagement, struggles to understand child cues, may be dissociative. Tends to be most obvious during moments of child distress.</i></p>	<p>When playing with child, mother suddenly sits up straight and has a stiff/stony look on her face.</p> <p>Mother seems to be moving through water.</p> <p>Mother startles when child swings toy, and then goes back to sitting still. Child falls over and mother does not respond.</p> <p>Mother seems to use trial and error to engage child. She engages, then sits back to watch silently, then re-engages again.</p> <p>Child throws toy, and mother says, “wow, be nice.” Child becomes upset. Mother offers child a high five.</p> <p>Mother is completely silent when child is uncertain or upset.</p> <p>Mother appears helpless and passive, and the child seems to have most of the control.</p> <p>Mother is entirely unresponsive one moment and is suddenly laughing and smiling the next moment.</p> <p>Mother offers inaccurate or halfhearted explanations of child’s distress and appears confused and irritated, saying “he’s tired,” or, “he gets like this when he’s thirsty.”</p>

		Mother gives command to child, “give him a kiss,” then says “stop” when child does it again.
	<i>Odd postural movements</i> ; physical touch seems unnatural or lacks true affection, “looming” toward child, attack-like posture	Mother’s arms encircle child as they play, yet she never makes physical contact with him. Mother crouches/squats near child in a “ready to pounce” position. Mother has “looming presence, moving upper body away from child, then suddenly toward child.
	<i>Shifts in vocal tone or volume that are unpredictable, disruptive, and jarring</i>	Mother suddenly shouts child’s name and, “stop!” Mother repeats phrases in different volumes and intonations High pitched tone that has an anxious or fearful quality to it, paired with inability to stay engaged. Abrupt shifts from soft/flat tone to overstimulating in child’s face.
Structuring	<i>Random structuring that fails to build</i> ; parent does not build on what child is doing or create a storyline	Mother repeats “look” over and over again and seeks child’s attention by presenting a series of toys in quick succession. Mother holds things up for child without words. She only provides help when child verbally asks for it. Mother jumps into play at random points and fails to construct storyline or logical structure.
	<i>Structuring is limited</i> ; direct commands, questions, simple actions with no teaching, parallel play, imitates child.	Mother says, “good job” or “what’s that?” repeatedly during play. Mother imitates child’s play and does not add anything Mother offers basic labels and phrases in play, yet child is not engaged. Child appears to be responsible for structure.
	<i>Inconsistent engagement</i> ; caregiver checks in and out periodically, which leaves child on his/her own	At start of play, mother overstructures by holding child on her lap and reading a book to him. Later, she sits back and watches; when child drops a toy and needs help, she simply says, “uh oh.”

		Mother vacillates between “checked out” and engaged and overbearing throughout interaction.
	<i>Flipped hierarchy or signs of role reversal; often seen through posturing, or caregiver uses self-referential language</i>	<p>Child climbs onto chair, and mother looks up at her from the floor.</p> <p>“You don’t want anything to do with me, do you?”</p> <p>“Can mommy try some?”</p> <p>“I like this, even if you don’t.”</p> <p>“Now you’re gonna reprimand me, aren’t you?”</p> <p>“Aren’t you gonna feed momma some?”</p>
Non-intrusiveness	<i>Inconsistent engagement; checks out and leaves child on own, then suddenly is overbearing</i>	<p>Mother sits back and watches silently, then suddenly re-enters play with suggestions and commands.</p> <p>Mother takes lead in play and is overbearing/overstimulating, then after a while leans back to sit and watch silently.</p>
	<i>Vocalizing without attending to child’s response; commands, questions, comments. Fails to tune into child’s perspective</i>	<p>Mother talks to child as he plays and asks questions, and although the child does not respond verbally or nonverbally, she persists.</p> <p>Interaction seems to be characterized entirely by mother’s commands and instructions.</p> <p>It seems like the mother is talking to empty air; she does not tune into child’s response or lack thereof.</p>
	<i>Distance is not due to exploration/ autonomy, but instead is intentionally created by caregiver/child. By child, can be active avoidance, fear-based, disorientation, or reaction to intrusiveness.</i>	<p>Child becomes frustrated by mother’s overstimulating behavior and crawls away repeatedly to play on own.</p> <p>Child brings mother with a toy, mother throws it away from her.</p> <p>Child brings mother a toy, and mother leans back and is silent.</p> <p>Child wanders in and out of room.</p>

		<p>Child hides behind chair during play.</p> <p>Whenever child comes close to mother, mother directs her away.</p>
	<i>Physical intrusiveness in attempt to control behavior</i>	<p>Child starts to get up to greet another adult and mother drags child toward her by his shirt, saying, “where are you going?”</p> <p>Mother holds child on her lap and pulls him by his shirt when he tries to move away.</p> <p>Mother pulls child off of a couch by his legs.</p>
	<i>Intrusiveness/controlling behavior paired with hostility</i>	<p>Child hears doorbell and stands up, mother says “come here” with angry tone and clenched jaw. She grabs child by arm to pull him.</p> <p>Mother becomes annoyed when child stands up during play</p> <p>Mother uses many commands and puts toys in child’s face, saying “what’s this?” Mother tells child, “close it, see if you can close it” in an impatient, tense tone.</p>
Non-hostility	<i>Mocking/ridiculing child</i>	<p>“Grumpy grump.”</p> <p>“You little rascal, you baby you.”</p> <p>“Ew, gross” when wiping child’s nose after he cries.</p> <p>Mother laughs at child’s distress or fear.</p> <p>“Look at those tears, oh those tears” in a low, mocking tone.</p>
	<i>Critical statements; explains child’s behavior in a critical manner, complains about what child does</i>	<p>“He just melts down when he’s thirsty”</p> <p>“You’re a tired boogie, it’s too early for you to be tired.”</p>

		<p>“Can you show me your school bus, it’s over on its side because you threw it.”</p> <p>“You’re just making a big old mess, huh”</p> <p>“My goodness, you’re noisy”</p> <p>“I see something on your nose that I don’t like, icky poo”</p>
	<i>Attributing negative intentions/malice to child</i>	<p>“Look at those crocodile tears.”</p> <p>“Now you’re gonna reprimand me, aren’t you?”</p> <p>“What’s that look for?”</p> <p>“You’re not gonna let me sit down are you?”</p> <p>“You don’t want anything to do with me, do you?”</p> <p>(During play with a doll), “don’t beat the baby, gonna make the baby cry.”</p>
	<i>Predatory-like behavior</i>	<p>“I’ll get you. What would you do if I get you?” and approaches child with a toy that had previously scared him. Moves toy toward child, saying “he’s gonna getcha.”</p>
	<i>Flashes of anger, irritation, displeasure</i>	<p>Mother looks at child with daggers in her eyes.</p> <p>Mother’s face shifts from flat to harsh/sinister.</p> <p>Mother glowers at child.</p> <p>Mother seems impatient and put-out.</p>
	<i>Frightening or frightened behaviors</i>	<p>Mother chooses toy that previously had scared the child and pushes it toward child.</p> <p>Mother’s head is down and she stares off into space.</p> <p>Mother sits still like a statue and startles suddenly when the child swings a toy around.</p> <p>High pitched tone that has an anxious or fearful quality to it</p>

Child Scales		
Responsiveness	<i>Shifts in affect that are out of context or generally odd; vacillation between overregulated and underregulated;</i>	<p>Child is easily dysregulated. He whines frequently and randomly, with no apparent reason or trigger.</p> <p>Child laughs at times, but it has a fearful tone to it. He also growls at mother. Otherwise, his affect is flat.</p> <p>Child smiles and giggles at start, but then becomes unresponsive emotionally. He looks at his mother with mild disgust on his face.</p> <p>Child yells suddenly when he needs help with a toy</p> <p>Post-reunion, mom sets child down and child runs to the door. He collapses to the floor and starts to cry, hitting his hands on his legs. He makes short loud shrieks, and puts a toy in his mouth.</p> <p>Child shrieks in fear when mother approaches her, then a few seconds later she turns around to smile at mother.</p> <p>Child's affect is stony, with minimal expression.</p> <p>Child growls at mother, then shrieks, then fusses. Giggles some, then when mother comes near he shrieks again.</p>
	<i>Crying that is sustained; distress makes child seem vulnerable; wailing that lasts ~30 or more seconds</i>	<p>Child cries with mouth wide open for about 40 seconds, and he cannot calm down until distracted.</p> <p>Child seems vulnerable and cries with no direction, seems to cry "to the room."</p> <p>Child screams with mouth wide open, yet little sound comes out.</p> <p>Child cries/wails for a full minute without moving.</p>
	<i>Positive affect is not shared</i>	<p>Mother smiles and child rarely/never matches smile</p> <p>Child's affect is solemn, she shows little enjoyment.</p>

	<p><i>Dissociative or fearful; wide-eyed, startle response, glazed stare, dazed-seeming. Child does not seek comfort from caregiver when afraid.</i></p>	<p>Post-separation, child appears dazed as mother brushes his hair.</p> <p>After seeing a toy that startles her, child backs up, puts hand in her mouth, and crosses her arms close to her chest.</p> <p>Child backs away from mother, her eyebrows go up and eyes widen. She turns around to look at the door, then turns back toward mom with her hands in her mouth.</p> <p>When a door opens, child startles with wide eyes and then halts her approach toward mother.</p> <p>When mother returns from separation, child looks up with wide eyes and puts her hand on the researcher's arm.</p> <p>Mother is offering physical comfort to child; he turns head away with a mouth agape, tongue slightly sticking out, and wide eyes.</p> <p>Child appears hypervigilant/uncertain, yet does not seek mother.</p>
	<p><i>Does not seek soothing or cannot be soothed for extensive period of time;</i></p>	<p>Child is upset by separation and has lost bodily control, falling to ground, crying. Mother enters and child walks toward her while rubbing his eyes. She picks him up yet he keeps wailing. He calms down some and mother sets him on the floor, but then he randomly starts to cry again and continues crying for several minutes, despite attempts from mother and researcher to calm him. He calms down eventually, yet continues to make crying-sounds and fussing slightly.</p> <p>Upon reunion, child stands up with wide eyes but does not move toward mother.</p> <p>Upon reunion, child stands up and walks toward mother, yet stops 3 feet away. Child does not reach to her and then walks around mother to door. Mother reaches to child and child rejects her.</p>

		<p>Child has been crying during separation, yet when mom enters the child does not move. Child does not reach for mother but allows herself to be picked up. She stops crying briefly, then starts again.</p> <p>Child gives a high-pitched scream that is almost inaudible during separation. When mother comes in the room, he stops shrieking but keeps fussing. He walks toward her and puts his head down. Mother picks child up and he averts his head, points to the door, and starts shrieking again. When she sets him down he rolls onto his knees, stands up slowly, and stumbles toward door. He turns around and screams at mother, and when she picks him up he screams again. He wanders around room, wailing. He arches his back when mom tries to pick him up again. He has been screaming for about two minutes. Child backs into corner away from mother.</p>
	<p><i>Physical dysregulation</i>; rubbing eyes, arching back, collapsing to ground, part of body gets “stuck” or does not move with the rest, losing control of body.</p>	<p>When upset, child runs in place, reaches to mom, sits down, rolls onto floor on stomach and kicks his legs, crying into the floor. Then, he runs into the wall and slams his arms into it, crying.</p> <p>Child bangs head on door when distressed.</p> <p>Child throws toys, collapses to ground and rolls around. He rolls onto back and stares at ceiling, then rolls around repeatedly before crawling away from mother.</p> <p>Child is upset and mother picks her up, child rubs her eyes and continues fussing. When mother puts her down, child cries, kicks legs, collapses onto her back, and rolls away from mother. Mother helps child stand, and child continues to fuss with her hands in her mouth. She collapses to her knees and puts hands over her eyes.</p> <p>Child’s breathing is shallow.</p>

		<p>Researcher helps child stand up and child's legs do not reach to ground, as if they are nonfunctional, child looks down, notices, and sets feet on ground.</p> <p>Despite being able to walk previously, child crawls around on hands and knees when distressed.</p> <p>Mother offers child a hug and he turns his head and suddenly falls out of her arms.</p> <p>Mother has child on her lap and child arches her back, flays her arms out, cries, and rubs her eyes.</p> <p>When mother returns from separation, child takes one step toward her and then collapses to ground.</p>
	<p><i>Protests proximity or physical contact; retracts from caregiver's touch, squirms away, fusses upon physical contact, arches back when in caregiver's lap, arms held stiff out to side when on caregiver's lap.</i></p>	<p>Child squirms off of mother's lap and kicks her legs.</p> <p>Child tries to squirm away from mother repeatedly, while crying and arching his back. When mother picks him up, he collapses.</p> <p>Mother reaches toward child and child shakes her head "no."</p> <p>Mother pulls child onto lap, child has her arm stuck out to the side and attempts to move away. Child looks at researcher solemnly.</p> <p>When mother comes close physically, child seems to retract and stiffen. Her arms are held stiff to her side, and she protests mildly.</p> <p>Mother goes in for a kiss and child turns head away.</p>
	<p><i>Passive responsiveness; complies with caregiver yet does not respond emotionally;</i></p>	<p>Child is somewhat responsive to commands yet is not engaged and prefers to play on her own.</p> <p>Mother gives frequent commands and child is compliant, yet child has a flat affect and does not elaborate with mother.</p>

Involvement	<i>Actively avoids or creates distance; crawling/walking away repeatedly, attempting to leave room, has back toward mom frequently</i>	<p>Mother moves toward child and he backs away.</p> <p>Child runs away and out of room when in mother's presence.</p> <p>Child plays far from mom, shrieks at her, and throws toys at her.</p> <p>Child frequently plays with back facing toward mother</p> <p>Mother hands child a toy and child swats at it. Child then backs up to a distance, puts a toy in her mouth, and crouches on the floor.</p> <p>Child repeatedly tries to leave room, mother carries him back toward toys and he starts to fuss and returns to door. He collapses upon reaching the door, turns around to face mom, with back arched. Mother walks toward him to pick him up and he cowers and turns around to face the door.</p>
	<i>Involves another adult while also avoiding caregiver</i>	<p>Child makes more eye contact with researcher than with mother.</p> <p>Child smiles and looks at researcher yet runs away from mother.</p> <p>Child shows toys to researcher and not to mother.</p>
	<i>Aggressiveness toward caregiver or objects</i>	<p>Child kicks mother's legs when she holds him on her lap</p> <p>Child throws, hits, and swats at toys</p> <p>Child growls at mother and when mother hands him toys, he swats at them or pushes her arm away.</p> <p>Child hits herself with a toy hammer, then hits toys with hammer.</p> <p>Child raises hand to throw toy, looks at mother, then throws it near her. Later, he drives a toy truck into the wall repeatedly.</p>

	<p><i>Little nonverbal involvement;</i> no eye contact, not seeking physical contact</p>	<p>Child looks at mother at first, yet over time stops. Child makes no eye contact during play, is positioned far away from mother, and does not talk much. Child makes little eye contact and avoids physical contact.</p>
	<p><i>Wandering behavior;</i> moving aimlessly around room, pacing or circling</p>	<p>Child wanders in and out of room. Child walks in circles near mother. Child runs back and forth between mother and door. Child wanders aimlessly around room, does not settle into play.</p>
	<p><i>Minimal elaboration with caregiver;</i> not permitted by caregiver's behavior, child also may struggle to engage fully in play, child may prefer distance and thus elaborate minimally</p>	<p>Child sits on floor with toys, looking around. He grabs toys but does not play, only picks them up and sets them back down again. Child appears interested in a book, yet does not settle in to look at it. She seems to be avoiding proximity with mother. Eventually, child sits down two feet away from mother with different toy. Child is content to play on his own and does not appear interested in interacting with the mother. He responds to some of her bids yet does not elaborate on them. Child halfheartedly rolls a toy bus in mom's direction, then stops playing and walks around the mother to her back.</p>
	<p><i>Simultaneous approach and avoid;</i> approach and: going to parent's back, moving toward caregiver backwards. Or child's body faces toward caregiver but head/face is faced away, upper body facing away and lower body facing toward.</p>	<p>Mother picks up child when he is crying, and he turns his head away from her repeatedly. After multiple incomplete approaches, child finally goes toward mom yet approaches from her back. Child crawls away from mother backwards. As mother holds the child in her arms, one of his arms touches her and the rest of his body faces away from her.</p>

	<p><i>Sequential approach and then avoid, or an incomplete approach; moving toward caregiver, followed by: orbit, freezing in place, stopping and turning around, falling/collapsing, moves toward in stops and starts, hands caregiver toy and quickly moves away.</i></p>	<p>Child walks toward mother and, when about a foot away, he orbits away. This happens multiple times.</p> <p>Child moves toward mom and then circles away, then goes back again with a toy and leaves it at her feet before immediately walking away.</p> <p>Child steps toward mom, stops, steps toward her, stops again, and then walks to the side of mom's chair.</p> <p>Child moves toward mom and freezes three feet away for a couple seconds, then starts walking again. When mother picks her up, she looks up at ceiling and rubs her eyes.</p>
<p>Strong indicators on child side:</p>	<p><i>Child can be soothed by stranger but not parent</i></p>	<p>Child cries and screams until researcher engages him, then he calms down. Mother does not soothe him.</p>
	<p><i>Child protests when another adult leaves, but not when parent leaves</i></p>	<p>Child has wide-eyes when mother returns and refuses physical contact, and then when the stranger leaves, the child cries.</p> <p>When a researcher leaves the room, child runs toward the doors with a high-pitched screech.</p> <p>Child follows the researcher to the door and cries when she leaves, attempting to leave the room also. When mother comes near, child retracts and collapses backwards. Child squirms off of mom's lap and runs toward the door. She rubs her eyes and collapses again.</p>
	<p><i>Child hides, particularly in presence of caregiver</i></p>	<p>Child attempts to hide when caregiver tries to play with him.</p> <p>Child hides behind chair during play. When mother grabs her arm, the child collapses to ground.</p>
	<p><i>Child collapses when caregiver comes near/makes physical contact</i></p>	<p>Mother moves near child to direct him toward the toys and child falls to the ground.</p> <p>Child is upset and mother picks her up, child rubs her eyes and continues fussing. When mother puts her down, child cries, kicks legs, collapses onto her back, and rolls away</p>

		<p>from mother. Mother helps child stand, and child continues to fuss with her hands in her mouth. She collapses to her knees and puts hands over her eyes.</p> <p>Mother offers child hug; he turns head and falls out of her arms.</p> <p>When mother returns from separation, child takes one step toward her and then collapses to ground.</p> <p>Child has run away from mother, and when she goes to pick him up he collapses to ground and then starts to hide under a chair.</p>
	<i>Child runs/crawls/rolls away when caregiver comes near</i>	<p>Mother attempts to pick child up when he is distressed, yet he screams louder and rolls away from her.</p> <p>Mother pulls child onto her lap, child squirms off and runs away toward door.</p> <p>Mother moves toward child and child runs away.</p> <p>During play, child repeatedly runs away to other part of house.</p>
	<i>Child is obviously frightened of caregiver</i>	<p>Child backs away from mother, her eyebrows go up and eyes widen. She turns around to look at the door, then turns back toward mom with her hands in her mouth.</p> <p>When the mother approaches, the child shrieks in fear.</p>
Self-as-Coder Notes	<p><i>Tight or tense feeling in chest, feeling like something is “off”</i></p> <p><i>Feel uncertain or stressed, due to parent’s own stress or the unpredictability of parent’s behavior.</i></p> <p><i>If, as a coder, you are uncertain what a child’s facial expression is, imitate the face and tune into how you feel.</i></p> <p><i>May feel confused, either by parent’s behavior or by the “mismatch” between the parent and child. Parent may be attempting to interact while child continues to maintain a strict distance. They lack a “contract.”</i></p>	

Study 2: Adverse Childhood Experiences, Current Life Stress, and Child Social-Emotional Development: An American Indian Context

Introduction

As a result of centuries of systematic oppression and historical trauma, American Indian and Alaska Native (AIAN) individuals in the United States are at an elevated risk for health disparities, socioeconomic disparities, and traumatic events compared to their non-Native peers (Brockie, Dana-Sacco, Wallen, Wilcox, & Campbell, 2015; CDC, 2017; Gone, 2007; Sarche & Spicer, 2008). Young children may be especially vulnerable to these risks and disparities, particularly because parents' childhood traumatic experiences and ongoing stress can negatively impact family functioning and child development (Belsky et al., 2009; Brown & Ash, 2017; Grant et al., 2003; Schleuter et al., 2017). At the same time, however, cultural and family values and practices can serve as protective factors for young children and their families (LaFromboise et al., 2006; Sarche et al., 2009; Sarche, Tafoya, Croy, & Hill, 2016).

Further research in this area can help to elucidate the developmental pathways that lead to maladaptation or resilience for AIAN parents, children, and families who have been exposed to stress and adversity (Cicchetti, 1993; Sroufe & Rutter, 1984). The present study uses three waves of data in order to examine the mechanisms by which parents' childhood adversity and current life stress influence their child's social-emotional outcomes.

Theoretical frameworks. A central goal of developmental psychopathology is to examine patterns of adaptation, both positive and negative, among at-risk individuals and families (Cicchetti, 1993; Sroufe & Rutter, 1984). Using this framework, researchers are motivated to examine not only the outcomes associated with various levels of risk, but also the

mechanisms that lead to such outcomes (Cicchetti, 1993). Further, risk and protective factors are viewed not as static variables, but instead as dynamic and adaptive processes that interact over time (Masten, 2014). Therefore, this framework calls for a consideration of multiple variables across time in order to adequately examine pathways to resilience or maladaptation.

Across studies of risk and resilience, the experience of strong and supportive relationships has consistently emerged as a powerful protective factor (Masten, 2014). This finding is consistent with the central tenets of attachment theory (Bowlby, 1969; 1973), which highlight the importance of early caregiving experiences to personality development and mental health. From this perspective, an individual who experiences warm, sensitive, and consistent caregiving as a young child is likely to develop a secure attachment, which then contributes to a positive sense of self, trust in others, and a greater capacity to cope with stress (Ainsworth, 1969; 1973; Bowlby, 1969; 1973; Bretherton, 1990; Sroufe, 2000). Indeed, many studies have shown the long-term positive outcomes of secure attachment, as well as the protective nature of such a bond (e.g., Alink, Cicchetti, Kim, & Rogosch, 2009; Groh et al., 2017; Sroufe, 2000).

The vast majority of research on attachment theory has been conducted among samples with low (or no) representations of American Indian families (McShane & Hastings, 2004), which likely limits the generalizability of conclusions drawn from these studies to AIAN cultural groups. Further, studies examining risk and resilience in AIAN populations (e.g., Frankel et al., 2014; LaFromboise et al., 2006; Sarche et al., 2009; Sarche et al., 2016) often identify social support for parents, native cultural values, and cultural practices as prominent protective factors. This suggests that broader community and cultural factors may play an important role in promoting the resilience of AIAN children and families. Therefore, it is important to maintain a systemic view of child development that considers not only children's relationships with their

primary caregiver(s), but also the broader cultural context within which they live, particularly for AIAN children and families (Bronfenbrenner, 1993, McShane & Hastings, 2004).

Taken together, developmental psychopathology, Attachment Theory, and ecological models can provide guiding principles to studying risk and resilience among families living in an American Indian context. The current study will use this combined framework in order to examine developmental trajectories from parents' early life trauma and current life stress to their child's functioning among a largely AIAN sample, using three waves of data. Parent-child relationship quality will be examined as a mediator and moderator of these pathways. Results will provide valuable insight into the pathways to positive and negative adaptation among AIAN families exposed to trauma, social-related stress, and financial strain, and this insight can inform further research, as well as prevention and intervention efforts.

Social, economic, and health disparities. Due to a long legacy of oppression and trauma, AIAN individuals in the United States face striking social, economic, and health disparities (CDC, 2017; Gone, 2007; Sarche & Spicer, 2008; U.S. Census Bureau, 2010). AIAN communities experience the highest rate of poverty among any other race in the U.S., as well as limited educational opportunities and high unemployment (CDC, 2013; 2017; National Center for Educational Statistics, 2016; Sarche & Spicer, 2008; U.S. Census Bureau, 2010). Moreover, risk factors, such as community violence and trauma, limited access to healthcare, and historical trauma, all contribute to disproportionate rates of physical and mental health problems among AIAN individuals (CDC, 2013; 2017; Sarche & Spicer, 2008). These socioeconomic and health disparities often contribute to higher levels of life stress for AIAN individuals and families. And, as shown in studies with other populations, chronic stress can lead to poor mental health outcomes for adults, as well as compromised parenting practices that negatively impact child

development (Danese & McEwen, 2012; Guajardo, Snyder, & Peterson, 2009; Gutermuth Anthony et al., 2005; Yates, Egeland, & Sroufe, 2003).

Although young children are especially vulnerable to these risk factors and disparities, various cultural beliefs and practices that are shared across AIAN tribes can provide protection against such risk (Best Start, 2010; Sarche et al., 2016). Most AIAN cultures believe that children are sacred gifts from the creator (Sarche & Spicer, 2008). As such, throughout their lifespan, many AIAN children experience practices and beliefs that ground them in their culture and community, offer guidance, and create a sense of belonging and cultural identity (Markstrom, 2008; Peacock, 2002; Sarche et al., 2016).

Further, research among AIAN communities has identified several other protective factors for individuals and families who have experienced adversity. These include: extended family ties, warm and supportive parent-child relationships, community support, a future orientation, traditional values, and identification with one's native culture (Evans-Campbell, 2008; Harrison, Wilson, Pine, Chan, & Buriel, 1990; LaFromboise, Hoyt, Oliver, & Whitbeck, 2006). Nevertheless, much of this research has been conducted among adolescents or adults. In order to have the greatest impact on child and family resilience, it is important to continue examining the protective factors that can be fostered early in life (Nation, 2003; Masten & Gewirtz, 2006). Therefore, this study will examine some of the developmental processes that contribute to positive or negative outcomes for young AIAN children.

Adverse childhood experiences. The experience of multiple traumatic events during childhood poses a significant risk for physical and mental health problems during adulthood, as well as an unresolved state of mind (Chapman et al., 2004; Danese & McEwen, 2012; Edwards, Holden, Felitti, & Anda, 2003; Felitti et al., 1998; Murphy et al., 2014). The Adverse Childhood

Experiences (ACEs) survey (Felitti et al., 1998) asks participants about the direct experience of abuse or neglect and other forms of relational trauma, including witnessing substance abuse or interpersonal violence. Participants receive an “ACE score” ranging from zero to 10, based on the number of experiences they report on the survey (Felitti et al., 1998).

In a mostly Caucasian, large community sample, over 60% of participants reported experiencing at least one ACE, and approximately 10% reported four or more ACEs (Felitti et al., 1998). Despite limited research on ACEs in AIAN communities, there is significant diversity in the prevalence of early trauma. A study with adolescents and young adults from one remote plains reservation community showed that almost 75% of individuals experienced one or more ACEs, and almost 25% had experienced four or more (Brockie et al., 2015). In this study, however, the questionnaire was adapted to be more culturally sensitive; certain items were removed and items regarding historical loss and discrimination were added. Another study of AIAN women who were incarcerated demonstrated that 81% had experienced at least two ACEs (De Ravello, Abieta, & Brown, 2008). Finally, a study that sampled older AIAN adults living in Midwestern states found that approximately 75% of individuals experienced at least one ACE and over 30% experienced four or more ACEs (Roh et al., 2015). Therefore, despite variability among communities, in general, the rate of adverse childhood experiences is higher for AIAN individuals than for other races. Further, it is important to note that the original survey used by Felitti et al. (1998) may not be sensitive to all cultures, and sometimes adaptations are necessary.

A wide body of literature demonstrates links between an individual’s ACE score and later health outcomes. A higher score increases the risk for physical and mental health problems during adulthood (Chapman et al., 2004; Edwards et al., 2003; Felitti et al., 1998). Among AIAN individuals, high ACE scores also pose a risk for negative outcomes during adulthood, including

alcohol dependence, multiple drug use, depressive symptoms, post-traumatic stress symptoms, and suicidality (Brockie et al., 2015; Koss et al., 2003). A greater number of ACEs also elevates the likelihood of ongoing relational challenges during adulthood (Bailey, Moran, & Pederson, 2007; Murphy et al., 2014). Research in non-Native samples also demonstrates that adults who experienced more ACEs are more likely to have an unresolved state of mind in regard to attachment, and their children are at risk for disorganized attachment (Madigan et al., 2006; Murphy et al., 2014). Overwhelming evidence, therefore, points to the long-lasting impacts of multiple adverse experiences during childhood.

Recent studies have demonstrated that parents' ACEs predict their own child's social-emotional challenges (Brown & Ash, 2017; Schleuter et al., 2017). However, further research is needed to replicate these findings, as well as to elucidate the pathways from parent trauma to child maladaptation. In line with the attachment perspective, it is possible that parents' childhood trauma contributes to an unresolved state of mind, which, in turn, leads to disorganized child attachment patterns and subsequent maladaptation (Madigan et al., 2006; Main & Hesse, 1992). Alternatively, it is possible that ACEs contribute to poorer parent mental health, which in turn, may affect child development (Chapman et al., 2004; Edwards et al., 2003; Field, 2010). However, the relation between parent mental health and child social-emotional problems is often moderated or mediated by parent sensitivity or attachment style (Feldman et al., 2009; Milan, Snow, & Belay, 2009). Therefore, further research is warranted in order to determine whether parent mental health and parent-child relationship quality mediate the relation between parents' ACEs and child social-emotional maladaptation. This line of study is particularly important within AIAN communities, due to elevated risks for trauma, stress, and mental health problems.

Current life stress. Due to social, economic, and health disparities, AIAN communities experience heightened levels of ongoing life stress and mental health problems. First, AIAN individuals and families are at risk for experiencing or witnessing community violence, homicide, suicide, motor vehicle accidents, domestic violence, or child abuse (CDC, 2003; 2013; Sarche & Spicer, 2008). Additionally, AIAN individuals are at an elevated risk for mental health disorders and social problems, including substance abuse, posttraumatic stress disorder, and suicidality (Gone & Trimble, 2012). Family and community-level stress also have implications for child development. In non-Native samples, poverty and parent stress are significant risk factors for children's negative mental health outcomes (Dearing, McCartney, & Taylor, 2006; Evans & English, 2002). Therefore, it is unsurprising that, compared to a national sample, young AIAN children show lower social-emotional competence, as rated by their caregivers (Frankel et al., 2014; Sarche, Croy, Big Crow, Mitchell, & Spicer, 2009). Further, poorer child social-emotional functioning is associated with maternal stress, substance abuse, and depressed affect, as well as lower household income.

However, in some of these same studies, mothers who report higher levels of social support and a strong identification with their tribal culture had children with greater social-emotional functioning (Frankel et al., 2014; Sarche et al., 2009). This suggests that AIAN-specific cultural and social factors may serve as protective factors, buffering against risk. Additionally, other supports within the broader family and community contexts, as well as cultural values and practices, can serve as protective factors for families and individuals (Evans-Campbell, 2008; Harrison et al., 1990; LaFromboise et al., 2006).

It is clear that AIAN communities often face high levels of risk, yet also possess unique resources and strengths to buffer against such risks. Less is known, however, about the processes

that lead to positive or negative adaptation in the face of stress. In line with previous literature in non-Native samples (Evans, Boxhill, & Pinkava, 2008; Mistry, Biesanz, Taylor, Burchinal, & Cox, 2004), it is possible that current life stress and associated mental health problems contribute to lower parent responsiveness, which, in turn negatively affects child social-emotional development. However, other research has found that positive parent-child interactions can serve to buffer the effects of family stress and parent mental health problems on child development (Belsky & Fearon, 2002; Edwards, Eiden, & Leonard, 2006; Feldman et al., 2009; Milan, Snow, & Belay, 2009). Thus, it is important to examine whether the quality of parent-child interactions serves as a mediator or a moderator of the association between parents' ongoing life stress and child social-emotional functioning. This line of research is particularly important in AIAN communities, given relatively higher levels of contextual stress and mental health, as well as gaps in our understanding of these developmental processes (Sarche & Spicer, 2008).

Emotional availability. Emotional availability (EA) refers to the capacity of an adult-child dyad to share a positive and reciprocal emotional connection (Biringen, Derscheid, Vliegen, Closson, & Easterbrooks, 2014). The term was first used by Mahler, Pine, and Bergman (1975) to describe a mother's ability to remain supportive as her child explored the environment. Emde (1980, 2000) expanded upon this definition to include the mother's ability to remain receptive to her child's emotional cues, describing EA as an "affective barometer" of the parent-child relationship (Biringen et al., 2014; Emde & Easterbrooks, 1985). The concept of EA, thus, utilizes not only constructs based in attachment theory (Ainsworth et al., 1978; Bowlby, 1969), such as sensitivity and responsiveness, but also expands these behavioral indicators to include an assessment of the emotional health of an adult-child relationship (Biringen et al., 2014).

EA is assessed using the EA Scales, which include four adult dimensions and two child dimensions, as well as the Emotional Attachment Zones Evaluation (EA-Z), which offers an assessment of attachment style (Biringen, 2008; Biringen, Robinson, & Emde, 1998). Both as a construct and as a measurement system, EA encompasses attachment-relevant qualities, such as adult sensitivity, yet it extends upon these qualities to also include other important characteristics of relationships (Biringen, 2008; Biringen et al., 1998; 2014). These other characteristics include the adult's ability to guide learning, the adult's capacity to support autonomy, absence of adult hostility, and the child's tendencies to both respond to the adult and bid for connection (Biringen, 2008; Biringen et al., 1998; 2014). Therefore, the EA construct and measurement system provides a multidimensional perspective on the overall quality of parent-child relationships.

Indeed, this multidimensional perspective is valuable in predicting child developmental outcomes and other qualities of the parent-child relationship. Not only do the EA Scales demonstrate expected relations with attachment security, but they also predict a variety of child developmental outcomes (see review by Biringen et al., 2014). During infancy and toddlerhood, higher parent-child EA predicts more adaptive sleep patterns, greater emotional regulation, and higher cognitive and language development (Licata et al., 2014; Martins, Soares, Martins, Terenod, & Osório, 2012; Moreno, Klute, & Robinson, 2008; Teti, Kim, Mayer, & Countermine, 2010). Among preschool children, higher EA is associated with fewer behavioral problems, greater social competence, and kindergarten readiness (Biringen, Skillern, Mone, & Pianta, 2005; Howes & Hong, 2008; Kang, 2005; Saunders et al., submitted). Further, many of these findings hold for the EA construct as a whole, although others are specific to certain EA dimensions (Biringen et al., 2014). This is important, for many studies examining parent-child relationship quality focus largely on singular measures of parent behavior, such as sensitivity.

The EA system provides a broad view of parent-child interactions, which permits researchers to examine overall relationship quality or specific dimensions.

Current study. The current study examines data from three time points in order to determine the roles of parent mental health and parent-child relationship quality in the transmission of parent early life trauma and concurrent life stress to child social-emotional functioning. Two main research questions will be examined:

1. Do parent mental health and parent-child EA mediate the association between parent adverse childhood experiences and child social-emotional functioning?
2. Does parent-child EA moderate the association between parents' current life stress (CLS) and children's social-emotional functioning?

I predict that parent mental health and parent-child EA will mediate the relation between parent ACEs and child social-emotional functioning (Figure 1). Specifically, a higher ACE score will predict poorer mental health, which will predict lower EA. EA, in turn, will predict poorer child social-emotional functioning. In contrast, EA is expected to moderate the relation between parents' CLS and their child's social-emotional functioning (Figure 2). Specifically, in the context of high EA, I predict that parents' CLS will have a weaker negative effect on child functioning, whereas in the context of low EA, CLS will have a stronger negative effect.

Method

This study uses a subset of variables from a larger research project, which consists of a partnership between the University of Colorado Anschutz Medical Campus and a tribal Early Head Start program that serves a large Southern plains tribe. The study was reviewed and approved by both the university IRB and the tribal IRB.

Participants. Participants were 100 parent-child dyads, or pairs, recruited from a tribal Early Head Start (EHS) program. The tribal EHS program serves many children and families who are members of a Southern plains tribe. At the first time point, participating children ranged from 8 to 25 months ($M = 16.68$; $SD = 4.59$). Forty-four were female, and 56 were male. Participating caregivers were recruited in person at the EHS Center and, following informed consent, voluntarily enrolled their child and themselves in the study. If a caregiver had two eligible children enrolled in EHS, he or she was permitted to participate with both children.

All but one of participating caregivers were female, and caregiver ages at the first time point ranged from 16 to 49 years ($M = 26.44$, $SD = 7.6$). A large majority ($n = 84$) identified themselves as the biological mother of the participating child, and other responses included adoptive mother, stepfather, grandmother, and foster parent (for simplicity, the term “parent” will be used). Of 100 caregivers, 65 identified as AIAN, and among those, 41 reported that they were affiliated with the local tribe (see Table 8 for more demographics). Parents also identified their child’s ethnicity, and 62 reported their child’s race as AIAN, with 37 affiliated with the local tribe. Thirty did not report their child’s ethnicity.

Procedure. Data were collected from each participating dyad at three time points, with intervals of approximately three months between each time point. Dyads completed the first wave of data collection soon after study enrollment, and they were invited to return to the study site three months later for the second wave of data collection, and again three months later for the third wave. At the first time point (T1), 100 participants completed some or all data collection. At the second time point, 77 participants completed some or all data collection; 17 participants had dropped from the study entirely, and 11 did not provide data but remained in the

study for the final wave of data collection. At the third time point (T3), an additional 9 participants dropped/did not provide data, which resulted in a total of 74 participants at T3.

At each time point, parents completed a self-report survey about their adverse childhood experiences, current life stress, and current mental health. They also completed a survey assessing their perception of their child's social-emotional functioning. Dyads also participated in a videotaped play session at each wave of data collection. These videos were then double coded using the Emotional Availability Scales (EA Scales; 4th edition; Biringen, 2008; Biringen, Robinson, & Emde, 1998). The EA session consisted of a 25-minute semi-structured play context, a 3-minute separation, and a reunion episode that lasted 2-3 minutes. Parent-child pairs were provided with a set of play materials (e.g., jack-in-the box, toy snake, sorting toys, finger puppets, and magazines). The researcher asked the parent to "interact or be with your child as you normally would." After 25 minutes, the researcher instructed the parent to leave the room, and after three minutes, the researcher signaled for the parent to return. Following the reunion, the researcher asked the parent and child to clean up the toys; the cleanup lasted approximately 2-3 minutes. Dyads completed these videotaped sessions at EHS sites in the tribal community, and sessions were filmed in a separate room from other EHS and data collection activities.

Measures.

Adverse childhood experiences. Adverse childhood experiences (ACEs) were assessed in a 10-item retrospective self-report survey (Felitti et al., 1998). The survey asked participants to answer *yes* or *no* to a series of questions regarding their first 18 years of life. Questions addressed traumatic experiences during childhood, including the direct experience of various forms of abuse or neglect, as well as indicators of household dysfunction, such as parental drug

abuse, parental incarceration, and interpersonal violence (Felitti et al., 1998). A participant's ACEs score was calculated by adding the total number of *yes* responses out of a possible 10.

Participants completed the ACE survey at each time point as part of their larger data collection packet. This also permitted an examination of test-retest reliability. At the first time point (T1), 89 out of 100 participants completed the ACEs survey. At the second (T2) and third time point (T3), 70 participants completed it. Test-retest reliability between T1 and T2 was $r = .88, p < .0001$; between T1 and T3, it was $r = .84, p < .0001$; and between T2 and T3, it was $r = .90, p < .0001$. Because test-retest reliability was over .80 (CITE), participants' ACE scores from T1 were used in all subsequent analyses.

The predictive validity of the ACEs survey has been demonstrated in a variety of studies. A higher ACEs score predicts both mental health problems (Chapman et al., 2004; Edwards et al., 2003) and poorer physical health during adulthood (Felitti et al., 1998). Further, physiological and neurological studies have demonstrated the mechanisms by which early life trauma impacts later health and development (Danese & McEwen, 2012). However, the cultural validity of the original ACEs questionnaire for AIAN individuals is not well-established, so prior studies have adapted the items to be more culturally sensitive (e.g., Brockie et al., 2015). This study used the original measure.

Current life stress. Current life stress (CLS) was operationalized using items that pertain to three categories of stress—financial strain, lack of community support, and perception of community problems. Seven items on the parent survey asked about aspects of financial strain. For example, one asked whether or not parents have had problems paying monthly bills in the last 12 months. Five items asked about food security, such as, “in the last 12 months, were you ever hungry but didn't eat because you couldn't afford enough food?” Responses to items were

placed on the same scale, summed, and rescaled using the proportion of maximum scoring (POMS) method. In this method, scores are divided by the maximum possible score, placing them on a common metric ranging from 0 to 1 (Little, 2013). The resulting composite score served as the first parcel (“Financial Strain”) for the CLS latent variable.

Next, 31 items pertained to perceived social support at the community or neighborhood level. First, 10 items asked parents about structural and social resources and challenges in their community. They were rated on a Likert-style scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). For example, one item read, “People in this community generally don’t get along with one another;” and another read, “People around here are willing to help their neighbors.” Items with a positive valence were reversed so that a higher score indicated greater stress (i.e., less support). Internal consistency of these ten items at the first time point (n = 90) was $\alpha = .75$. Items were summed and placed on the POMs metric, and they made up the second parcel (“Lack of Community Support”) for the CLS latent variable (Little, 2013).

Finally, 21 items asked participants about problems they notice in their community, such as, “high unemployment” or “police not being available.” These items were rated from 0 (*not a problem*) to 2 (*big problem*). Internal consistency of these items at the first time point (n = 90) was $\alpha = .95$. Items from this scale (“Community Problems”) were also summed and rescaled using the POMS method, and they comprised the third CLS parcel (Little, 2013).

Observed emotional availability. Parent-child emotional availability was coded from videotaped interactions at each of the three time points using the Emotional Availability Scales (EA Scales; 4th edition; Biringen, 2008). The EA Scales consist of six semi-continuous scales measuring four adult dimensions – sensitivity, structuring, non-intrusiveness, and non-hostility – and two child dimensions – child responsiveness and child involvement.

Adult sensitivity refers to an adult's capacity to express mostly positive emotions, respond to the child's cues, and demonstrate acceptance of the child. Structuring consist of the adult's ability to successfully guide and support child learning, as well as set age-appropriate limits. Non-intrusiveness describes the adult's tendency to follow the child's lead in play, and to avoid intrusive behaviors. This dimension encompasses both physical interferences, such as moving the child's body unnecessarily or thrusting toys into the child's face, and verbal interferences, such as commands or interruptions. Non-hostility refers to the adult's capacity to effectively regulate negative emotions, thus avoiding the expression of either covert or overt hostility toward the child. Covert hostility includes expressions of impatience or frustration, and overt includes direct statements or behaviors toward the child that are ridiculing or aggressive.

On the child side, responsiveness refers to the child's tendency to express a healthy range of emotions, mostly positive. It also includes the child's capacity to use the adult to effectively regulate such emotions, and his or her willingness to respond to the adult's bids for connection. This scale takes into account both under-responsive and over-responsive behaviors, and it also considers age-appropriate autonomy seeking. Finally, child involvement describes the child's tendency to invite the adult to connect through verbal and nonverbal bids. It also considers elaborative exchanges, in which the child and adult work together to create a positive storyline.

The six EA Scales are all measured using direct scores coded on a 7-point scale from 1 (*nonoptimal*) to 7 (*optimal*). Research personnel who have been trained and certified as reliable by the developer of the EA system used the EA Scales to code the 30-minute videotaped parent-child interactions. Each video was coded by two research assistants, and an interrater reliability of at least .80 was maintained for direct scores on each scale. The reliability and validity of these

scales have been demonstrated in a variety of cultures, caregiver contexts, and child age ranges (for more detail, see review by Biringen et al., 2014).

The Emotional Attachment Zones Evaluation (EA-Z; Biringen, 2008; Saunders & Biringen, submitted) is a tool used in conjunction with the EA Scales that provides both a categorical and continuous/dimensional measure of attachment security for the parent and a separate measure for the child's attachment security. The same two coders who coded the EA Scales also double coded the EA-Z. Coders assigned the parent and child each a continuous/dimensional EA-Z score ranging from 0 to 100, in which a higher score indicates greater attachment security. Interrater reliability for the EA-Z score is maintained at an ICC of $r = .80$ or above. Coders also assign one of four "attachment zones" to the parent and child—emotionally available, complicated, detached, or problematic—that corresponds to each of the four attachment styles (Ainsworth, Blehar, Waters, & Bell, 1978; see Table 9).

In order to assign EA-Z scores and zones, coders rely mostly on attachment-relevant behaviors that are coded within the adult sensitivity and child responsiveness scales. However, in the 4th edition of the system, other relevant behaviors from other scales can also aid coders in determining EA-Z score and zone. For example, parent hostility can indicate a disorganized attachment (Lyons-Ruth, Melnick, Bronfman, Sherry, & Llanas, 2004), so a coder also uses this information to determine whether the parent falls within the "problematic" zone. The validity and reliability of the sensitivity and responsiveness EA Scales in being associated with attachment styles has been well established (Biringen et al., 2014; Kim et al., 2017), and the EA-Z as an attachment tool is in the early stages of validation (Baker & Biringen, 2012; Saunders & Biringen, submitted).

Infant Toddler Social-Emotional Assessment. The Infant Toddler Social-Emotional Assessment (ITSEA; Carter, Briggs-Gowan, Jones, & Little, 2003) is a survey that assesses social-emotional development of children ranging from 12 to 36 months. The ITSEA consists of 166 items describing specific behaviors or characteristics that relate to child social-emotional functioning. At each of the three time points, parents rated their agreement with each item on a 3-point scale ranging from 0 (*not true/rarely true*) to 2 (*very true/often true*). They can also select “no opportunity” if they believe that they have not had the chance to observe the behavior.

The ITSEA assesses four domains of child social-emotional functioning. The competence domain assesses the child’s prosocial peer relations, attention, compliance with demands, play, empathy, and mastery motivation. The internalizing domain consists of behaviors related to general anxiety, depression, withdrawal, separation anxiety, and inhibition. Next, the externalizing domain includes aggression toward adults, defiance, impulsivity, and peer aggression. Finally, the dysregulation domain consists of behaviors related to eating problems, sensory sensitivity, emotional reactivity, and sleep problems. Domain scores range from 0 to 2.

For this study, data entry was done using a software that only exports subscale and domain-level scores. Thus, it was not possible to use individual items in order to compute domain-level Cronbach’s alpha levels. Instead, subscale scores were used to compute domain-level reliability, and at the first time point, alphas ranged from $\alpha = .66$ to $\alpha = .83$. In another study that used a large, ethnically and economically diverse sample, internal consistency of domains ranged from .80 to .90. Additionally, test-retest reliability of domains ranged from .82 to .90 (Carter, Briggs-Gowan, Jones, & Little, 2003). Further, internal consistency of the ITSEA domains in another AIAN community sample ranged from .62 to .88 (Sarche et al., 2009).

Criterion validity of the ITSEA has been shown through correlations with other observational measures and parent-report surveys of child social-emotional functioning (Carter et al., 2003).

Center for Epidemiological Studies Depression Scale (CES-D). The Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977) assesses depressive symptomatology using a 20-item self-report scale. Participants respond to items by selecting the frequency at which they experienced each symptom in the past week. Possible responses range from 0 (*rarely or none of the time [less than 1 day]*) to 3 (*most or all of the time [5-7 days]*). Responses are summed to a total depression score out of a maximum possible 60. A total score at or above 16 indicates clinical levels of depression. Parents were asked to complete this survey regarding their own symptomatology in the past week.

The CES-D is widely used and has been validated as a measure of depressive symptoms in community samples (Orme, Reis, & Herz, 1986). Internal consistency was assessed using Cronbach's alpha. At the first time point, 83 participants completed the CES-D with an internal consistency of $\alpha = .69$, which is considered marginally acceptable (Tavakol & Dennick, 2011). Scores on the CES-D were placed on the POMS metric (Little, 2013).

Generalized Anxiety Disorder 7-item scale (GAD-7). The Generalized Anxiety Disorder 7-item scale (GAD-7; Spitzer, Kroenke, Williams, & Lowe, 2006) measures self-reported anxious feelings. Each of the seven items describes a symptom, and respondents rate them on a 4-point Likert scale ranging from 0 (*not at all*) to 3 (*nearly every day*). For example, one item reads, "Feeling nervous, anxious or on edge." Parents completed this survey regarding their symptoms in the last two weeks. The GAD-7 demonstrates strong internal validity and test-retest reliability (Spitzer et al., 2006). It shows convergent validity with functional status and other measures of mental health, as well as divergent validity with measures of depression (Spitzer et

al., 2006). At T1, 73 participants completed the GAD-7, and internal consistency was $\alpha = .90$. The POMS method was used to rescale scores onto the same metric (Little, 2013).

Mental Health Inventory (MHI-5). The 5-item Mental Health Inventory (Berwick et al., 1991) is an abbreviated version of the 18-item Mental Health Inventory, and it assesses the frequency of anxious and depressive symptoms over the past month. Example items include “felt calm and peaceful” and “been a very nervous person.” Participants rate the items on a 4-point Likert scale ranging from 0 (*less than usual*) to 3 (*much more than usual*). The MHI-5 has been validated as an accurate measure of anxiety disorders and major depression (Berwick et al., 1991). At T1, 93 participants completed the MHI-5, and internal consistency was $\alpha = .72$. The POMS method was used to rescale scores (Little, 2013).

Results

Preliminary analyses and analytic plan. Table 10 displays descriptive statistics for T1 variables (ACEs, CES-D, GAD-7, MHI-5, and CLS), T2 variables (EA-Z scores and EA Scale Scores), and T3 variables (ITSEA domains). Next, Table 11 shows bivariate correlations among variables. In order to examine pathways among parent ACEs, parent CLS, parent mental health, parent-child EA, and child ITSEA problem domains, data were analyzed using Structural Equation Modeling (SEM) in Mplus (Muthén & Muthén, 1998-2017). SEM allows for multiple indicators to contribute to constructs, and random error is modeled in the form of residuals and thus does not inform the latent constructs (Little, 2013). The latent moderated structural equations (LMS) method was used to test the second hypothesis regarding moderation. The LMS method is built into Mplus, and it creates interaction terms between latent variables (Maslowsky, Jager, & Hemken, 2015). LMS provides estimates of interactions that reduces measurement error, thus reducing the likelihood of bias and increasing power (Little, Bovaird, & Widaman

2006; Maslowsky et al., 2015). All models were estimated using maximum likelihood estimation with robust standard errors (Klein & Moosbrugger, 2000; Muthén & Muthén, 1998-2017).

Model 1: Mediation of ACEs via Mental Health and Emotional Availability. The first hypothesis predicted that the effect of parent ACEs on child social-emotional problems would be mediated through parent mental health and EA. Temporal precedence (Cole & Maxwell, 2003; MacKinnon, Fairchild, & Fritz) was established in that ACEs occurred prior to all other variables (i.e., during parent's childhood), mental health scores from T1 were used, EA Scale/EA-Z scores from T2 were used, and ITSEA problem domain scores from T3 were used. The model was tested using an ITSEA latent variable, as well as with each of the three ITSEA problem domains separately.

Before testing the mediation model, the measurement model was fit (see Figure 3). The mental health latent variable (LV) was composed of POMS-scaled CES-D, GAD-7, and MHI-5 scores. The ITSEA LV was comprised of the dysregulation, externalizing, and internalizing domains. The EA LV was comprised of EA Scale scores and EA-Z scores from T2, and parceling was used in order to decrease the total number of observed indicators, thus maintaining an identified model (Little, 2013). The first parcel consisted of parent EA-Z score, sensitivity, and non-hostility. The second parcel combined structuring and non-intrusiveness, and the third parcel combined child EA-Z score, responsiveness, and involvement. Although their constructs overlap somewhat, parent and child EA-Z scores, sensitivity, and responsiveness were all included in the LV in order to heavily "weight" attachment-relevant qualities in the LV.

Standardized factor loadings of observed variables onto LVs were adequate, ranging from .71 for MHI-5 to .92 for dysregulation. ACE score was significantly correlated with the mental health LV ($r = .49, p < .001$) and the ITSEA LV ($r = .67, p < .001$). However, none of the three

LVs were significantly related to each other. Nevertheless, model fit was adequate, $\chi^2(30) = 33.42, p = .30, RMSEA = .036, CFI .988, TLI .983$.

Path analyses of mediation confirmed that the model did not support an indirect effect of ACEs on ITSEA via mental health and EA. Other nested models were also tested and compared to this one. Neither EA nor mental health alone demonstrated an indirect effect. Also, when ITSEA domains (dysregulation, internalizing, and externalizing) were tested individually as observed outcome variables, there also was no indirect effect of mental health, EA, or the two combined. CLS was also tested as a mediator, and the results were non-significant. Thus, none of the models tested supported mediation via mental health, EA, and/or CLS.

Model 2: Moderation of CLS by Emotional Availability. The second hypothesis predicted that the effect of parent CLS on child social-emotional functioning would be moderated by parent-child EA. Temporal precedence was established in that CLS scores from T1 were used, EA and EA-Z Scale scores from T2 were used, and ITSEA domain scores from T3 were used. After assessing the fit of the measurement model, a two-step estimation procedure was used to estimate the structural model (Maslowsky et al., 2015). The first model, which did not include the interaction term, provided model fit indices (χ^2 , RMSEA, CFI, TLI); this is because these indices have not yet been developed for Latent Moderated Structural equations (LMS) in Mplus (Muthén & Muthén, 2017). Next, the second model included the interaction term. Models were compared using a log-likelihood ratio test, which resulted in a difference value of D . D values are approximately distributed as χ^2 . To determine the significance of D , the difference in free parameters between the two models is treated as the df . A Chi square distribution is used to determine whether the second model represents a significant improvement in model fit (Maslowsky et al., 2015). Additionally, to determine the amount of variance in Y

accounted for by the interaction term, the standardized R^2 values from each model were compared. Four sets of LMS models were run: the first used ITSEA as a latent outcome variable, and the remaining three tested each of the ITSEA problem behavior domains (internalizing, externalizing, and dysregulation) as observed outcome variables.

Model 2A: ITSEA as a latent variable. First, the measurement model was examined (see Figure 4). ITSEA and EA LVs were composed of the same variables as in model 1, and their standardized factor loadings were all above .79. The CLS LV was tested using POMS-scaled financial strain, lack of community support, and community problems scores. Factor loadings of the observed CLS variables onto the LV were fairly low (.53, .66, and .44, respectively), yet they were similar in size and statistically significant.

With the ITSEA domains modeled as a latent outcome variable, model fit without the interaction term was good, $\chi^2(24) = 31.32, p = .14, RMSEA = .056, CFI .973, TLI .959$. When the latent interaction term between EA and CLS was included in the model, model fit improved significantly, $\Delta \chi^2(1) = 4.32, p = .038$. The CLS x EA interaction effect was significant, ($\beta = .289, SE = .12, p = .015$). Plotting the interaction revealed that, at higher levels of EA, the effect of CLS on child social-emotional problems was more positive (see Figure 5). In other words, the moderation effect was the opposite of what was predicted. The first model, without the interaction term, resulted in a standardized $R^2 = .549$, and the second model resulted in $R^2 = .670$. Thus, the interaction term had an $R^2 = .121$, meaning that it accounted for an additional 12.1% variance in child social-emotional problems.

Model 2B: Internalizing symptoms. Next, a two-step LMS model estimation was run with observed internalizing ITSEA domain as the outcome variable. The first model, without the interaction term, fit well, $\chi^2(12) = 9.97, p = .61, RMSEA = .00$ (90% CI .00-.08), CFI 1.00, TLI

1.02. However, the model with the interaction term did not significantly differ in fit from the model without the interaction term, $\Delta \chi^2(1) = 1.84, p = .175$. Without the interaction term, $R^2 = .697$, indicating that 69.7% of the variance in child internalizing symptoms was explained by this model. With the interaction term, $R^2 = .690$, the interaction term was not significant, ($\beta = .151, SE = .10, p = .11$). Therefore, this model does not support the hypothesis that EA would moderate the effect of CLS on child internalizing symptoms.

Model 2C: Externalizing symptoms. The same two-step LMS estimation was run with observed externalizing ITSEA domain as the outcome variable. The first model, without the interaction term, fit well, $\chi^2(12) = 12.70, p = .39, RMSEA = .024, CFI .995, TLI .992$. When the latent interaction term between EA and CLS was included in the model, model fit improved, but only marginally, $\Delta \chi^2(1) = 3.20, p = .074$. The CLS x EA interaction effect was significant, ($\beta = .272, SE = .07, p < .001$). As with the model testing LV ITSEA, the moderation effect was the opposite of what was predicted; higher EA strengthened the relation between CLS and child externalizing symptoms. The first model, without the interaction term, resulted in a standardized $R^2 = .400$, and the second model resulted in $R^2 = .522$. Thus, the interaction term had an $R^2 = .122$, so it accounted for an additional 12.2% variance in child social-emotional problems.

Model 2D: Dysregulation. Finally, the two-step LMS estimation was run with observed dysregulation ITSEA domain as the outcome variable. The first model, without the interaction term, fit well, $\chi^2(12) = 10.25, p = .59, RMSEA = .00$ (90% CI .00-.09), CFI 1.00, TLI 1.02. When the latent interaction term between EA and CLS was included in the model, model fit improved significantly $\Delta \chi^2(1) = 4.84, p = .028$. The CLS x EA interaction effect was significant, ($\beta = .312, SE = .15, p = .034$). Again, the interaction occurred in the opposite direction as was expected, with higher EA strengthening the positive relation between CLS and child

dysregulation. The first model, without the interaction term, resulted in a standardized $R^2 = .378$, and the second model resulted in $R^2 = .537$. Thus, the interaction term had an $R^2 = .159$, meaning that it accounted for an additional 15.9% variance in child social-emotional problems.

Post-hoc group comparison. In order to more closely examine the relation between EA-Z and child ITSEA domains, independent-samples T-tests were run. The t-tests compared ITSEA domain scores between children of complicated and emotionally available parents. Complicated parents reported higher ITSEA problem domain scores than emotionally available parents for all three domains, yet the difference was only significant for the externalizing domain, $t(45) = 2.36$, $p = .023$, and the internalizing domain, $t(45) = 2.05$, $p = .046$. The difference between groups on the composite score of all three ITSEA domains was also significant, $t(45) = 2.12$, $p = .039$.

Discussion

ACEs and child social-emotional functioning. The first hypothesis predicted that a higher parent ACE score would be related to poorer child social-emotional functioning, mediated by poorer parent mental health and low parent-child emotional availability. Parent ACE score did relate to child social-emotional functioning. This is consistent with other recent research on parent ACEs and child outcomes linking parent ACEs to child ADHD diagnoses and behavior/conduct problems (Brown & Ash, 2017; Watamura & Brown, 2017). It highlights the relevance of early life trauma, not only to parents' mental and physical health (e.g., Felitti et al., 1998), but also to the well-being of their young children. Given the prevalence of ACEs in the general population (Felitti et al, 1998; Watamura & Brown, 2017), as well as even higher rates among AIAN communities (Brockie et al., 2015; De Ravello et al., 2008; Roh et al., 2015), it is important to continue examining this relation and developing prevention and intervention efforts targeted at childhood adversity.

However, the effect of ACEs on child social-emotional functioning was not mediated through mental health, EA, or current life stress. Instead, in this study, the pathway appeared not only direct, but robust. This finding is interesting for several reasons. First, it could be reasoned that ACEs influence children via ongoing family risk, such as a parents' mental health or contextual risk factors, such as low family income. However, in this study, neither parents' mental health nor their current life stress (which included financial and community-level variables) mediated this effect. This is despite the fact that ACEs predicted both poorer mental health and greater stress. Thus, it seems that, in this sample, the effect of ACEs on child social-emotional functioning may potentially be explained by another, unmeasured, variable. Nevertheless, future studies should continue to examine the possibility that ongoing family risk may play a role in the intergenerational transmission of ACEs.

Next, it could be expected that ACEs influence children by way of an impaired parent-child interaction. For example, in prior research, a higher ACE score predicts unresolved or cannot classify attachment status during adulthood, which, in turn, poses a risk for child disorganized attachment style (Murphy et al., 2014). In this study, however, the effect of ACEs was not mediated by parent-child EA. It could be that this effect is moderated by parents' attachment-related states of mind, as measured by the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1996). That is, some parents with significant trauma histories may be resolved with respect to their trauma and thus foster a healthy parent-child relationship. In contrast, some parents with trauma histories may remain unresolved with respect to their childhood experiences, and this may impair their ability to relate in a healthy way to their child (Bailey et al., 2007; George et al., 1996; Madigan et al., 2006). Indeed, in prior research, the AAI related in expected ways with the EA Scales and EA-Z scores (Saunders & Biringen, submitted).

Without the AAI measured in this study, it was not possible to examine whether attachment-related states of mind could help explain the effect of ACEs on child outcomes. Thus, it will be important for ongoing research to examine these pathways in order to understand the ways in which ACEs may be transmitted through the parent-child relationship, both to enhance the field's understanding of these phenomena and to guide prevention and intervention efforts.

Moreover, although the ACEs survey is simple to administer and consistently predicts a wealth of health-related and relational outcomes (e.g., Brockie et al., 2015; Felitti et al., 1998; Murphy et al., 2014; Watamura & Brown, 2017), it is nonetheless somewhat limited as a measure of childhood trauma. It may be subject to reporter bias or lack of memory (Hardt & Rutter, 2004). Further, its simple format means that questions regarding the severity and chronicity of trauma, as well as the existence of protective factors, are not included. However, more severe and chronic experiences of abuse, neglect, or household dysfunction are more likely to contribute to attachment-related difficulties in adulthood (Bailey et al., 2007). Also, the existence of protective factors, such as a loving and supportive adult, can ameliorate the impacts of adversity in childhood on later attachment states of mind (Lieberman, Padrón, Van Horn, & Harris, 2005; Narayan, Rivera, Bernstein, Harris, & Lieberman, in press).

Thus, future studies may find it useful to include a wider range of measures to examine the long-term impacts of childhood trauma. This could include a more in-depth measure of traumatic experiences or of their effect, such as the Impact of Event Scale-Revised (Wyman et al., 1998). Utilizing the AAI (George et al., 1996) can help to determine the effect of traumatic or distressing experiences on attachment-related states of mind. Researchers or practitioners may also find it useful to examine the existence of protective factors, such as the Benevolent

Childhood Experiences Survey (BCES; Narayan et al., in press), when examining the effects of ACEs on parent-child relationship quality and child outcomes.

Finally, it could be simply that the sample size in this study ($N = 98$) was not large enough to adequately examine the pathway from ACEs through mental health and EA to child social-emotional functioning. Although the SEM model fit was adequate, a larger sample would have offered greater power to detect effects. It could have also permitted an examination of the effects within subgroups of the sample, such as those exhibiting a disorganized attachment style or those with very high ACE scores. Future studies should continue examining these pathways with larger samples in order to better understand how parents' childhood adversity is transmitted to their own young child.

Current life stress and child social-emotional functioning. The second hypothesis predicted that parents' current life stress would predict poorer social-emotional functioning among their children, and that this effect would be weaker in the context of high parent-child EA. Although higher levels of CLS at the first time point did predict poorer social-emotional functioning among children at the third time point, the interaction effect was opposite what was predicted. Specifically, higher EA seemed to strengthen the relation between CLS and ITSEA problem domains. This effect was fairly small, yet it was unexpected. There are a few possible reasons for this surprising finding.

First, it could be, simply, that dyads who presented with higher overall EA spent more time together. This may have offered more opportunities for the child to come into contact with sources of parental stress (e.g., conflicts with others), or to witness the parent expressing distress or frustration towards others (Crnic, Gaze, & Hoffman, 2005). Negative parent behavior directed towards others in the social environment, not toward the child, can be dysregulating to children

(Cole, Michel, & Teti, 1994; Crnic et al., 2005). In fact, the non-hostility EA Scale codes expressions of frustration, impatience, and irritation towards others in the environment as part of its overall score (Biringen, 2008; Biringen et al., 2014). However, in this study, parent and child were observed in a lab setting (versus home, where other family members may be present), so there was no opportunity to observe such behaviors. In summary, it is possible that parents' stress may affect children through expressions of distress, even those not directed toward the child. Thus, it may be useful to develop programs to help parents adaptively cope with stress and to buffer their child from its effects (e.g., mindfulness strategies; Kabat-Zinn, 2003).

Also, in this sample, a large proportion ($n = 41$, 60%) of parents were coded in the complicated (i.e., insecure-anxious) EA-Z zone at the second time point, and only 25% ($n = 17$) were coded in the Emotionally Available (i.e., secure) zone (see Table 12). This is in contrast with other studies using large, nationally representative samples, where about 40-60% of infants are coded as securely attached, and 8-22% of infants are coded as insecure-anxious (Fraley & Spieker, 2003; Groh et al., 2017). Thus, it seems that, within this sample, there was an overrepresentation of complicated dyads. Complicated parent-child dyads are characterized by overconnection and accentuated distress responses (Biringen, 2008; Biringen et al., 2014), so it may be that the relative overrepresentation of complicated parents in this sample contributed to the unexpected moderation effect. This conclusion is further supported by the result that parents in the complicated zone at T2 reported their children to have more social-emotional problems at T3 than did parents in the emotionally available zone. Although those analyses used a much smaller sample size ($n = 45$), they offer some evidence that high EA does not predict poorer social-emotional functioning.

Next, the moderating effect of parenting style in the context of high risk seems to vary among different cultural groups (Dearing, 2004). Specifically, more restrictive, yet supportive, parenting was associated with better child outcomes among African American families, but not European American families. Although this study was not conducted with AIAN samples, it demonstrates how the effect of parenting practices may not be universal across cultural contexts. Thus, it may be that, within this largely AIAN sample, the moderating nature of the parent-child relationship may be different than was predicted based on prior research in non-Native samples. Indeed, research on the effects of parenting practices in AIAN populations is limited (McShane & Hastings, 2004). Thus, future research should continue to examine this question in order to better understand what kinds of parenting practices buffer risk for AIAN children.

Finally, it may be that mothers with higher EA were more realistic in their reporting of current life stress. Some research suggests that insecurely attached individuals process social information in a biased fashion; for example, they are more likely to selectively exclude negative or painful information (Dykas & Cassidy, 2011). Further, adults with a secure state of mind during adulthood tend to have higher reflective functioning, which is the capacity to accurately assess one's own mental state and those of others (Fonagy, Steele, Steele, Moran, & Higgitt, 1991). Thus, it could be that, parents with a secure attachment style both demonstrated higher EA (Biringen et al., 2014) and reported on their stress and their child's social-emotional functioning in a more accurate manner.

Nevertheless, the moderating effect of EA was fairly small in this study, and the effect of CLS on child ITSEA domains appeared strong. This indicates that parents' perception of low social support, community-level problems, and financial strain predicts lower social-emotional functioning among their young children. This is consistent with prior research in both non-Native

(Dearing et al., 2006; Evans & English, 2002) and Native samples (Frankel et al., 2014; Sarche et al., 2009). Moreover, other research has found a similar direct effect of parents' experience of ongoing stress and negative outcomes for young children (Crnic et al., 2005). Further, studies in which families living in low-income and risky neighborhoods are relocated to safer neighborhoods have shown direct positive effects on child cognitive outcomes and mental health (Kling, Liebman, & Katz, 2006; Leventhal & Brooks-Gunn, 2004). Those findings, along with the results presented here, suggest a strong need for interventions that directly reduce socio-economic disparities and neighborhood risk factors in a community-driven and community-focused way (e.g., Communities that Care; Hawkins, Catalano, & Kuklinksi, 2014). This may be especially true for AIAN communities, where such risks are often rooted in long-term and systemic disparities (Gone, 2007; Sarche & Spicer, 2008).

Limitations and strengths. The results of this study are limited for a variety of reasons. First, with a fairly small sample of 100, it was not possible to test more complex models or to examine outcomes by subgroup. Also, within the fairly small sample, there was a significant amount of missing data at each time point. However, Mplus was able to estimate most of the missing data using maximum likelihood estimation with robust errors (Muthén & Muthén, 1998-2017). Only observed variables acting as predictors were not estimated in this way (i.e., ACE score in Model 1).

Next, many measures in this study were obtained through self-report, which is subject to bias. Responses could have been affected by participants' mental state, their level of stress, social desirability bias, or fatigue (Cook & Campbell, 1979). Moreover, the ACE survey, although supported in its predictive validity, may not always provide a valid measure of

adversity during childhood (Hardt & Rutter, 2004). Participants may respond unreliably due to poor memory, current mental health challenges, or discomfort sharing sensitive information.

Finally, it is important to note that conclusions drawn from this study are not generalizable to the general population or to all AIAN communities. The sample was not entirely AIAN, and there is significant diversity across AIAN communities. Diversity exists not only between rural and urban AIAN populations, but also among tribes and nations. Thus, results from one sample of AIAN participants do not generalize to the AIAN population as a whole. Thus, this study should be viewed as one step in better understanding these processes within this specific AIAN community. Ongoing research should continue to examine these questions in a wide range of AIAN populations, as well as in other populations.

Despite these limitations, this study had various strengths. First, having three time points allowed us to establish temporal precedence, and thus conduct mediation and moderation path analyses (Cole & Maxwell, 2003; MacKinnon et al., 2007). This also allowed us to examine the test-retest reliability of the ACEs survey in this sample, which is important to do, given concerns about its validity and reliability (Hardt & Rutter, 2004). Next, the use of Mplus is a strength, for this system estimates missing data on latent variables and observed outcome variables (Muthén & Muthén, 1998-2017). The use of latent variables within the SEM framework, also, reduces measurement error (Kelloway, 2015; Muthén & Muthén, 1998-2017). Moreover, SEM methods simultaneously examine questions of measurement and prediction, and nested models can be compared for their adequacy of fit (Kelloway, 2015; Muthén & Muthén, 1998-2017).

Conclusions. In closing, this study provides evidence that parents' experience of adversity in childhood, as well as their current experience of financial and community-based stress, has an effect on their child's social-emotional well-being. This adds to the literature

demonstrating the long-term impacts of ACEs, even on the next generation (e.g., Brockie et al., 2015; Brown & Ash, 2017; Felitti et al., 1998; Watamura & Brown, 2017). It also calls to attention the importance of not only screening for ACEs, but also prevention and intervention efforts that directly address childhood adversity. Moreover, the results demonstrating links between parents' current life stress and child social-emotional functioning were also consistent with prior research in both Native and non-Native samples (e.g., Dearing et al., 2006; Frankel et al., 2014). Thus, prevention and intervention efforts should also target ongoing sources of risk and health disparities, such as community violence, unemployment, and food insecurity.

All of these intervention and prevention efforts are particularly relevant in AIAN communities, given the centuries of systemic oppression, historical trauma, and ongoing socio-economic and health disparities that create additional barriers to upward mobility and healing from adversity (Gone, 2007; Sarche & Spicer, 2008). Moreover, such efforts should be conducted in a collaborative manner with local communities (i.e., community-based participatory research) so as to ensure that they are empowering, ethical, culturally sensitive, and considerate of the unique strengths of AIAN cultures (McShane & Hastings, 2004).

Tables and Figures

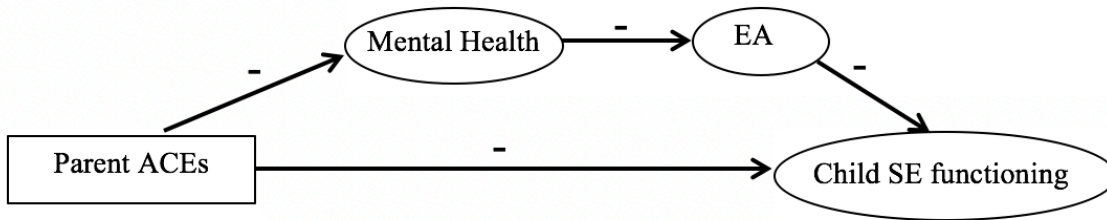


Figure 1. Model predicting child social-emotional functioning from ACE score

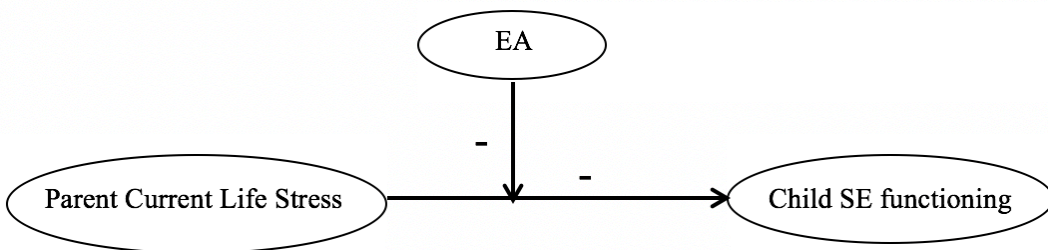


Figure 2. Model predicting child social-emotional functioning from current life stress

Table 8. *Parent Demographic Information*

Variable						No response
Gender	93% female	1% male				6%
Age	14% 16-19	35% 20-25	25% 26-30	7% 31-35	12% 36 and older	7%
Rel. to child	84% bio. mother	3% adoptive mother	1% foster mother	1% grandmother	1% stepfather	10%
Marital status	40% married	28% in relationship	7% div./sep.	1% widowed	15% single	9%
Education	15% college+	24% some college	18% assoc./vocat.	16% HS/GED	21% less than HS	6%
Ann. income	4% 75k or higher	8% 50-74K	20% 25k-49k	16% 10-24k	10% 10k or lower	42%
Race	42% AIAN only	22% White only	21% AIAN + White	3% AIAN+Black.	6% other	6%
Tribal affil.	41% local tribe	15% other tribe	35% no tribe			9%
Ethnicity	73% Non-Hispanic/Latino		21% Hispanic/Latino		6%	

Table 9. *EA-Z scores, zones, and corresponding attachment style*

<u>EA-Z Score</u>	<u>EA-Z Zone</u>	<u>Attachment Style</u>
85-100	Emotionally Available	Secure
65-80	Complicated	Insecure-Resistant/Anxious
45-60	Detached	Insecure-Avoidant
0-40	Problematic	Insecure-Disorganized

Table 10. *Descriptive statistics*

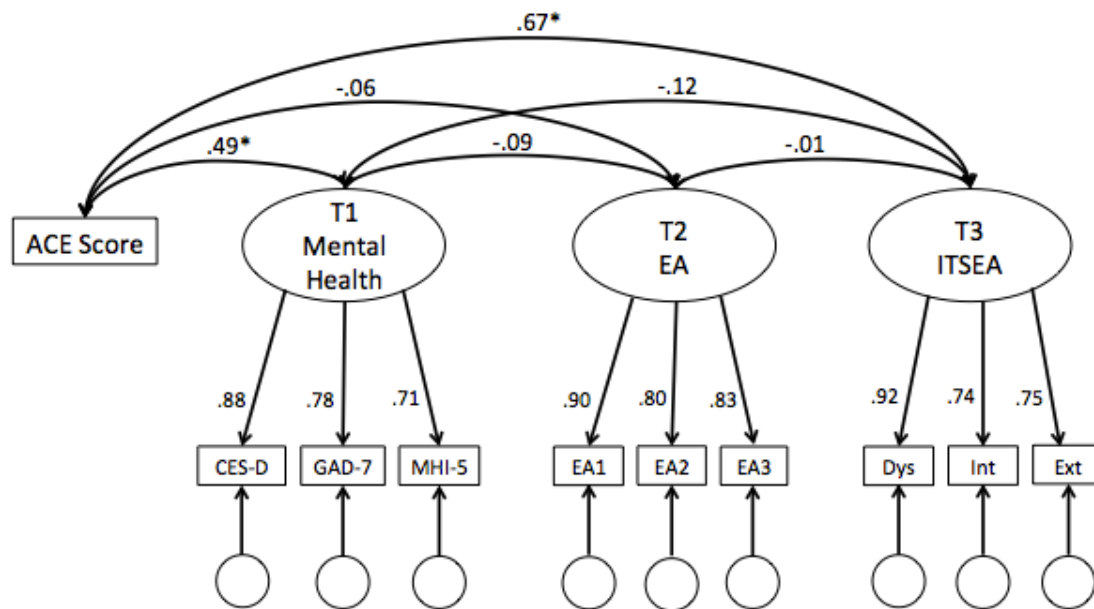
Measure	N	M	SD	Min.	Max.	Maximum Possible Score
Time 1 Variables						
ACE Score	89	2.04	2.49	0	10	10
CES-D Score	94	10.60	7.85	0	36	60
GAD-7 Score	73	3.92	4.27	0	21	21
MHI-5 Score	93	4.74	2.38	0	10	15
Financial Strain POMs	88	0.22	0.20	0.03	0.81	1
Lack Comm. Supp. Raw	90	18.77	4.43	10.00	31.00	40
Comm. Problems Raw	90	14.23	10.22	0.00	35.00	42
Time 2 Variables						
Parent EA-Z	68	73.28	15.98	30	95	100
Child EA-Z	68	73.54	17.68	30	100	100
Parent Sensitivity	68	4.57	1.16	2.0	6.5	7.0
Parent Structuring	68	4.56	1.19	1.0	7.0	7.0
Parent Non-intrusiveness	68	4.60	1.31	2.0	7.0	7.0
Parent Non-hostility	68	5.29	1.19	2.0	7.0	7.0
Child Responsiveness	68	4.68	1.28	2.0	7.0	7.0
Child Involvement	68	4.81	1.15	3.0	7.0	7.0
Parent EA Scales Total	68	19.01	3.94	10.0	25.5	28.0
Child EA Scales Total	68	9.49	2.26	5.5	14.0	14.0
Time 3 Variables						
ITSEA Dysregulation Raw	64	0.43	0.29	0.00	1.51	2.00
ITSEA Externalizing Raw	64	0.53	0.33	0.00	1.74	2.00
ITSEA Internalizing Raw	65	0.47	0.21	0.15	1.12	2.00
ITSEA Competence Raw	64	1.42	0.32	0.31	2.00	2.00

Table 11. *Correlations among T1 parental stress and mental health variables, T2 EA, and T3 child social-emotional functioning.*

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. T1 ACE Score														
2. T1 CES-D Score	.39**													
3. T1 GAD-7 Score	.49**	.66**												
4. T1 MHI-5 Score	.36**	.62**	.49**											
5. T1 Financial Strain	.22*	.39**	.33**	.29**										
6. T1 Lack Comm. Sup.	.37**	.26*	.44**	.11	.35**									
7. T1 Comm. Prob.	.45**	.24*	.15	.16	.29**	.20								
8. T2 Parent EA-Z	-.08	-.03	-.14	.07	-.12	-.30*	-.14							
9. T2 Child EA-Z	-.04	-.03	-.18	.00	-.04	-.27*	-.10	.87**						
10. T2 Parent EAS Tot.	-.04	-.10	-.16	-.02	-.12	-.33**	-.19	.82**	.69**					
11. T2 Child EAS Tot.	-.02	-.02	-.08	-.06	.02	-.32*	-.16	.76**	.90**	.73**				
12. T3 ITSEA Dysreg.	.53**	.19	.27	.16	.14	.29*	.30**	-.03	.06	-.06	.05			
13. T3 ITSEA Extern.	.48**	.13	.18	.08	.18	.18	.36*	-.07	-.01	-.16	-.06	.75**		
14. T3 ITSEA: Intern.	.58**	.32*	.43**	.12	.24	.50**	.33	-.14	-.08	-.17	-.04	.74**	.56**	
15. T3 ITSEA. Comp.	-.17	-.27*	-.15	-.15	-.23	-.24	-.05	.19	.12	.18	.15	-.11	.03	.01

Table 12. Frequency of EA-Z zones at T2

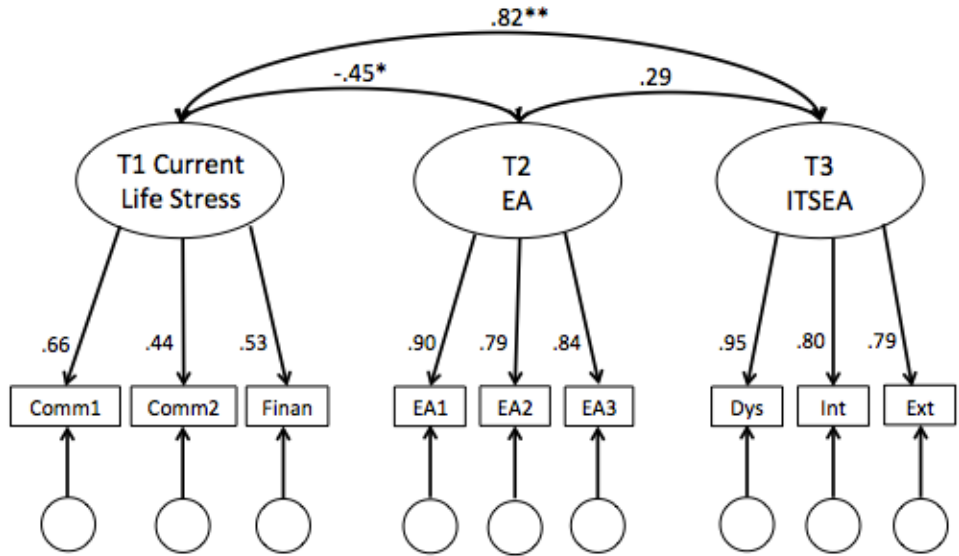
EA-Z Zone	Parents	Children
Emotionally Available	17	22
Complicated	41	33
Detached	4	6
Problematic	6	7
<i>Total N</i>	68	68



* $p < .001$

Note. $\chi^2(30) = 33.42, p = .30, RMSEA = .036, CFI .988, TLI .983. N = 98.$ Estimates are standardized.

Figure 3. ACEs, EA, and ITSEA measurement model



* $p < .01$, ** $p < .001$
 Note. $\chi^2(24) = 31.32, p = .14, RMSEA = .056, CFI .973, TLI .959. N = 98$. Estimates are standardized.

Figure 4. CLS, EA, and ITSEA measurement model.

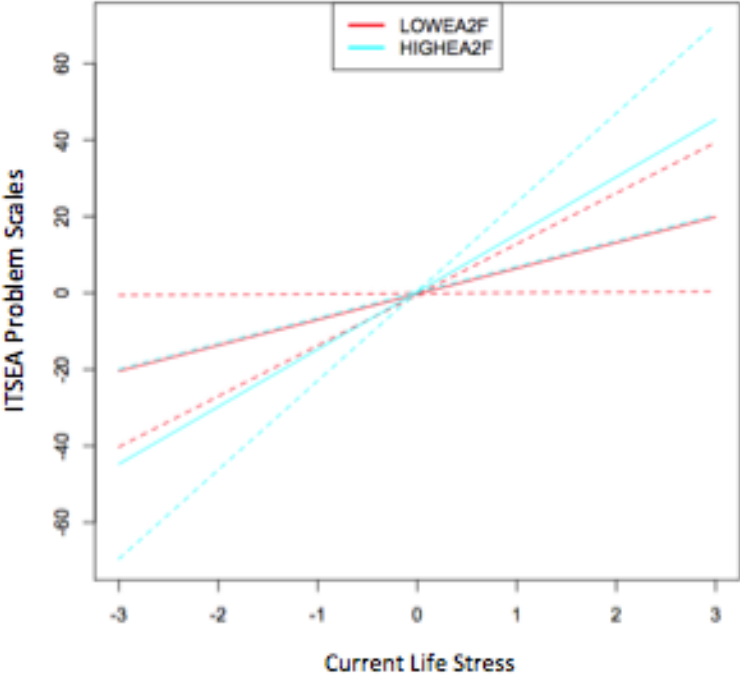


Figure 5. ITSEA moderates effect of CLS on ITSEA problem scales.

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