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The differential influence of maltreatment subtype and age of exposure on empathy

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Abstract

The capacity for empathy may be shaped by interpersonal interactions throughout development. Research shows that detrimental interactions, such as maltreatment, lead to aberrant levels of empathy. However, different subtypes of abuse and neglect as well as age of exposure complicate the relationship between maltreatment and empathy. The current study aims to elucidate the contributions of maltreatment subtypes and age of exposure in predicting state and trait empathy. Participants (N=94, M age=19.12 years, 45.7% male) self-reported their age of exposure to eight subscales of maltreatment from caregivers. Next, participants self-reported their trait empathy and completed a vignette measure aimed to assess state empathy. State and trait empathy were regressed onto each subscale of maltreatment. Results revealed physical neglect negatively predicted state empathy. Emotional neglect and physical neglect both negatively predicted trait empathy, and parental physical maltreatment positively predicted trait empathy. Relative weights analysis revealed that adolescent versus childhood exposure to emotional neglect was significantly more impactful in predicting state empathy. These results illuminate the nuanced associations between timing of maltreatment subtypes and how they differentially impact state versus trait empathy.

The Differential Influence of Maltreatment Subtype and Age of Exposure on Empathy

Empathy, or the capacity to attend to another's state or perspective, is critical for adaptive interpersonal functioning and harmonious engagement in society (Bailey et al., 2008; Portt et al., 2020). Conversely, lower levels of empathy are associated with externalizing behaviors and participation in antisocial behaviors, such as aggression and criminal psychopathy (Brook & Kosson, 2013; Miller & Eisenberg, 1988). Research shows that interpersonal interactions across development shape the capacity for socially attending to others and may therefore contribute to the capacity for empathy (Porges, 2009). Specifically, harmful interactions, including various types of maltreatment, necessitate vigilance to others' emotional states in order to maintain safety. Maltreatment from caregivers may be particularly poignant given the foundational influences of social attunement beginning in infancy (Porges, 2009) and the key role of primary attachment figures throughout childhood and adolescence (Bowlby, 1982). However, as relationships with primary caregivers evolve as children age (Kerns et al., 2006), maltreatment at different developmental stages may have disparate influence on later empathy. Given that emerging adulthood is often marked by increased autonomy from caregivers (Arnett, 2007), this stage offers a launching point to investigate the lasting effects of caregiver-perpetrated maltreatment. Thus, the current study examines how different types of maltreatment experienced throughout childhood and adolescence affect state and trait empathy in emerging adulthood.

Empathy

Empathy is a complex and multifaceted construct, creating difficulty in obtaining accurate measurements. Researchers have struggled to reliably define empathy, resulting in inconsistencies in the literature (Baldner & McGinley, 2014). Eisenberg (1990) discussed different components of empathy, but ultimately defined empathy as an affective process

involving the sharing of emotional states based on direct and indirect environmental emotional cues from others. Subsequent literature has identified numerous subcomponents of empathy, including emotional contagion, sympathy, and compassion, each purported to capture a unique construct (Baldner & McGinley, 2014; Cuff et al, 2016). Among these various components, empathy is most often subcategorized into affective and cognitive subscales, each showing unique associations with different constructs, such as conduct disorder, internalizing disorders, autism spectrum disorder, and reactive and proactive aggression (Anastassiou-Hadjicharalambous & Wardon, 2008; Bray et al., 2021, Noorden et al., 2015, Mazza et al., 2014). Despite the idiosyncrasies of these subcategories, a holistic view of empathy may be necessary to understand how individuals appropriately attend to others.

An additional consideration in the study of empathy is the differentiation of trait and state empathy. Many measures focus on trait-based empathy, or the disposition one has to exhibit empathy. Self-report questionnaires are used to capture perceptions of the capacity for empathy by asking series of questions regarding how one is influenced by others. Over the last few decades, numerous questionnaires have been developed to measure trait empathy (Baron-Cohen & Wheelwright, 2004; Davis, 1980; Spreng et al, 2009). Such measures show concurrent validity with one another (Lawrence et al., 2004; Spreng et al., 2009) and divergent validity from constructs associated with deficits in empathy, such as autism spectrum disorder (Baron-Cohen & Wheelwright, 2004; Spreng et al., 2009) and aggression (Han, 2016; Shah, 2015). Additionally, many questionnaires have been adapted and validated for use with populations of various cultures (Han, 2016; Totan et al., 2012). Despite these strengths, self-report trait measures typically fail to capture how one would react to specific environmental triggers.

Measures of state empathy offer a complementary component to trait empathy scores. State empathy, which captures empathic responding to a particular situation, is elicited by transient environmental cues. Adverse interactions with caregivers may differentially shape these immediate reactions versus typical baseline levels of empathy. In order to assess this construct, researchers use measures with emotionally valent stimuli rather than trait-based questionnaires. However, limited research has compared how trait and state empathy may differentially relate to real-world phenomenon. Van der Graaff et al. (2015) showed adolescent participants (M age= 17.04 years) four video clips intended to elicit empathic responses. Researchers collected information on cognitive and affective state empathy by probing participants to identify the emotion presented by the character in the video clip, state their own elicited emotion, and report their level of sympathy toward the character. Participants additionally completed a trait measures of affective and cognitive empathy. Results revealed that state and trait empathy were most often positively related for video clips involving sadness and distress. However, state empathy was more likely to be linked with feelings of happiness compared to trait empathy. These discrepancies reflect meaningful differences in what types of emotions individuals attend to with differing levels of state and trait empathy.

Vignette measures, such as the one mentioned above, present individuals with empathy-inducing stimuli and collect data that are indicative of state empathy. Different variations of these types of measures have been used in research. Numerous studies have used vignette measures to study empathic accuracy (Brook & Kosson, 2013; Schmid Mast & Ickes, 2007). However, these measures focus on cognitive empathy and underemphasize affective components. Other research has implemented vignette measures aimed at capturing a more universal view of empathy. Locher and Barenblatt (2014) used a video clip measure to assess

adults' state empathy. Participants from South Africa viewed video clips from a real-life, emotionally provocative criminal trial and then responded to 13 open-ended questions regarding emotions and thoughts they experienced while watching. The combination of responses depicts both cognitive and affective processes of state empathy. Similar open-ended measures probing thoughts and emotions should be tailored for different target populations, such as emerging adults, to accurately capture the nuances of state empathy.

Maltreatment

Interactions with caregivers across development contribute to the behavioral and physiological foundations of social engagement that may underpin empathy (Darwish et al., 2001; Feldman et al., 2013, Porges 1995; Raby et al., 2015; Tong et al., 2012). Although literature often shows childhood maltreatment is associated with atypical sympathetic nervous system activity (i.e., "fight or flight" system; Young-Southward et al., 2020), theory on the development of parasympathetic nervous system (PNS) may highlight pathways to empathy. Beginning in infancy, interactions with caregivers shape autonomic functioning to prime individuals for social attending (Porges, 1995). Warm, nurturing, and positive interactions with caregivers support healthy development of the ability to attend to others, including the capacity for empathy (Guo & Feng, 2017; Murphy, 1994; Strayer & Roberts, 2004; Wagers & Kiel, 2019). Porges's (1995, 2009) polyvagal theory posits the crux of social interaction is modulated by the tenth cranial nerve, or the vagus nerve. This nerve has efferent and afferent pathways influencing heart rate and respiration and plays a large role in physiological regulation. When vagal influence is augmented, the vagus nerve has increased control on the heart and lungs. Specifically, heart rate and respiration slow allowing for physiologic relaxation. Porges describes this state as the social engagement system, as individuals' autonomic activity promotes the

ability attend to others. This engagement allows for social behaviors, including increased eye contact and attunement to human voices. Thus, this physiological state may promote empathy as it bolsters the ability to attend to others' emotions. Further, as autonomic activity often changes from baseline levels in response to specific environmental cues, the social engagement system may be differentially activated to support trait versus state empathy.

Given that attuned caregiver interactions support social engagement, it may be intuited that negative interactions, such as maltreatment, would disrupt the social engagement system. However, literature on these associations is mixed. Indeed, some studies show that maltreatment across childhood is linked with reduced parasympathetic activity, or an inhibited social engagement system (Gray et al., 2017, Skowron et al., 2011). For instance, one study recruited maltreated and non-maltreated preschool-aged children (Skowron et al., 2011). Researchers collected data on participants' parasympathetic activity during an interaction with their mothers. Results revealed that children who had experienced maltreatment exhibited lower parasympathetic activity than did their non-maltreated counterparts, indicating inhibited physiological social engagement. Parallel to research on autonomic underpinnings, relationships between maltreatment and empathy measures exist as well, showing that increased adversity in childhood is related to deficits in empathy (Lochler & Barenblatt, 2014; Yu et al., 2020). Locher and Barenblatt (2014) assessed adult participants' empathy in response to emotionally salient video clips. Researchers found that those who had experienced child maltreatment exhibited lower levels of state empathy. Such findings support the idea that maltreatment in childhood would disrupt the capacity for empathy.

However, research has also found alternative associations between child maltreatment and empathy. Greenberg et al. (2018) found that adults who experienced a traumatic event in

childhood, including abuse, had elevated trait empathy in adulthood. Additionally, some psychophysiological research has found no group differences for parasympathetic activity between maltreated and non-maltreated groups, potentially implying no influence on the physiological social engagement system (Gordis et al., 2010; Shenk et al., 2012). Such discrepancies require further research to elucidate the relationship between childhood maltreatment and empathy.

One potential explanation for these inconsistent findings is the type of maltreatment being assessed. Total childhood maltreatment scales include an array of harmful interactions, such as different types of abuse and neglect. However, depending on the child-caregiver interactions associated with each type of maltreatment, children need to fine-tune their ability to attend to caregiver's emotions to maintain safety. For example, research shows that individuals who have experienced physical and sexual abuse show faster reaction times in attending to threatening stimuli in dot-probe tasks than non-abused participants (Hirai et al., 2022; Pollak & Tolley-Schell, 2003). This pattern may reflect adaptive mechanisms of increased emotional attunement to detect potentially threatening interactions with caregivers.

Literature on the links between maltreatment type and empathy are sparse. Some evidence indicates that sexual abuse has been linked with heightened empathy (Greenberg et al., 2018), whereas others indicate a decrease in empathy (Brassard et al., 2022; Gobin et al., 2015; Simons et al., 2002). Physical maltreatment has been associated with lower empathy and heightened callousness and psychopathy (Bert et al., 2009; Bujalski et al., 2019). Further, emotional abuse (Bert et al., 2009) and neglect (Arzeen & Hassan, 2012; Pereiera et al., 2012) have been associated with decreased empathy as well. However, many of these studies use clinical, criminal, or dyadic samples. The effects of subtypes of maltreatment on later empathy

need to be investigated with nonclinical samples aimed at investigating one participant at a time. Parsing apart these constructs will delineate the impact of childhood maltreatment on later empathy.

Similar to the convolution of maltreatment subtypes, studying age of exposure to maltreatment may further illuminate the development of empathy. Although research on the effects of age of exposure on empathy does not exist, previous studies have shown that timing of maltreatment differentially contributes to psychological outcomes. Dunn et al. (2013) analyzed longitudinal data on maltreatment from infancy to adolescence and examined how age of first exposure to maltreatment subtypes influenced early adulthood mental health. Findings showed that first exposure to maltreatment at preschool age contributed the most to depression in early adulthood. Additionally, maltreatment subtype was indicative of mental health. Emerging adults who experienced first exposure of physical abuse during preschool age were more likely to be depressed, whereas those who experienced sexual abuse in early childhood were more likely to exhibit suicidality. Although this study highlights the impact of first maltreatment exposure, research needs to compare maltreatment subtype exposures across different ages to clarify the weight of distinct child-caregiver interactions in the development of empathy.

The present study seeks to expand the literature on the link between maltreatment subtypes and state and trait empathy. Additionally, this study will explore the differential impacts of childhood versus adolescent exposure to maltreatment subtypes. Empathy will be measured using both a common trait-based questionnaire and a newly developed vignette measure to capture state empathy in emerging adults. Based on Porges (1995, 2009) theory of the physiological social engagement system, it is hypothesized that maltreatment subtypes that do not require increased attention to caregivers' emotional states to maintain physical safety (i.e.,

verbal abuse, emotional abuse, physical neglect, and emotional neglect) will be associated with lower empathy. Conversely, subtypes of maltreatment that require attention to another's emotional states for adaptive safety responses (i.e., physical abuse, sexual abuse, witnessing interparental violence, and witnessing violence to siblings) will be associated with higher levels of empathy. Further, exploratory analysis will investigate potentially disparate influences of childhood versus adolescent exposure to maltreatment and the comparison of state and trait empathy as outcomes.

Methods

Participants and Procedure

This study (protocol #21E045) was approved by the State University of New York, University at Albany's Institutional Review Board (IRB). Undergraduate students were eligible to participate if they were between the ages of 18 to 25 years old (emerging adult age). The final sample consisted of 94 undergraduate students (45.7% male, 44.7% female, 9.6% no response) recruited from the university's department of psychology research pool website. Participants had a mean age of 19.12 years, ranging from 18 to 22 years old. Participant ethnic composition was 76.6% non-Hispanic/Latino and 23.4% Hispanic/Latino. Participants race composition was 42.6% White, 35.1% Black or African American, 9.6% Asian, 6.4% Other, 5.3% Mixed/Biracial, and 1.1% American Indian or Alaska Native.

Participants received a link via the university's department of psychology research pool website to access the survey. Participants were prompted to download and read the consent form and then check a box indicating they understood and consented to participate in the study. The consent form indicated the study assessed interpersonal interactions (rather than empathy) to prevent socially desirable responding on empathy measures. A series of questionnaires and a

vignette measure aimed to collect data on sociodemographic variables, control variables, empathy, and childhood maltreatment. After completing the measures, participants were presented with a debrief script explaining the deception of studying empathy. The survey then instructed participants to check one of two boxes indicating whether or not they still consented to their data being used in the study. Data was excluded for participants who opted out at the debrief script or who did not complete the survey. At the end of the survey, participants were provided with a list of mental health resources due to the study's focus on sensitive topics (i.e., maltreatment).

Measures

Maltreatment and Abuse Chronology of Exposure (MACE; Teicher & Parigger, 2015). The MACE is a 52-item questionnaire assessing age of exposure to ten subscales of childhood maltreatment. Participants report *Yes* or *No* if they experienced a particular maltreatment during childhood and check each age of exposure (0 to 18 years old). The MACE has shown convergent validity with Adverse Childhood Experiences (ACE) and Childhood Trauma Questionnaire (CTQ) measures with correlation coefficients of 0.6 to 0.8.

The current study focuses on MACE questions regarding experiences within the home/family system: emotional neglect (e.g., unjustified unavailability of caregivers, lack of being made to feel loved, important, or supported), nonverbal emotional abuse (e.g. taking on adult responsibilities, caregivers withholding important information, difficult to please caregivers), parental physical maltreatment (e.g., being pushed, kicked, hit, or spanked, needing medical attention from harm), parental verbal aggression (e.g., being sworn at, humiliated with words, threatened), physical neglect (e.g., lack of protection from caregivers, not being taken to doctors' appointments, lack of food and clean clothes), sexual abuse (e.g., inappropriate sexual

comments, touching, or activity from caregivers), witnessing interparental violence (e.g., caregivers pushing, hitting, or throwing something at one another), and witnessing violence to siblings (e.g., observing physical harm or perpetration of sexual acts towards siblings). Thus, two subscales, peer physical violence and peer emotional abuse, were excluded. The eight included subscales ranged in Cronbach's α values from acceptable to good (emotional neglect α= .6, nonverbal emotional abuse α=.78, parental physical maltreatment α=.75, parental verbal aggression α=.77, physical neglect α= .68, sexual abuse α= .6, witnessing interparental violence α=.61, and witnessing violence to a sibling α=.66).

This study modified the collection of age of exposure data for each of the eight subscales. We collected data from ages 3 to 18 years old (rather than 0 to 18 years old). We did not consider exposure earlier than this range given poor reliability of episodic memory (traumatic and nontraumatic) prior to three years of age (Fivush, 1998). Participants reported *Yes* or *No* for each age in which they were exposed to the particular maltreatment. Years were then aggregated into two broader groups: childhood (age 3 to 11 years old) and adolescence (age 12 to 18 years old) and averaged.

Toronto Empathy Questionnaire (TEQ; Spreng et al., 2009). The TEQ is a 16-item self-report questionnaire measuring cognitive and affective trait empathy. Items assessing trait empathy, such as *It upsets me to see someone being treated disrespectfully*, are scored on a scale from 0 (*Never*) to 4 (*Always*). The TEQ has been positively correlated with the Interpersonal Reactivity Index (Davis, 1980) and the Empathy Quotient (Cohen-Baron & Wheelwright, 2004), negatively correlated with the Autism Quotient with a sample of university students (Baron-Cohen et al., 2001), and has shown high test-retest reliability (r=.81) and a Cronbach's α of .85. This study had a Cronbach's α of .89.

Empathy vignette measure. The empathy vignette measure was created in-house to assess state empathy. This measure was tailored to the population being studied. The final analysis included three vignettes about common situations, including being stuck behind a slow driver, witnessing a child having a temper tantrum in a grocery store, and watching a friend fall during a race (see *Figure 1*). After reading each vignette, the measure prompted participants to respond to the following questions: (1) *What emotions does [the main character in the vignette] feel in this situation? List as many emotions as you can. For each, explain why they'd feel that way* and (2) *How do you feel in this situation? List as many emotions as you can think of. For each emotion, please explain why you are feeling that way.*

Researchers began the initial development of this measure by creating 16 hypothetical situations aimed to elicit empathetic responses. This list was narrowed down to six vignettes based on relatability and potential for variability in answers. That is, researchers chose scenarios that may be common experiences for an emerging adult sample and that seemed likely to elicit mixed emotions. These final six vignettes were presented to participants.

Researchers trained a team of five coders to score the qualitative data. Researchers created a coding manual (*Figure 2*) using a 5-point scale, with larger scores indicate higher empathy. Based on the two open-ended participant responses, coders assigned one global score to each vignette. Scores were based on expression of emotion and perspective taking. Coders practiced using this manual with multiple sets of sample responses. First, researchers and coders used practice response sets to engage in group discussions of potential scores and appropriate justifications. Coders then independently scored numerous practice response sets. For these independent exercises, each practice response was scored by two coders. Coders began scoring real data from the current sample once they achieved an intraclass correlation coefficient (ICC)

of .7 with every other coder in the team during practice exercises. Coders achieved ICCs of at least .7 (ranging from .7 to .96) on the three vignettes mentioned above (*Figure 1*). The three vignettes not analyzed included scenarios of witnessing someone asking for money at a red light, choosing how to split time with friends who recently broke up, and responding to a friend who cheated on an exam to get an A.

Researchers then calculated total empathy scores for every participant. Each of the three vignettes was scored by two coders based on the 5-point scale in the coding manual. For each vignette, scores between the two coders were averaged, creating 3 scores for each participant. A mean average was taken from these 3 scores to give a total state empathy score. Scores from the three vignettes had a Cronbach's α of .82.

Analytic Plan

All analyses were conducted using R version 2022.02.3+492. Little's MCAR test was used to assess randomness of missing data. Listwise deletion was used for data missing at random. Given associations in the literature of empathy with gender (O'brien et al., 2013; Thompson & Voyer, 2014), gender was assessed as a potential covariate. Data were checked for heteroscedasticity with the Breusch-Pagan test before running regression analyses. Skew of variables was assessed before analysis. Variables with a skew greater than one were transformed with square root transformations. Linear regressions were run with each maltreatment subscale predicting state empathy (vignette measure) and trait empathy (TEQ). Relative weights analysis was then conducted to assess differences between childhood (3 to 11 years old) and adolescent exposure (12 to 18 years old) to each maltreatment subscale's impact on empathy. Using Tonidandel and LeBreton's R Shiny app (2014), 10,000 bootstrap samples on the predictors'

relative weights' assessed significant differences between childhood versus adolescent exposure to maltreatment subtypes.

Results

Raw values for variables' means, skews, and standard deviations appear in *Table 1*. The initial dataset included 117 participant responses. Of these responses, 14 were excluded due to incompletion of the study consent and/or debrief procedure and an additional seven opted out of having their data analyzed. Of the remaining 96 participants, two participants were excluded for not being in the emerging adulthood age (18 to 29 years old). Two participants did not complete the state empathy measure. All other data was complete. Childhood and adolescent subscales for nonverbal emotional abuse, parental physical maltreatment, and parental verbal abuse were skewed (>1) and were transformed with square root transformations. Correlations with transformed variables appear in *Table 2*. Gender was not a significant covariate and thus was not considered in subsequent analyses. Total maltreatment scores were not predictive of state (b=-.32, $t(90)$=.64, p=.53) or trait empathy(b=.14, $t(92)$=.03, p=.98). The vignette measure of state empathy had a significant moderate positive correlation with trait empathy (r=.30, p=.003). MACE sexual abuse, witnessing interparental violence, and witnessing violence to siblings subscales were substantially skewed (3.21, 3.49, 2.88, respectively). As such, data for these three subscales were examined as potential binary predictors (*0*=no exposure, *1*= any exposure) before linear regression analysis. After dichotomizing these subscales, only 13% participants reported any level of sexual abuse, 25% reported witnessing of interparental violence, and 22% reported witnessing violence to siblings. Rates of exposure to the remaining maltreatment subscales in this sample are as follows: 62% of participants reported some degree of emotional neglect, 50% reported nonverbal emotional abuse, 47% reported physical neglect, 61% reported physical

maltreatment, and 59% reported verbal abuse. Data for the MACE was missing not at random (MNAR). Upon further analysis, MNAR data was driven by sexual abuse, witnessing interparental violence, and witnessing violence to siblings subscales. Multiple imputation was not appropriate for this missing data given it was MNAR (Jakobsen et al., 2017). Due to these data abnormalities, sexual abuse, witnessing interparental violence, and witnessing violence to siblings subscales were excluded from the analysis.

Maltreatment Subtypes Predicting Empathy

State Empathy (Vignette Measure)

State empathy was regressed onto each of the five maltreatment subscales (*Table* 3). Physical neglect was a significant predictor of state empathy (b=-.68, t(90)=-2.25, p=.027) and accounted for 5.3% of the variance (R^2=.05). Emotional neglect (b=-.51, t(90)=-1.79, p=.078), nonverbal emotional abuse (b= .52, t(90)=1.88, p=.063), parental physical maltreatment (b= .47, t(90)=1.65, p=.102), and parental verbal abuse (b= .32, t(90)=1.42, p=.16) were not significant predictors of state empathy.

Trait Empathy (TEQ)

Trait empathy was regressed onto each of the five maltreatment subscales (*Table 4*). Emotional neglect was a significant predictor of trait empathy (b= -6.52, t(92)=-2.06, p=.042) and accounted for 4.4% of the variance (R^2=.044). Parental physical maltreatment was a significant predictor (b= 6.35, t(92)=2.01, p=.047) and accounted for 4.2% of the variance (R^2=.044). Physical neglect was also a significant predictor (b=-9.29, t(92)=-2.84, p=.006) and accounted for 8% of the variance (R^2=.08). Nonverbal emotional abuse (b= 3.27, t(92)=1.03,

p=.31), and parental verbal abuse (*b*= 1.96, *t*(92)=.77, *p*=.44) were not significant predictors of trait empathy.

Age of Exposure

State Empathy (Vignette)

Results from the relative weights analysis predicting state empathy are shown in *Table 5*. Emotional neglect from both child and adolescent exposure together accounted for 9% of the variance in state empathy (R^2=.09; *adjusted* R^2=.07). Relative weights analysis revealed that childhood emotional neglect accounted for 2.2% (*b*=.022) of the variance and 23.78% of the rescaled weight, and adolescent emotional neglect account for 6.9% of the variance (*b*=.069) and 76.22% of the rescaled weight in contributing to state empathy. Adolescent and child emotional neglect were significantly different from each other (95% CI [.002, -.14]; *Figure 1*). No significant age of exposure differences existed for nonverbal emotional abuse (95% CI [-.14, .02]), physical neglect (95% CI [-.004, .10]), parental physical maltreatment (95% CI [-.09, .09]), or parental verbal abuse (95% CI [-.05, .05]).

Trait Empathy (TEQ)

Emotional Neglect

Results from the relative weights analysis predicting trait empathy are shown in *Table 6*. No significant differences between childhood and adolescent maltreatment exposure existed for any of the five maltreatment subscales (emotional neglect, 95% CI [-.02, .06], nonverbal emotional abuse, 95% CI [-.1, .01], physical neglect, 95% CI [-.05, .01], parental physical maltreatment, 95% CI [-.11, .01], parental verbal abuse 95% CI [-.01, .08]).

Discussion

The results partially support the a priori hypotheses based on the theory of the autonomic social engagement system (Porges, 1995; 2009). The first hypothesis suggested that maltreatment that does not threaten physical safety and does not present opportunities for attuned child-caregiver interactions should be associated with lower levels of empathy. The current study's findings show higher levels of physical neglect were associated with lower state and trait empathy levels. Additionally, higher levels of emotional neglect were associated with lower trait empathy scores. In line with Porges theory of the social engagement system, these patterns may highlight how physical and emotional disconnection from caregivers across development provides fewer opportunities for individuals to "practice" social attending, thus leading to a physiological system that is not attuned to exhibit empathy. The presence of attuned interactions from caregivers, both emotionally and physically, are crucial to fine-tune the development of an individuals' capacity to attend to others.

The second hypothesis posited that maltreatment subtypes that threaten physical safety will result in higher levels of empathy to support attention to threat. The study results show physical maltreatment contributes to an increase in trait empathy. This finding aligns with literature showing heightened social-emotional attention is necessary to assess for potential interpersonal interactions that may threaten one's physical boundaries (Hirai et al., 2022; Pollak & Tolley-Schell, 2003). Those with histories of physical maltreatment may have adapted to have a vigilant disposition in order to attend to potentially threatening caregiver emotions.

The first exploratory question investigated the importance of age of exposure to each maltreatment subscale. Relative weight analyses revealed that emotional neglect in adolescence was significantly more impactful than childhood emotional neglect in predicting state empathy. Evolving caregiver-child relationships may explain the emphasized weight of emotional neglect

in adolescence. As children approach adolescence, they engage in less attachment behaviors with caregivers and increasingly use peer and romantic relationships as additional attachments (Keizer et al., 2019; Kerns et al., 2006). Moreover, maturationist models posit that increased conflict and less closeness with caregivers occurs in order to negotiate growing autonomy, with a goal of ultimately evolving the adolescent-caregiver relationship (Laursen & Collins, 2009). As such, some caregivers may be prone to emotionally withdraw given this increased tension. Despite less attachment behaviors and more relationship strain, adolescents still perceive and use caregivers as primary attachment figures and require ongoing emotional support and attunement (Kobak et al., 2017). Further, research shows that consistent and attuned parenting strategies in adolescence, such as monitoring, discipline, supervision, and acceptance, are linked with increased social functioning in emerging adulthood (Jones et al., 2000). In conjunction with a potential for withdrawn caregiving, adolescence may be a particularly vulnerable period for the development of state empathy given the role of social modeling (Bandura, 1977). As adolescents begin expanding their peer relationships, they may more closely use interactions with caregivers as a roadmap to navigate novel interpersonal situations. Therefore, not only may a lack of love, support, and availability from caregivers be detrimental to the social engagement system, but adolescents may learn how to react to their own unpredictable interpersonal situations by observing emotionally neglectful responses from caregivers.

The second exploratory question investigated the differences among trait and state empathy as outcomes. While physical and emotional neglect and physical maltreatment were significantly associated with trait empathy, only physical neglect and emotional neglect in adolescence were associated with state empathy. Maltreatment subtypes may be more likely to contribute to one's trait empathy, similar to how childhood maltreatment may influence more

stable constructs, such as personality types (Oshri et al., 2013; Rogosch & Cicchetti, 2004). For example, results of the current study showed that emotional neglect was negatively associated with trait empathy. Exposure to this type of maltreatment across development may contribute to an attenuated foundational ability for empathy. Additionally, physical maltreatment was associated with higher trait empathy. This pattern may reflect that a baseline disposition to be consistently attuned to others' emotions is more adaptive in order to consistently scan for environmental threats. In regard to physical neglect, exposure to this maltreatment subtype permeates both trait and state empathy capabilities. Severity of a lack of physical resources from caregivers provides a potential explanation for this ubiquitous pattern; physiological needs and safety are requisite for interpersonal well-being (Maslow & Lewis, 1987).

Aside from physical neglect, results show that maltreated individuals' capacity for state empathy partially diverges from their trait empathy. For emotional neglect, state empathy may be particularly salient as adolescents have been learning how to navigate specific, novel interpersonal situations based on their interactions with caregivers. It is also helpful to consider that the current state empathy measure only targets three specific situations. Individuals with exposure to certain maltreatment subtypes may respond differently to different vignettes. For example, more threatening or emotionally intense vignettes may have elicited an increase in state empathy in individuals with histories of physical maltreatment. Further research is needed to understand the adaptive function of empathetic reactions to a variety of specific situations.

Interestingly, many of the subtypes of maltreatment did not show significant associations with either state or trait empathy. Parental verbal abuse and nonverbal emotional abuse may simultaneously not threaten physical safety (therefore not eliciting increased emotional attunement) while still allowing for caregiver interactions (albeit negative). As for sexual abuse,

witnessing interparental violence, and witnessing violence to siblings, these subscales were significantly skewed, data was not missing at random, percentage of those exposed in the sample was low, and one scale showed heteroscedasticity with state empathy. The lack of usable data creates inconclusive findings for this study.

Limitations

Although this study has strengths in providing novel information on the associations of maltreatment subtype and timing with state and trait empathy, several limitations should be considered when interpreting the results. First, this study consists of a sample of undergraduate students from one university. It is possible that certain study constructs, such as empathy, may vary by location or education level. Collecting data across regions and socioeconomic status would give further insight into the associations of maltreatment and empathy.

Second, self-report measures are subject to bias. Despite participants being blinded to the study's purpose, questions regarding empathy may still elicit socially desirable responding. Additionally, reporting histories of maltreatment from ages 3 to 18 may be fallible to recall bias. Maltreatment reported from adolescence may be more accurate than that reported from childhood due to temporal distance. To combat this issue, timing of exposure was binned into two main age categories (childhood and adolescence) to give a general view of age of exposure, rather than specific years. Another limitation of this data collection method is the inability to interpret associations as causational. In the future, longitudinal and prospective studies would account for both of these limitations.

Fourth, the state empathy measure includes vignettes designed to reflect common and relatable situations for an emerging adult sample. However, these situations may not be relatable

to all participants. In the future, more situations of varying emotions and intensities should be used to elicit empathetic responses from participants.

Fifth, three subscales of maltreatment (i.e., sexual abuse, witnessing interparental violence, and witnessing violence to siblings) were substantially skewed, had a low percentage of individuals exposed to any degree of the maltreatment, and had data missing not at random. These phenomena may be less prevalent than other forms of maltreatment in the population being studied. In the future, a larger sample size should be used to conduct a more robust analysis on the effects of these maltreatment types on empathy.

Lastly, the analytic plan consists of ten linear regressions and ten relative weight analyses. The high number of individual analyses increases the likelihood of receiving a spurious significant result. However, as analyses were conducted to explore individual influences of each maltreatment subtype and not intended to be compared, a type I error correction was not implemented. Results should be interpreted with caution.

Implications

This study's findings highlight opportunities for prevention and intervention to bolster the development of empathy. Results reveal overlap in predictors of state and trait empathy, such that physical and emotional neglect have negative associations with both trait and state empathy. Specifically, emotional neglect negatively predicts state empathy for those with greater exposure in adolescence. Spreading awareness of these associations to caregivers, teachers, healthcare providers, and victims of maltreatment may help combat the pervasive effects. In particular, education on the importance of emotional support and attunement to adolescents may support caregivers who are trying to navigate children's burgeoning autonomy. Lastly, physical maltreatment perpetrated by caregivers predicted increased trait empathy. While an increase in

empathetic disposition may present itself as a favorable outcome, too much empathy may be linked with hypervigilance and mental health problems (Cardona-Isaza et al., 2022; Wagner et al., 2019). Those possessing the trait for increased attention to others' emotions may be more likely to require mental health intervention. Ultimately, increased awareness of the links between maltreatment subtypes, age of exposure, and empathy may support preventions for caregivers prone to maltreatment, interventions for those who have experienced maltreatment, and may subsequently lead to more individuals engaging harmoniously in society.

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Table 1

Variable means, standard deviations, range, and skews

	M	SD	Range	Skew
State empathy	3.24	-.76	1.33-4.83	-.14
Trait empathy	46.61	-8.61	30-63	-.12
Total MACE score	.20	.16	0-.84	1
Emotional Neglect	.29	-.28	0-1	.38
Nonverbal Emotional Abuse	.22	-.28	0-.83	.99
Physical Neglect	.21	-.26	0-1	.77
Parental Physical Maltreatment	.28	-.28	0-1	.57
Parental Verbal Abuse	.34	-.35	0-1	.57
Emotional Neglect in childhood	.37	.26	0-.87	-.25
Emotional Neglect in adolescence	.40	.24	0-1	-.20
Nonverbal Emotional Abuse in childhood	.06	.13	0-.59	2.25
Nonverbal Emotional Abuse in adolescence	.10	.16	0-.69	1.7
Physical Neglect in childhood	.35	.26	0-.76	-.25
Physical Neglect in adolescence	.37	.24	0-.83	-.37
Parental Physical Maltreatment in childhood	.12	.16	0-.63	1.31
Parental Physical Maltreatment in adolescence	.04	.08	0-.48	2.58
Parental Verbal Abuse in childhood	.10	.18	0-.72	1.83
Parental Verbal Abuse in adolescence	.16	.02	0-.79	1.12

Note. State empathy as measured by the vignette measure. Trait empathy as measured by the TEQ (Toronto Empathy Questionnaire); childhood= age 3 to 11, adolescence= age 12 to 18

Table 2

Variable correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. EV	--																
2. TEQ	.30**																
3. MACEt	.07	.003															
4. EN	-.18	-.21*	.57***														
5. NVEA	.19	.11	.69***	0.06													
6. PN	-.23*	-.28**	.44***	.73***	-.09												
7. PPM	.17	.21*	.75***	.15	.53***	.03											
8. PVA	.15	.08	.75***	.22*	.6***	-.02	.61***										
9. ENc	-.13	-.15	.35***	.65***	.04	.62***	-.03	.09									
10. ENa	-.25*	-.17	.31**	.68***	.004	.55***	-.09	.08	.85***								
11. NVEAc	.2	.17	.61***	.08	.69***	-.03	.49***	.51***	-.07	-.09							
12. NVEAad	.22*	.14	.63***	.07	.84***	-.14	.53***	.57***	-.09	-.09	.83***						
13. PNc	-.23*	-.17	.21*	.5***	-.09	.65***	-.08	-.1	.84***	.7***	-.14	-.23*					
14. PNad	-.29**	-.14	.20	.51***	-.1	.63***	-11	-.11	.78***	.81***	-.1	-.22*	.89***				
15. PPMc	.19	.16	.62***	.12	.44***	.03	.85***	.50***	-.05	-.14	.51***	.50***	-.10	-.12			
16. PPMad	.18	.06	.63***	.24*	.39***	.09	.63***	.57***	.03	.05	.38***	.45***	-.05	-.1	.53** *		

17. PVAc	.06	.05	.71***	.14	.55***	.12	.57***	.77***	.02	-.02	.61***	.51***	-.07	-.05	.58***	.48***
18. PVAad	.05	.08	.68***	.15	.59***	-.03	.57***	.88***	.04	.06	.44***	.57***	-.11	-.13	.43***	.58***	.69***

Note. EV= Empathy Vignette (state empathy), TEQ= Toronto Empathy Questionnaire (trait empathy), MACEt= total of all maltreatment subscales, EN=Emotional Neglect, NVEA=Nonverbal Emotional Abuse, PN=Physical Neglect, PPM=Parental Physical Maltreatment, ENc= childhood exposure to emotional neglect, ENad= adolescent exposure to emotional neglect, NVEAc= childhood exposure to nonverbal emotional abuse, NVEAad= adolescent exposure to nonverbal emotional abuse, PNc= childhood exposure to physical neglect, PNad= adolescent exposure to physical neglect, PPMc= childhood exposure to parental physical maltreatment, PPMad= adolescent exposure to parental physical maltreatment, PVAc= childhood exposure to parental verbal abuse, PVAad= parental verbal abuse, $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$

Table 3

Linear Regressions: Maltreatment Subtypes Predicting State Empathy (Empathy Vignette)

	b	R^2	*SE*	*t*	95% CI		*p*
					LL	*UL*	
MACE total	.32	.004	.5	.64	-.68	1.31	.53
Intercept	3.18		.13	24.85	2.92	3.43	<.001
EN	-.51	.034	.28	-1.79	-1.07	.06	.08
Intercept	3.24		.08	41.43	3.08	3.39	<.001
NVEA	.52	.038	.28	1.88	-.03	1.07	.06
Intercept	3.24		.08	41.53	3.08	3.39	<.001
PPM	.47	.03	.28	1.65	-.09	1.04	.102
Intercept	3.24		.08	41.39	3.09	3.4	<.001
PN	-.68	.053	.3	-2.25	-1.27	-.08	.027
Intercept	3.24		.08	41.81	3.08	3.9	<.001
PVA	.32	.022	.22	1.42	-.13	.76	.16
Intercept	3.24		.08	41.23	3.09	3.4	<.001

Note. EN=Emotional Neglect, NVEA=Nonverbal Emotional Abuse, PN=Physical Neglect, PPM=Parental Physical Maltreatment, PVA=Parental Verbal Abuse

Table 4

Linear Regressions: Maltreatment Subtypes Predicting Trait Empathy (TEQ)

	b	R^2	*SE*	*t*	95% CI		*p*
					LL	*UL*	
MACE total	.14	0	5.65	.03	-11.08	11.37	.98
Intercept	46.58		1.44	32.16	43.7	49.45	<.001
EN	-6.51	.044	3.15	-2.06	-12.77	-.25	.04
Intercept	46.61		.87	53.4	44.87	48.34	<.001
NVEA	3.27	.011	3.17	1.03	-3.03	9.57	.31
Intercept	46.61		.89	52.51	44.84	48.37	<.001
PPM	6.35	.042	3.16	2.01	.08	12.63	.047
Intercept	46.61		.87	53.34	44.87	48.34	<.001
PN	-9.29	.08	3.28	-2.84	-15.8	-2.79	.006
Intercept	46.61		.86	54.44	44.91	48.31	<.001
PVA	1.96	.006	2.54	.77	-3.08	7	.44
Intercept	46.61		.89	52.38	44.84	48.37	<.001

Note. TEQ=Toronto Empathy Questionnaire, EN=Emotional Neglect, NVEA=Nonverbal Emotional Abuse, PN=Physical Neglect, PPM=Parental Physical Maltreatment, PVA=Parental Verbal Abuse

Table 5

Relative Weights Analysis Predicting State Empathy (Vignette Measure)

Predictor	*b*	Relative weight	95% CI		95% CI IV Comparisons	
			LL	*UL*	*LL*	*UL*
IV: Emotional Neglect						
Childhood	.02	23.8	-.03	.06		
Adolescent	.07	76.2	.001	.17	.002	.14
IV: Nonverbal Emotional Abuse						
Childhood	.02	29.2	-.03	.12		
Adolescent	.05	70.8	-.02	.13	-.05	.1
IV: Physical Neglect						
Childhood	.03	32.05	-.02	.09		
Adolescent	.06	67.95	-.001	.15	-.0043	.1
IV: Parental Physical Maltreatment						
Childhood	.02	51.8	-.07	.12		
Adolescent	.02	48.2	-.07	.11	-.1	.09
IV: Parental Verbal Abuse						
Childhood	.007	49.63	-.14	.02		
Adolescent	.007	50.37	-.14	.02	-.05	.03

Note. IV= Independent Variable, 95% IV Comparisons= 10,000 bootstrapped confidence intervals comparing statistically significant difference of childhood and adolescent exposure

Table 6

Relative Weights Analysis Predicting Trait Empathy (TEQ)

Predictor	*b*	Relative weight	95% CI		95% CI IV Comparisons	
			LL	*UL*	*LL*	*UL*
IV: Emotional Neglect						
Childhood	.01	39.8	-.11	.05		
Adolescent	.02	60.2	-.1	.06	-.02	.06
IV: Nonverbal Emotional Abuse						
Childhood	.03	71.2	-.2	.03		
Adolescent	.01	28.8	-.21	-.01	-.08	.02
IV: Physical Neglect						
Childhood	.02	64.3	-.02	.1		
Adolescent	.01	35.7	-.03	.06	-.05	.01
IV: Parental Physical Maltreatment						
Childhood	.02	92.1	-.02	.13		
Adolescent	.002	7.9	-.05	.04	-.12	.01
IV: Parental Verbal Abuse						
Childhood	.003	20.2	-.16	.01		
Adolescent	.01	79.8	-.15	.02	-.02	.07

Note. IV= Independent Variable, 95% IV Comparisons= 10,000 bootstrapped confidence intervals comparing statistically significant difference of childhood and adolescent exposure

Figure 1

Vignette Empathy Measure Three Vignettes

Scenario 1: You're in the grocery store when you see a mother and her toddler come down the same aisle as you. For no known reason, the child starts screaming and crying. Other people around her begin to look annoyed.

Q1: What emotions do you think the mother is feeling? List as many emotions as you can. For each, explain why she might be feeling that way.

Q2: How do you feel in this situation? List as many emotions as you can think of. For each emotion, please explain why you are feeling that way.

Scenario 2: You are watching your friend compete in a road race for their cross-country team. Your friend has been telling you how important this race is for her all week. One runner is about 3 minutes ahead of your friend, but she develops sharp abdominal pain along the race. Your friend sees her on the course, stops, finds a coach to alert, and once she is helped off the course, your friend finishes the race with a time that is 10 minutes longer than she might have otherwise had.

Q1: What emotions do you think your friend is feeling? List as many emotions as you can. For each, explain why your friend might be feeling that way.

Q2: How do you feel in this situation? List as many emotions as you can think of. For each emotion, please explain why you are feeling that way.

Scenario 3:You're headed home after a full day of work. You're in a no pass zone and the car in front of you is marked as a student driver. The student driver is going 10 miles under the speed limit. You hear other drivers begin to honk their horns behind you.

Q1: What emotions do you think this student driver is feeling? List as many emotions as you can. For each, explain why the student driver might be feeling that way.

Q2: How do you feel in this situation? List as many emotions as you can think of. For each emotion, please explain why you are feeling that way.

Note. Vignette order was randomized per each participant.

Figure 2

Vignette Empathy Measure Coding Manual

We will be coding participants' responses with global empathy ratings. Global empathy ratings are based on question 1 and 2 from each scenario. Please see below for the scale of each ratings:

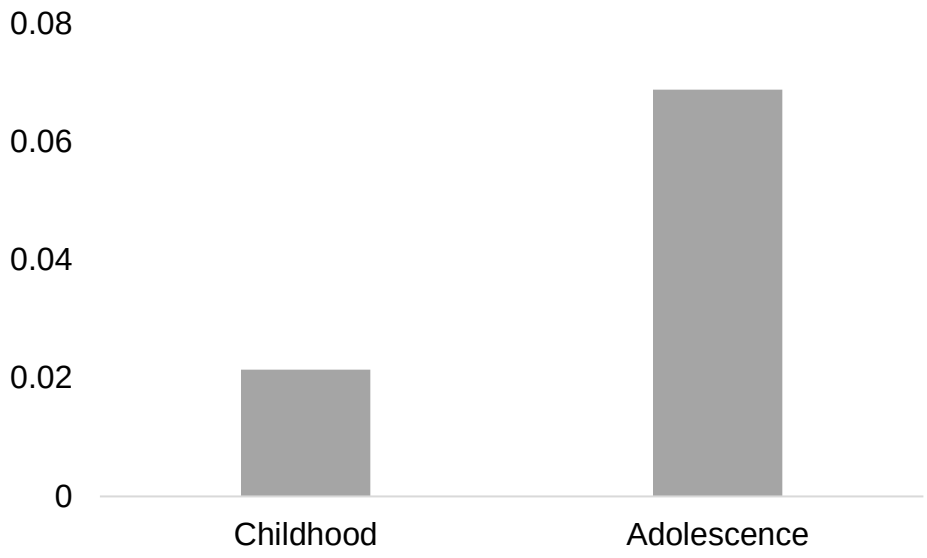
- **Global Empathy Ratings**
  - **1** - No emotion or empathy / inappropriate emotion with no elaboration of explanation
  - **2** - Having some emotions but no acknowledgment of the situation or elaboration of the situation
  - **3** - Having some emotions and demonstrating some but very little acknowledgment of other person's experience, but does not focus on the other person's perspective
  - **4** - Having some emotions and demonstrating some acknowledgment of other's experiences. Stating emotions and giving some reasons why the person feels that way
  - **5** - Having some emotions and clearly demonstrating perspective-taking from both points of view, focused on another person's experience, demonstrating compassion, acknowledgment of the other person's experiences, especially if it is different from yours. Elaborate explanations for why the person in the scenario feels the way they do. The respondents' feelings take into consideration the feelings of the person in the scenario.

** Global empathy ratings are rated based on <u>both responses</u> from question 1 and 2 in each scenarios.

Note. A global rating is one score representative of empathy based on responses to the two open-ended questions

Figure 3

Relative Weights of Childhood versus Adolescent Exposure to Emotional Neglect Predicting State Empathy



Note. Relative weights are raw based on an unadjusted R^2=.09.