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EMOTIONAL COMPETENCE IN CHILDREN: A UNIFYING FRAMEWORK AND NOVEL MEASURE

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This dissertation, written by Megan Hare, and entitled Emotional Competence in Children: A Unifying Framework and Novel Measure, having been approved in respect to style and intellectual content, is referred to you for judgment.

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ABSTRACT OF THE DISSERTATION

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Emotional competence is a precursor to the development of healthy psychosocial functioning, with deficits in emotional competence triggering a cascade of negative outcomes throughout development. Despite the importance of each component of emotional competence, there are inconsistent definitions with negative downstream implications for assessment, risk identification, prevention/intervention, and monitoring treatment progress. Therefore, the first paper presented a unifying theoretical framework of emotional competence, which included four main components: emotion reasoning, emotion stability, emotion regulation, and empathy. This paper also reviewed commonly used assessments for each component of emotional competence to examine how questions from each assessment align with their descriptions and relate to definitions provided. The second paper developed a comprehensive parent-report measure of emotional competence grounded in the unifying framework. Through six empirically driven stages, a factor structure consisting of four overall components of emotional competence was established (i.e., Emotion Reasoning, Emotion Stability, Emotion Regulation Empathy), and

subcomponents for Emotion Reasoning (Interpersonal and Intrapersonal) and Emotion Stability (Duration, Threshold, Intensity) were supported. The final measure demonstrated strong psychometric properties across indexes of reliability and validity. Lastly, the paper examined the unique concurrent validity of each scale and subscale across a range of mental health outcomes. Results suggest that each component and subcomponent of emotional competence holds distinct and important utility in screening and assessing children across disorders.

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ABBREVIATIONS AND ACRONYMS

ADHD	Attention deficit/hyperactivity disorder
ARI	The Affective Reactivity Index
DBD	The Disruptive Behavior Disorder
CAMS	Children's Anger Management Scales
CEMS	Children's Emotion Management Scales
CFA	Confirmatory factor analyses
Conners	The Conners 3rd Edition, Parent Short Form
CU	Callous-unemotional
CWMS	Children's Worry Management Scale
CSMS	Children's Sadness Management Scale
DERS	The Difficulties in Emotion Regulation Scale
EC	Emotional competence
EDA	Electrodermal activity
EESC	The Emotion Expression Scale for Children
EFA	Exploratory factor analyses
EMA	Ecological momentary assessment
EMT	Emotion Matching Task
ERC	The Emotion Regulation Checklist
ERICA	The Emotion Regulation Index for Children and Adolescents
GEM	The Griffith Empathy Measure
ICU	The Inventory of Callous-Unemotional Traits
IECE	The Empathy Index for Children and Adolescents

IRI	The Interpersonal Reactivity Index
MTurk	Amazon’s Mechanical Turk
ODD	Oppositional defiant disorder
PEP	Cardiac pre-ejection period
RCADS	The Revised Children's Anxiety and Depression Scale- Short Version
RSA	Respiratory sinus arrhythmia

I. INTRODUCTION

Emotional competence (EC) is a precursor to the development of healthy psychosocial functioning (Domitrovich et al., 2017; Hessler & Katz, 2010; Saarni, 1999), with deficits in EC triggering a cascade of negative outcomes throughout development (Herts et al., 2012; Leehr et al., 2015; Trentacosta & Fine, 2010). For example, EC deficits are involved in the pathogenesis of the most common childhood mental health disorders (e.g., ADHD; Graziano & Garcia, 2016) and are associated with high levels of impairment over time (Moffitt et al., 2011). Assessing each component of EC (i.e., emotion reasoning, emotion stability, emotion regulation, empathy) is vital, as these components differentially predict later functioning across multiple domains (Izard et al., 2001; Kim-Spoon et al., 2013; Zych et al., 2019). Further, given the transdiagnostic associations of these facets, each component is consistently targeted in evidence-based treatments and may act as key mechanisms of change across multiple types of interventions (e.g., Luby et al., 2020; Jennings & Greenberg, 2009). Failure to correctly identify and assess each component of EC may limit case conceptualization and personalized treatment planning which, in turn, can inhibit an individual's progress in treatment and undermine the success of an intervention. Thus, accurately defining and measuring each component of EC holds important implications for children's overall health.

Despite the importance of each component of EC, inconsistent definitions in the literature have resulted in detrimental downstream implications for assessment, risk identification, prevention/intervention, and monitoring treatment progress. Therefore, the current paper presents a unifying theoretical framework of EC with direct applications to assessment, to increase consistent and accurate measurement. In addition, commonly used

assessment tools for each component of EC in children are reviewed to demonstrate how they relate to definitions provided herein to discusses the direct impact of assessment and consistency of such constructs. A targeted literature search was conducted by examining previously published meta-analytic studies and systematic reviews for each component of EC, as well as current peer-reviewed publications. Next, google scholar was used to investigate how frequent each measure has been cited in order to select commonly used self- and parent-report measures per component. Importantly, some measures state that they assess multiple components of EC. If other popular assessment methods (e.g., tasks) were available for each component they were also included and reviewed. Lastly, a summary of the current issues in the field regarding the measurement of the components of EC and recommendations for future research is provided.

Theory of Emotional Competence

The model proposed in this review integrates influential work in emotion theory (Gross, 1998; Saarni, 1999) with applications from a meta-analytic review (Graziano & Garcia, 2016) and clinical interventions (Southam-Gerow, 2013) into a unifying theoretical framework of EC. In line with previous work, the proposed model is comprised of four distinct, but related, components (emotion reasoning, emotion stability, emotion regulation, and empathy), see Figure 1. However, the current framework defines each construct as an independent component, rather than as a temporal process where components are dependent on each other. Further, this model incorporates associations between components, as well as related constructs not included in previous models (e.g., irritability, callousness). Lastly, the current framework refines previous terminology and

definitions and introduces subcomponents for emotion reasoning (i.e., interpersonal and intrapersonal) and emotion stability (i.e., threshold, duration, and intensity).

Emotion Reasoning

The first component in the model is emotion reasoning, also referred to in the literature as emotion knowledge, emotion understanding, emotion recognition, emotional intelligence, emotion differentiation, emotional granularity, alexithymia, and emotional awareness. Emotion reasoning is defined as the ability to accurately identify emotional states in one's self and others and understand appropriate responses to those recognized emotional states (Ruba & Pollak, 2020). Emotion reasoning-interpersonal is the ability to use expressive behaviors and contextual information to make reasoned inferences and predictions about other people's emotional states. Emotion reasoning-intrapersonal relies on behavioral and contextual information sources, as well as individual internal cognitive and physiological affective experiences to correctly identify one's current emotional state.

Development of Emotion Reasoning

As early as infancy, children can discriminate between and categorize different facial expressions, such as happy or afraid (Izard et al., 1995). At approximately 1 year, infants engage in social referencing, using adults' emotion reactions to guide their own behavior and also develop expectations about the types of emotions that will be elicited in certain situations (Hoehl & Striano, 2008; Leppänen & Nelson, 2009). As children increase their vocabulary around 2-3 years, they begin to apply verbal labels to emotion, typically starting with the basic emotions such as happy and sad (Barrett et al., 2007; Cole et al., 2009; Izard, 1992). When children move into preschool, they begin to accurately identify and label basic emotions in themselves and others (e.g., sadness, happiness, fear, and anger)

and to comprehend and connect their internal and external causes (Bassett et al., 2012; Pons et al., 2004). This increase in emotion reasoning is partially due to exposure to new surroundings (e.g., preschool) and the formation of bonds outside of caregivers, enabling children to move beyond basic emotion experiences (Izard et al., 2011). By 6 years, children are fairly accurate at discriminating several facial expressions of emotion (Izard, 1971), with some studies suggesting near-adult levels of recognition are achieved before adolescence (Tremblay et al., 1987). Across childhood, youth gradually learn how to define more emotion words, to accurately label emotional facial expressions, to predict specific emotional responses from contextual settings, and to manage their emotional responses (Baron-Cohen et al., 2010; Nook et al., 2020). However, a more detailed understanding of how emotion reasoning continues to develop throughout later childhood and adolescence is less clear, with most studies focusing on infancy and early childhood (Herba & Phillips, 2004).

Emotion Reasoning Outcomes

Emotion reasoning has been related to academic performance (DuPaul et al., 2004; Haynes et al., 2003; Wilson et al., 2001), executive functioning (Denham et al., 2012), internalizing and externalizing problems (Trentacosta & Fine, 2010), and response to treatment across multiple domains of functioning (Hare et al., 2021). Emotion reasoning also plays a role in children's social competence, with better emotion reasoning leading to more positive social interactions with parents, teachers, and peers (Curby et al., 2015; Ensor et al., 2011). On the other hand, children with low emotion reasoning have a difficult time recognizing and understanding emotions in others and may inappropriately respond

to others with withdrawn or aggressive behavior (Izard et al., 2001; Voltmer & von Salisch, 2017).

Assessment of Emotion Reasoning

One of the most commonly used self-report measures of emotion reasoning is the Emotion Expression Scale for Children (EESC; Penza-Clyve & Zeman, 2002), comprised of two scales **(**see Table 1). The first scale, the Poor Awareness scale, is defined as difficulty labeling internal emotional experience, which aligns with our definition of emotion reasoning- intrapersonal. Whereas the Reluctance to Express Emotion scale describes a lack of motivation or willingness to communicate or express negative emotions to others. This scale assesses a reluctance to share or show emotions (e.g., "I do not like to talk about how I feel"), reflecting an underlying level of emotion reasoning- intrapersonal (i.e., one must correctly understand how they are feeling to talk about it), but is not a direct measure emotion reasoning-intrapersonal. Further, while some questions also appear to measure suppression (e.g., "When I am sad, I try not to show it"), other questions (e.g., "It is hard for me to show how I feel about somebody") assess difficulties expressing emotion, rather than active suppression.

A set of commonly used measures for multiple components of EC are the Children's Sadness Management Scale (CSMS; Zeman et al., 2001), the Children's Anger Management Scales (CAMS; Zeman et al., 2001), and Children's Worry Management Scale (CWMS; Zeman et al., 2010), collectively referred to as the Children's Emotion Management Scales **(**CEMS; Zeman et al., 2001). Within each of the separate versions (i.e., CSMS, CWMS, CEMS) there are the same three subscales: Inhibition, Dysregulated Expression, and Coping. The first subscale, Inhibition, assesses the masking or suppressing

of emotional expression (e.g., “I hide my sadness/anger/worry”). Similar to the Reluctance to Express Emotion scale, this subscale does not directly assess emotion reasoning and only suggests an underlying level of emotion reasoning-intrapersonal (i.e., you have to correctly understand you feel sadness/anger/worry in order to successfully hide it). Additionally, as it is unclear if these questions assess suppression (i.e., they are actively trying to suppress an emotion) verse specifically not showing an emotion to someone (e.g., expressing the emotion to yourself, but staying in your room to avoid a parent seeing), these scales do not align with emotion regulation either.

The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) is the most commonly used adult self-report measure to assess six domains of emotion dysregulation. It has been used with children as young as 11 years old (Neumann et al., 2010; Vasilev et al., 2009; Weinberg & Klonsky, 2009). The Nonacceptance scale focuses on the acceptance of emotions, which includes a tendency to have negative secondary emotional responses to initial negative emotions or not accepting one’s reactions to distress (e.g., “When I’m upset, I feel ashamed with myself for feeling that way”). Similar to the above scales, the Nonacceptance subscale implies a level of emotion reasoning-intrapersonal (i.e., the individual must correctly understand they feel ashamed) without directly assessing the core construct. The Awareness subscale assesses the ability to attend to and acknowledge emotions. While some of the questions relate to emotion reasoning, other questions (e.g., “When I’m upset, I acknowledge my emotions”) expand to other constructs (e.g., acceptance). Lastly, the Clarity scale assesses lack of emotional clarity, which includes the ability to identify the emotions one is experiencing, thus serving as a measure of emotion reasoning-intrapersonal.

Specific to an individual's ability to differentiate emotions in themselves, researchers have also used ecological momentary assessment (EMA) methods to assess emotion reasoning. Briefly, an EMA requires individuals to complete multiple emotion ratings each day in response to specific emotions (e.g., anger), with high consistency in emotion ratings across instances indicating poor emotion differentiation (Erbas et al., 2014). Researchers have also shown positive and negative images to participants and then asked them to report how much they felt each emotion while looking at the image (e.g., Nook et al., 2018). Similarly, high consistency in emotion ratings across images indicates poor differentiation of one's affect, with both tasks assessing emotion reasoning-intrapersonal.

Additionally, there are also two common emotion reasoning tasks in children: the Emotion Matching Task (EMT; Izard et al., 2003) and Denham's (1986) Puppet Interview. The EMT measures a child's recognition of emotion expressions, production of expression labels, matching of expressions and examiner-verbalized expression labels, and articulation of the causes of each expression. In Denham's puppet interview, children are shown a series of four faces (depicting happy, sad, angry, and scared) and asked to identify the emotion using words (expressive recognition). Children also receive the name of an emotion and are asked to identify it from a series of feeling faces (receptive recognition). Both tasks align with our conceptualization of emotion reasoning, focusing more on emotion reasoning.

Emotion Stability

The next component is emotion stability, also referred to in the literature as emotion negativity, emotion lability, emotion reactivity, and emotional impulsivity. Emotion

stability is defined as an individual's rapidity in responding to emotion eliciting stimuli, including the threshold, intensity, and duration of affective arousal for both positive and negative emotions (Rothbart & Derryberry, 1981). Rapidity in responding to emotion eliciting stimuli refers to the emotions expressed immediately following entry into a situation or exposure to a stimulus. For example, if a child with low emotion stability is told they cannot go to their friend's party, their initial reaction may be screaming or throwing a tantrum. Individuals with low emotion stability experience low frustration tolerance, higher levels of irritability, quickness to anger, and emotional excitability. Further, children who are prone to emotional instability may experience greater emotional and physical responses to stressful situations (Pietromonaco & Barrett, 2009).

The threshold, intensity, and duration of emotion stability are dependent on the emotion expressed, which can be positive or negative. Again, considering the child who could not go to the birthday party, it may be that the child has a low threshold (e.g., they already knew they couldn't go to the party, so this is not new information/a surprise), high intensity (e.g., they are screaming at the top of their lungs, breaking things), but short duration (e.g., it only lasts one minute). Duration can also refer to the quick changes between emotions (also referred to in the literature as lability). For example, if a child reacts very strongly, but then quickly changes their mood drastically, that would be captured under duration. Given that the threshold, intensity, and duration can vary for each situation/stimulus, we further break down emotion stability into each of these three subdomains, emotion stability-threshold, emotion stability-intensity, emotion stability-duration.

Within emotion stability, it is also important to understand irritability. While irritability represents a component of emotion stability, it can also be assessed as its own construct. Irritability is defined as excessive reactivity to negative emotional stimuli (for a comprehensive review on irritability see Beauchaine and Tackett, 2020). The most commonly used self- and parent-report measure of irritability is the Affective Reactivity Index (ARI; Stringaris et al., 2012). While the two constructs (i.e., irritability and emotion stability) overlap, research has demonstrated that they are separate constructs (Liu et al., 2019; Maire et al., 2020), with irritability representing an even smaller subcomponent of emotion stability. Therefore, when assessing these constructs, it is important to provide clear definitions.

Development of Emotion Stability

As early as infancy, research has shown significant individual differences in emotional reactivity to novel and stressful events (Calkins et al., 2007; Fox, 1989). Yet, there is a limited understanding of how emotion stability develops across childhood and adolescence (Leaberry et al., 2020). While some research has shown a genetic underpinning (Coccaro et al., 2012), it has also been suggested that adverse childhood experiences, such as maltreatment, may contribute to the development of poor emotion stability (Kim-Spoon et al., 2013). Early life stressors may predispose children to have a more reactive and negative response to emotional situations, increasing vulnerability to experiencing worse emotion stability later in life (Cicchetti & Handley, 2017; Leaberry et al., 2020). Although some research has examined emotion stability in the context of psychiatric disorders (Marwaha et al., 2014), even fewer studies have examined the etiology of emotion stability or how it develops in non-clinical populations. Future research

is needed to understand how emotion stability develops in typically developing and clinical samples.

Emotion Stability Outcomes

Greater emotion stability has been linked to better social skills and lower levels of aggression (Dvorak et al., 2013; Eisenberg et al., 1995), while low emotion stability has been shown to predict peer rejection, internalizing, and externalizing problems (Kim-Spoon et al., 2013; Reyes et al., 2020). Within clinical populations, low emotion stability is associated with worse impairments and reduced response to treatment. For example, poor emotion stability is associated with increased severity of ADHD symptoms (Sobanski et al., 2010) and represents one of the strongest predictors of suicidal behavior in individuals with borderline personality disorder (Yen et al., 2004).

Assessment of Emotion Stability

Within the CEMS, while the description of the Dysregulated Expression subscales align with our definition of emotion stability, many of the questions within the sadness (CSMS; e.g., "I do things like mope around when I am sad") and worry (CWMS; e.g., "My child can't stop him/herself from acting really worried") versions assess other constructs (e.g., depressed mood). However, the dysregulated expression subscale in the anger version (CAMS; e.g., "My child does things like slam doors when he/she is mad") provides a clearer fit to our definition of emotion stability, specifically within the subcomponent intensity. Within the DERS, the Impulse scale assesses an individual's impulse-control difficulties (e.g., "When I'm upset, I lose control over my behaviors"), reflecting both emotion stability threshold and intensity.

Another common self-report measure is the Emotion Regulation Index for Children and Adolescents (ERICA; MacDermott et al., 2010), stated to assess emotion regulation. The first scale, Emotional Control, is reflective of dysregulated negative affect or inappropriate emotional displays (e.g., "When things don't go my way, I get upset easily") and fits with our definition of emotion stability, including threshold and intensity. Lastly, the most common parent-report measure of emotion stability is the Emotion Regulation Checklist (ERC; Shields & Cicchetti, 1997). The scale for emotion stability, called Negativity/Lability, represents negative affect, anger dysregulation, arousal, and mood lability. While the description of the scale and many of the questions map onto our definition of emotion stability for negative emotions, there are individual questions that assess other components of EC such as empathy (e.g., "Takes pleasure in the distress of others").

Emotion stability also can be assessed by observational coding during different emotion electing tasks (e.g., frustration). Across the literature, many different tasks (e.g., impossibly perfect circles, gift delay) and coding systems (e.g., Jahromi et al., 2012; Siener & Kerns, 2012; Van Liefferinge et al., 2018) have been used. One example of a coding system is an adapted version of the Laboratory Temperament Assessment Battery (LAB-TAB; Goldsmith & Rothbart, 1993). Children's facial expressions are coded during such tasks for affect lability on a scale from 0 = *stable* to 4 = *very unstable*.

Emotion stability also has been indexed by sympathetic functioning via psychophysiological measures, such as the cardiac pre-ejection period (PEP) and electrodermal activity (EDA; Beauchaine, 2001; Caruelle et al., 2019). Stressful stimuli that evoke approach-based responses (e.g., reward responsiveness) are associated with

reactivity indexed via cardiac PEP (i.e., the systolic time interval between contraction of the left ventricle and the onset of ejection of blood into the aorta, with shortened PEP associated with sympathetic activation linked to emotional reactivity/arousal (Beauchaine, 2001; Sherwood et al., 1986). Similarly, EDA (i.e., variation of the electrical conductance of the skin in response to sweat secretion) also has been correlated with avoidance or negative reactivity, (Caruelle et al., 2019). However, more research examining how PEP and EDA relate to emotion stability in children is needed to draw more concrete conclusions.

Emotion Regulation

The next component is emotion regulation. While maybe the most commonly used term, there is no clear consensus on a definition (Adrian et al., 2011; Cole et al., 2004; Compas et al., 2017). Some researchers have used the term to represent a broad, umbrella construct of emotional functioning (similar to our use of EC), while others have used it to represent a very specific aspect of EC. Further, researchers also have combined components of EC (i.e., emotion reasoning and emotion stability) and referred to this construct as emotion regulation. The current framework defines emotion regulation as extrinsic and intrinsic processes responsible for monitoring, evaluating, and modulating emotional arousal to generate and sustain emotions to accomplish one's goal (Thompson, 1994). Emotion regulation goals include increasing or decreasing the magnitude or intensity of emotion experience, expression, or physiology (i.e., emotion stability). This includes the down regulation of negative (e.g., having a calm conversation although you are extremely mad) and positive emotions (e.g., concealing your excitement about a gift for someone before they open it), as well as the upregulation of positive (e.g., sharing happy

news to prolong excitement) and negative emotions (e.g., yelling to get pumped up for fight) to accomplish one's goal. Importantly, emotion regulation strategies can be adaptive or maladaptive, depending on the specific individual, the emotion, and the context (Aldao & Nolen-Hoeksema, 2012).

It is also important to address the term emotion dysregulation. Emotion dysregulation also had a range of definitions, including as a broad construct, a specific component of emotion functioning, and a term encompassing multiple aspects of EC. Further, some researchers use the term emotion dysregulation on the same spectrum as emotion regulation, indicating that emotion dysregulation is synonymous with poor emotion regulation. Conversely, other researchers have used the term emotion dysregulation to represent a related, but separate construct. We consider emotion dysregulation (e.g., lack of coping skills) to be on the same spectrum as emotion regulation, representing poor emotion regulation capabilities.

Development of Emotion Regulation

Although infants have been shown to engage in self-soothing and regulatory behaviors (e.g., thumb sucking; Thompson & Goodman, 2010), emotion regulation capacity is limited and infants largely depend on parents and the family environment to help them regulate their own emotions (Morris et al., 2007; Woltering & Lewis, 2009). Even as children develop, parents represent one of the most influential forces in the development of emotion regulation. For example, the quality of the infant-parent relationship not only influences infants' emotion regulation, but also predicts emotion regulation capabilities in preschool (Cole et al., 2004). To better understand the impact of the family on children's emotion regulation development, Morris and colleagues (2007)

proposed the tripartite model. According to the model, parents/families influence children's emotion regulation through three mechanisms: children's observation of parents' emotion regulation (e.g., modeling, social referencing, emotion contagion), emotion-related parenting practices (e.g., emotion coaching, reactions to emotions), and the emotional climate of the family (e.g., attachment, parenting style, emotional expressivity, family relationships). Into late childhood and adolescence, other socialization contexts start to play a larger part in children's emotion regulation development and functioning such as peers and school (e.g., Kelly et al., 2008). However, the family environment still plays an important role, with research demonstrating that parenting behaviors and parent-youth interactions still predict adolescent emotion regulation (Criss et al., 2016).

Emotion Regulation Outcomes

Emotion regulation has been found to be related to multiple domains of functioning, including physical and mental health. Children with adaptive emotion regulation are more prosocial, have better social skills and relationships with their parents, and have better academic success (Eisenberg et al., 2000; Smithers et al., 2018). Conversely, maladaptive emotion regulation (or emotion dysregulation) has been shown to underlie multiple disorders and comorbidities (Compas et al., 2017; Sloan et al., 2017), with emotion regulation in childhood impacting mental health problems more than 30 years later (Robson et al., 2020). Further, maladaptive emotion regulation also has been associated with multiple physical health problems such as cardiovascular disease, diabetes, obesity, and sleep problems (Cloitre et al., 2019; Crowell et al., 2015; Shih & Davis, 2020).

Assessment of Emotion Regulation

Across the CEMS, the Coping subscale fits with our definition of emotion

regulation, as it assesses the ability to cope with anger/sadness/worry through constructive control over emotional behaviors, see Table 1. Within the DERS, the Strategies subscale assesses an individual's access to emotion regulation strategies perceived as effective and partially overlaps with our definition of emotion regulation (e.g., "When I'm upset, I believe that wallowing is all I can do"), demonstrating limited emotion regulation skills. The Goals subscale of the DERS assesses difficulties engaging in goal-directed behavior when upset partially conforms with our definition of emotion regulation (e.g., "When I'm upset, I have difficulty getting work done"). The second subscale in the ERICA (MacDermott et al., 2010), Emotional Awareness, represents emotional self-awareness (e.g., "I am a sad person"), reluctance to express emotion (e.g., "I am quiet and shy and I don't show my feelings"), and emotion regulation (e.g., "I handle it well when things change"). Given the variability within the Emotional Awareness subscale, it does not clearly align with any of our definitions.

As with emotion stability, the most common parent-report measure of emotion regulation is the ERC. Within the ERC, the Emotion Regulation scale assesses processes central to adaptive regulation, including socially appropriate emotional displays and empathy. However, the Emotion Regulation scale has been found to have low face validity (Mazefsky et al., 2021), as it includes items that assess other constructs of EC, such as emotion reasoning (e.g., "Can say when s/he is feeling sad, angry or mad, fearful or afraid") and empathy (e.g., "Is empathic towards others"). It is important to note that a recent comprehensive review examining the psychometric properties of measures of regulation found most measures would not be recommended for use (Mazefsky et al., 2021). When utilizing current measures, it may benefit researchers to conduct an EFA and/or CFA for

measures used to assess main outcomes within their own samples. For researchers and clinicians, they may also want to examine what individual items actually capture the construct they are trying to assess, rather than relying on the description of the measure.

There are also multiple observational coding systems used to assess emotion regulation during frustration tasks (e.g., Cole et al., 2003; Provenzi et al., 2017). For example, LAB-TAB is also used to assess emotion regulation whereby children's facial expressions and reactions are coded on a scale from 0 = *dysregulated or no control of distress* to 4 = *child seemed to completely regulate distress during most of the task.* Emotion regulation also can be assessed during delay of gratification/frustration tasks by coding the type and number of regulation strategies employed, such as active distraction, focus on object, seeking physical comfort (e.g., Grolnick et al., 1996).

Physiological measures, such as respiratory sinus arrhythmia (RSA), also have been used to examine emotion regulation (e.g., Calkins et al., 2019). As a measure of parasympathetic arousal, RSA reflects heart rate variability, which is controlled by the vagus nerve. Vagal regulation, in the form of RSA suppression during a stressful/demanding task, may reflect physiological processes that allow a child to shift focus from internal homeostatic demands to the generation of coping strategies to control affective or behavioral arousal. Research has shown that higher resting RSA and suppression of RSA during challenging situations is associated with better emotion regulation while lower resting RSA was associated with poor emotion regulation (e.g., Beauchaine, 2001; Beauchaine, 2015). Overall, RSA may serve as a peripheral index and potential biomarker of emotion regulation (Thayer & Lane, 2000).

Empathy

Empathy is a commonly used term, defined as the ability to feel or express emotions/behaviors that are consistent with the emotional experience of others, based on the relevance of the experience/situation to that person (Eisenberg et al., 2015; Saarni, 1999). Importantly, empathy can occur whether or not an individual has experienced the same situation or correctly understands what another person is feeling (i.e., emotion reasoning). For example, if a child is crying over the loss of a pet, another child can still be upset and feel sad for them, even if they have never owned a pet themselves. Empathic expression can also occur for positive emotions. For example, even if a child does not like animals, they can still be happy and express congratulations for another child getting a dog for their birthday.

It is important to note that some literature defines empathy through two separate components: cognitive and affective empathy. Cognitive empathy is defined as one's ability to comprehend the affective or cognitive status of another, while affective empathy refers to the ability to experience another's affective state and/or express concern for another's position (Blair et al., 2005). While research tends to find more consistent associations between affective empathy and expected outcomes (e.g., peer relationships, prosocial behavior), findings are mixed when examining cognitive empathy, with null findings more likely to be found within the cognitive empathy domain (Gini et al., 2008; Van der Graaff et al., 2018; Winters et al., 2020). This is likely due to the fact that the definition for cognitive empathy overlaps with emotion reasoning-interpersonal. Based on the current theoretical framework of EC, emotion reasoning-interpersonal represents the knowledge/ability to correctly identify how others are feeling, as part of a larger emotion

reasoning component, while empathy represents a separate component of feeling the emotion of another person, expressing concern, or helping behaviors.

In conceptualizing and defining empathy, it also is important to understand the construct callous-unemotional (CU) behaviors, defined as having a lack of guilt, caring for others, empathy, and unemotional traits (Frick et al., 2014). The most common parent- and self-report measure is the Inventory of Callous-Unemotional Traits (ICU; Frick, 2004). There are various competing theories for how the constructs of empathy and CU relate (i.e., one construct on the same spectrum verses two separate constructs). A recent meta-analysis examining the association between CU and empathy found a high correlation between CU and empathy (r= -.57), but smaller correlations when examining affective (r = −.33) and cognitive empathy (r = -.43) separately (Waller et al., 2020). However, there is significant variability in the measurement of these constructs (i.e., CU and empathy) across studies. Based solely on the definition, lack of empathy only represents a component of the overall construct of CU. However, at the measurement level, questions used to assess CU and empathy are very similar. For example, questions like "Feels sorry for another child upset" assesses empathy (Dadds et al., 2008), while similar questions (e.g., "Is concerned about the feelings of others") are reverse coded and are used to assess callousness (Frick, 2004). Future work examining differences of empathy and CU within self, parent, and observational report may shed light on these questions.

Development of Empathy

Empathy begins to develop at a young age, with many researchers suggesting empathy develops through phases. First, infants can start to mimic others' emotions and emotional responses. For example, an infant may cry because they see another infant cry

(sometimes referred to as reflexive or contagious crying), even though they do not understand how the other infant is feeling (Geangu et al., 2010). Toddlers begin to show more complex forms of empathic concern to others' distress, such as facial expression or vocal responses. Around 2-3 years old, a child starts to show physical displays of empathy towards others, such as hugging (Eisenberg et al., 2014). As children move into the preschool age (4-5 years), they start to become capable of taking another's perspective. As children develop, they can also start to experience how others are feeling by remembering their own similar emotional experiences. Among adolescents, empathy has been shown to be related to multiple environmental processes (e.g., family interactions, school climate; Silke et al., 2018). Research has shown that positive parent-child interactions (Thompson & Gullone, 2008; You et al., 2015), supportive and cohesive family relationships (Estévez et al., 2016; López et al., 2008), quality of peer friendships (Barr & Higgins-D'Alessandro, 2007; Evans & Smokowski, 2015; Plenty et al., 2015), and positive, democratic school environments (Barchia & Bussey, 2011; You et al., 2015) are related to greater empathy among adolescents.

Empathy Outcomes

Empathy plays an important role in children's social competence, with greater empathy leading to more prosocial behaviors and better quality relationships (Williams et al., 2014). In children, low empathy is associated with poor peer relationships, hostility, and bullying (Findlay et al., 2006; Mayberry & Espelage, 2007), while low empathy in adolescence is associated with aggression and antisocial behavior (Cohen & Strayer, 1996; Lovett & Sheffield, 2007).

Assessment of Empathy

One of the most common self-report measures of empathy is the Interpersonal Reactivity Index (IRI; Davis, 1983). The IRI contains four subscales, each capturing a separate facet or precursor of empathy. The Empathic Concern subscale assesses the feelings of sympathy and compassion for others and provides the closest match to our definition of empathy within the EC model (see Table 1). The Fantasy subscale measures the tendency to imaginatively transpose oneself into fictional situations. While some questions measure empathy, other questions assess an individual's involvement in movies/TV (e.g., "Becoming extremely involved in a good book or movie is somewhat rare for me"). The Perspective Taking subscale measures adopting the psychological point of view of others. Similarly, only some questions align with our definition of empathy, while other questions focus more on willingness to listen (e.g., "If I'm sure I'm right about something, I don't waste much time listening to other people's arguments). The last subscale, Personal Distress, assesses the tendency to experience distress and discomfort in response to extreme distress in others and does not map onto any EC constructs. Instead, this scale assesses personal responses to emergency situations.

Next, the Situational Responsiveness scale of the ERICA assess empathy (e.g., "When others are upset, I become sad") and situationally appropriate affective displays (e.g., When other kids are friendly to me, I am friendly to them). Although some of the questions assess empathy, questions related to affective display do not clearly align with any of our definitions and may be more in line with prosocial behavior. Another self-report measure created to assess empathy is the Empathy Index for Children and Adolescents (IECE; Bryant, 1982), which creates an overall subscale to assess empathic resonance of

sadness, empathic concern, and personal distress (e.g., “I get upset when I see a girl being hurt”) and fits with our definition of empathy.

A common parent-report measure of empathy is the Griffith Empathy Measure (GEM; Dadds et al., 2008), which captures an overall dimension of empathy as well as two subscales of affective and cognitive empathy. The affective subscale (e.g., “My child gets upset when they see another child being punished”) assesses empathy, while the cognitive subscale (e.g., “It's hard for my child to understand why someone else gets upset”) relates to our definition of emotion reasoning-interpersonal.

II. CURRENT GAPS AND FUTURE DIRECTIONS

Definitional & Theoretical Considerations

The theoretical and research literature on the components of EC reflect little consensus on definitions, with substantial variation in operationalization and measurement of each component. Different terms are being used to describe the same construct and, at times, the same term is used for describing different constructs. The inconsistencies around conceptualization and definitions substantially limit the ability to aggregate findings, synthesize the literature, and draw meaningful conclusions about the development and potential associations of these components. The framework proposed in this paper provides guidelines for consistently defining each component of EC and an understanding for how related terms/constructs (i.e., emotion dysregulation, irritability, CU) fit within the unifying framework. Specifically, we recommend using the term EC to represent broad, overall emotional abilities (i.e., emotion reasoning, emotion stability, emotion regulation, empathy). Under the umbrella of EC, the term emotion regulation should be reserved for a specific component of EC (i.e., describing extrinsic and intrinsic processes responsible for

monitoring, evaluating, and modifying emotional reactions, including increasing or decreasing the magnitude or intensity of emotion experience). Further, we argue for breaking down emotion reasoning and emotion stability into subcomponents, as these subcomponents may differentially relate to functioning and provide better insight into pathways of risk and resilience and potential mediators of treatment response. Lastly, we propose that the ability to use expressive behaviors and contextual information to make reasoned inferences and predictions about other people's emotional states is defined as emotion reasoning-interpersonal and not captured under empathy (i.e., cognitive empathy). It is also important to understand that these components are not diagnostic labels and may represent healthy functioning or impairment based on the circumstances and understanding of the reporter.

Psychometric Properties

Inconsistent definitions directly impact assessment. Many current measures of the components of EC have limited psychometric support, leading to concerns of theoretical purity, and the potential for successful replication. For example, different studies testing the same hypothesis using two different measures, may arrive at different results. These inconsistences may mistakenly be attributed to issues within the hypothesis rather than differences in the content of the measure itself or measurement error, underscoring the importance of consistent and clear definitions for each construct and measure across studies.

Additionally, limited measures have been examined using measurement invariance, which gives clinicians and researchers confidence that the same underlying construct is being measured in the same way across groups or time (Van De Schoot et al., 2015).

Specifically, only a few measures have examined measurement invariance across sex (e.g., Lucas-Molina et al., 2016; Neumann et al., 2010). Almost no studies have used measurement invariance to examine fit across other important constructs, such as child developmental stage, although numerous measures are used across multiple developmental periods (e.g., 5-17). Many measures were also created and tested in middle class, White, Non-Hispanic samples, but are used within diverse samples. Yet limited measures have examined measurement invariance across race, ethnicity, culture, or socioeconomic status. As clinicians and researchers work with children and adolescents from diverse backgrounds, for comparisons of impairment, symptomatology, and effectiveness of treatments, it is important to know whether a measure can provide comparable information across children with different demographic or clinical characteristics. Lastly, while many measures have been used in longitudinal studies or to assess treatment progress over time, limited research has examined measurement invariance longitudinally. Without measurement invariance, mean differences and the strength of predictive relationships in regression models can be over-estimated and may lead to false conclusions (see Chen & West, 2008 for an example). Data sharing across diverse samples would increase power and permit exploration of measurement invariance across multiple domains, allowing for items to be revised, new items developed, or scoring adjusted. Taken together, the evaluation of psychometric properties and measurement invariance will enhance the field's confidence in the assessments utilized leading to increased consistency across research and clinical settings.

A Cohesive Single Measure

Next, there is currently no measure that simultaneously assesses all components of

EC. Although research has demonstrated discriminant validity between the components of EC, they are also related. For example, having good emotion regulation may make it easier to develop empathy or emotion reasoning skills (Lucas-Molina et al., 2020; Ornaghi et al., 2020). There are also issues of conceptual overlap across some constructs (e.g., emotion reasoning and cognitive empathy). As many of these overlapping constructs have not been included in the same measure and are rarely assessed together, it limits our ability to statistically examine theoretical differences. Further, the existing measures do not discriminate across components of EC or have too much conceptual overlap. This directly impacts our ability to replicate findings and accurately assess each component in treatment. When studies do assess multiple components of EC (e.g., Nalbant et al., 2019), replication may still be difficult with interpretations limited based on constraints of current measures. As each component of EC may differentially predict psychopathology and relate to progress in treatment, being able to assess each construct accurately and consistently is critical. Future research should develop a novel measure, for parent-report, youth self-report, and teacher-report that includes all components of EC together. Additionally, an adult self-report would provide unique insight into how parents' own EC may influence perceptions of their child's EC. Starting with questions from all domains and using theory and statistics to guide the development would increase theoretical purity and allow for more accurate results when examining these domains together. For example, including questions that measure empathy and emotion reasoning-interpersonal would increase confidence that they are separate constructs, as defined in this paper, or if they are related under one larger construct of empathy (i.e., fitting more in line with cognitive and affective empathy). In addition, a measure that includes all components will make it easier and increase the

likelihood that researchers and clinicians will assess all relevant components, leading to a better picture of children's overall emotion functioning.

Normed Scores and Cutoffs

Lastly, while some of these scales have been shown to be reliable and valid measures of EC continuously, less work has focused on developing cutoff scores. This has limited their use in detecting clinically elevated levels to inform treatment planning. Although continuous values are important (i.e., monitoring treatment progress), they can be less informative/convenient when deciding whether a child is at-risk and needs early prevention or if their score is in the clinical range of impairment and needs treatment. Additionally, none of the scales reviewed herein have normed scores, limiting comparisons between how a child is functioning/scoring relative to the general population. While this limits our ability to detect weaknesses for each child, it also limits our understanding of what components of EC may be a strength for a child in comparison to the population.

More work is needed to better understand what scores on each of these measures and scales represent. Creating validated cutoff scores would allow for increased detection of children at-risk for EC deficits and the ability to distinguish groups on important outcomes related to EC. We recommend the use of rigorous statistics (e.g., ROC analysis, Youden's index) to develop new normed measures and clinical cutoffs. Further, the development of normed scores would provide a better understanding of what each child's score represents and how it compares to the population.

Limitations

We acknowledge that our review and recommendations are not without limitations. We did not complete a systematic or meta-analytic review of measures for each construct

and acknowledge there a number of other available measures. The purpose of this targeted review was to focus on assessment tools currently being utilized in the field and examine how questions align with their descriptions and relate to definitions presented. We are also not disregarding the importance of the measures presented in the study. Rather, the goal is to demonstrate the inconsistency in definitions and terms used to represent them, while providing a unifying theoretical framework with clear definitions to increase consistency and move the field forward. We also recognize that there have been many accomplished researchers and clinicians who have developed theories around emotion, in which our model of EC is based (e.g., Gross, 1999; Sarni, 1999). Our goal was to synthesize a large body of research across multiple domains that typically are examined in isolation and demonstrate how issues related to a specific definition can directly impact assessment, with downstream impacts on risk identification, prevention/intervention, monitoring treatment progress, leading to inconsistencies in the field.

Further, while we did include a brief overview of how each component develops, we did not review how each component may differ across important constructs (e.g., gender, culture) as it was not the focus of the current review. Importantly, the literature has demonstrated mixed findings, with only some work showing differences across components of EC for such constructs (e.g., Ang & Goh, 2010; Michalska et al., 2013; Morelen et al., 20210; Sanchis-Sanchis et al., 2020). These mixed findings may be a result of the inconsistent definitions and measurement of such constructs, with few measures demonstrating measurement invariance, which may introduce bias and skew true differences or similarities. Finally, while not a limitation of this paper specifically, but of the complexity of defining/measuring emotion constructs, it is important to recognize that

components in this paper are related. While research has demonstrated discriminate validity between the components of EC, the ability to better define and measure these constructs will lead to a more profound understanding of their shared variance and unique properties. Precise and accurate measurement of these different components also holds important implications for future research regarding the identification of biological underpinnings and developmental trajectories that could inform future precision therapeutics (i.e., prevention, treatment, medication).

III. CONCLUSION

The components of EC represent critical constructs in the development of healthy functioning across the lifespan. Therefore, accurate and consistent definitions and measurement are vital to understanding developmental trajectories, predicting those at risk, and monitoring treatment gains. As demonstrated in the current review, many current assessment tools fall short of accurately measuring components of EC. The current paper presents a unifying theoretical framework with clear definitions, for how different components of emotion relate and fit within the EC model. New assessments, based on the theoretical model of EC, are needed to increase clarity and consistency across fields and constructs.

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Table 1. *Parent- and Youth Self-Report Measures of the Components of Emotional Competence*

Measure	Reporter	Age	# of Qs	What the Authors state they are measuring	Components of EC	Example Question	Alphas
Emotion Expression Scale for Children (EESC)*	Self-report	7-17	8	**Poor awareness**: difficulty labeling internal emotional experience	**Emotion Reasoning**	*I often do not know how I am feeling*	.78-.83
			8	**Expressive reluctance**: lack of motivation or willingness to communicate or express negative emotions to others.	N/A	*I prefer to keep my feelings to myself*	.76
Children's Emotion Management Scales (CEMS)	Self-report	6-17	4-5	**Inhibition:** the masking or suppressing emotional expression of sadness/anger/worry	N/A	*I'm afraid to show my anger/sadness/ worry*	.63-.72
			4-5	**dysregulated expression**: the outward expression of emotion in a dysregulated manner	**Emotion Stability** *(CAMS only)*	*I lose my temper when I am sad/angry/worried*	.51-.55
			4-5	**Coping**: the ability to cope with sadness/anger/worry through constructive control over emotional behaviors	**Emotion Regulation**	*I talk to someone until I feel better*	.41-.85
The Difficulties in Emotion Regulation Scale (DERS)*	Self-report	11-adult	6	**Nonacceptance**: acceptance of emotions, including tendency to have negative secondary emotional responses to initial negative emotions or not accepting one's reactions to distress	N/A	*I talk to someone until I feel better*	.76
			6	**Awareness:** lack of emotional awareness and understanding of emotions, or the ability to attend to and acknowledge emotions	N/A	*When I'm upset, I believe that my feelings are valid and important*	.77-.83
			8	**Strategies:** an individual's access to emotion-regulation strategies perceived as effective,	**Emotion Regulation**	*When I'm upset, I believe there is nothing I can do to make myself feel better*	.87
			5	**Goals:** difficulties engaging in goal-directed behavior when emotionally aroused	**Emotion Regulation**	*When I'm upset, I have difficulty concentrating*	.88
			6	**Impulse**: individual's impulse-control difficulties	**Emotion Stability**	*When I'm upset, I lose control over my behaviors*	.88
			5	**Clarity:** lack of emotional clarity, including the ability to identify the emotions one is experiencing	**Emotion Reasoning**	*I have no idea how I am feeling*	.76
Emotion	Parent	6-	8-	**Negativity/lability**: negative affect, anger	N/A	*Displays negative*	.84

Regulation Checklist (ERC)*	report	18	10	dysregulation, arousal, and mood lability		*emotions when attempting to engage others in play*	.87
			14 - 15	**Emotion Regulation**: processes central to adaptive regulation, including socially appropriate emotional displays and empathy	N/A	*Responds positively to neutral or friendly approaches by peers*	.56 - .73
The Emotion Regulation Index for Children and Adolescents (ERICA)*	Self-report	9-16	8	**Emotional control**: reflective of dysregulated negative affect or inappropriate emotional displays	**Emotion Stability**	*I get upset easily*	.73-.82
			5	**Emotional Awareness**: self-awareness, emotional modulation, and emotion regulation	N/A	*I am a happy person*	.53-
			4	**Situational responsiveness**: assess empathy and situationally appropriate affective displays	N/A	*When other kids are friendly to me, I am friendly to them*	.72-.75
Interpersonal Reactivity Index (IRI)*	Self-report	11 - 18	7	**Perspective taking**: measures the reported tendency to spontaneously adopt the psychological point of view of others in everyday life	N/A	*I sometimes try to understand my friends better by imagining how things look from their perspective*	.73
			7	**Empathic concern**: assesses the tendency to experience feelings of sympathy and compassion for unfortunate others	**Empathy**	*I often have tender, concerned feelings for people less fortunate than me*	.58 - .82
			7	**Personal distress**: scale taps the tendency to experience distress and discomfort in response to extreme distress in others	N/A	*Being in a tense emotional situation scares me*	.77
			7	**Fantasy**: measures the tendency to imaginatively transpose oneself into fictional situations	N/A	*When I am reading an interesting story/novel, I imagine how I would feel if the events in the story were happening to me*	.83
The Empathy Index for Children and	Self-report	6-16	22	**overall scale**: assesses empathic resonance of sadness, empathic concern, and personal distress	**Empathy**	*It makes me sad to see a girl who can't find anyone to play with*	.54-.79

Adolescents (IECE)*						
Griffith Empathy Measure; (GEM)*	Parent report	4-16	9	**Affective**: sharing of another's emotional state	**Empathy**	*My child gets upset when he/ she sees an animal being hurt* .83
			6	**Cognitive**: understand the emotional states of others emerges	**Emotion Reasoning**	*My child doesn't understand why other people cry out of happiness* .62

Note. * = indicates that the measure is freely available, Qs = questions, N/A = the subscale does not measure any of the components of emotional competence, age is in years

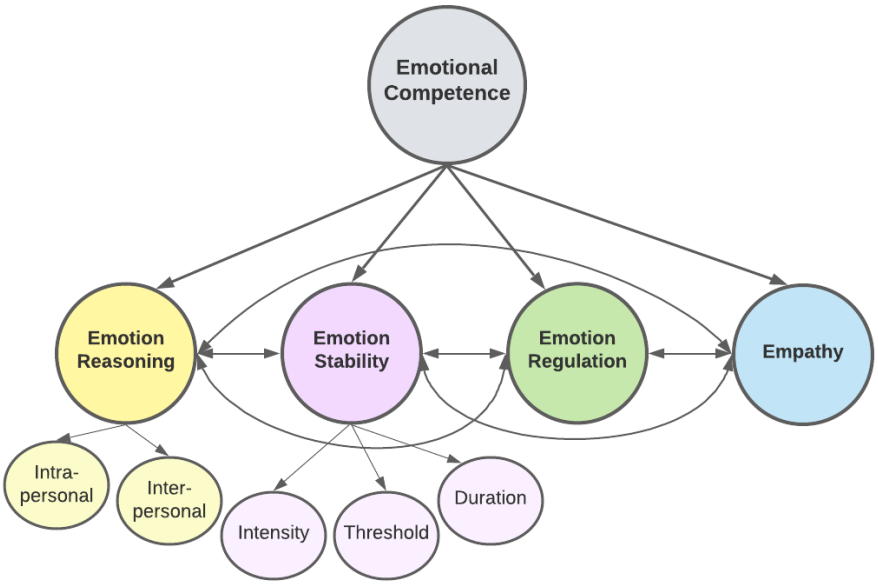

Figure 1. The theoretical framework of emotional competence.

I. INTRODUCTION

Emotional competence (EC) is the foundation to the healthy development of psychosocial functioning later in life. Children with good EC have better social skills, executive functioning, and parent-child relationships (Denham et al., 2012; Domitrovich et al., 2017; Eisenberg et al., 2010; Morris et al., 2018). In contrast, deficits in EC can lead to a host of negative outcomes, such as poor school readiness and aggression (Eisenberg et al., 2010; Herts et al., 2012), which can persist throughout development (Moffitt et al., 2011). EC has demonstrated transdiagnostic properties, exemplified by associations to multiple disorders such as ADHD, ODD, anxiety, and depression (Graziano & Garcia, 2016; Johnson et al., 2013; Sloan et al., 2017), in addition to heterotypic comorbidity (Airdrie et al., 2018; Aldao et al., 2016). Each component is also implicated in important domains beyond the scope of mental health functioning, such as work performance, treatment adherence, academic performance, and physical health (Karademas et al., 2011; Smithers et al., 2018; Zhao et al., 2019). Further, difficulties related to EC become more pronounced as children become older, which can have lasting impacts into adulthood (Moffitt et al., 2011; Robson et al., 2020), underscoring the need for early identification, prevention, and intervention.

A multidimensional, unifying theoretical framework of EC (Hare & Parent, under review) proposes that there are four main components of EC: emotion reasoning, emotion stability, emotion regulation, and empathy (see Figure 1). This framework diverges from previous models as it proposed a set of related but unique constructs, rather than a temporal process where components are dependent on each other. Further, this model refines previous terminology and introduces subcomponents for emotion reasoning (i.e.,

interpersonal and intrapersonal) and emotion stability (i.e., threshold, duration, and intensity). As each component differentially predicts later functioning across multiple domains (Aldao et al., 2016; Kim-Spoon et al., 2013; Zych et al., 2019) and is individually targeted in treatment (e.g., Southam-Gerow, 2013), accurately assessing each component is vital.

Yet, previous work (Lilienfeld & Strother, 2020; Mazefsky et al., 2021; Sellbom & Tellegen, 2019) has highlighted flaws within common assessment tools purported to measure components of EC. That is, some assessments actually assess constructs other than what they state (e.g., Gratz & Roemer, 2004), have weak psychometric properties (Mazefsky et al., 2021), and use identical items to measure different components (e.g., Shields & Cicchetti, 1997). A measure capable of assessing all components of EC simultaneously would provide empirical support for the theoretical framework proposed by Hare and Parent (under review) and allow for a better understanding of how these components are related. Therefore, to validate the unifying framework and advance the field in the assessment of EC, the current study aims to develop a novel parent-report measure that includes the various facets of EC, using rigorous statistical methods to ensure theoretical purity and determine psychometric properties. Development of this unifying measure will facilitate better identification of children at risk for EC difficulties, potentially informing the prevention of psychopathology across a spectrum of disorders and improving assessment of EC across the broader healthcare environment.

The Unifying Theoretical Framework of EC

The first component of EC theorized by Hare and Parent (under review) is emotion reasoning, defined as the ability to accurately identify emotional states in one's self and

others and understand appropriate responses to those recognized states (Ruba & Pollak, 2020). Greater emotion reasoning has been linked to better academic performance, executive functioning, positive social interactions, and response to treatment (Denham et al., 2012; Hare et al., 2021; Voltmer & von Salisch, 2017), while poor emotion reasoning predicted more internalizing and externalizing problems (Trentacosta & Fine, 2010). Emotion reasoning is also posited to be comprised of two subcomponents (Hare & Parent, under review): interpersonal and intrapersonal. Emotion reasoning-interpersonal is the ability to use expressive behaviors and contextual information to make reasonable inferences and predictions about other people's emotional states. Emotion reasoning-intrapersonal involves utilizing behavioral and contextual information sources, as well as individual, internal, cognitive, and physiological affective experiences to identify one's own emotional state (Hare & Parent, under review). The current paper will examine if emotion reasoning is best captured by a single overall dimension or these two subcomponents.

The next component of EC, emotion stability, is defined as an individual's threshold, intensity, and duration of affective arousal, for both positive and negative emotions (Rothbart, 1981). Children with good emotion stability have greater social skills and less externalizing problems, while children with poor emotion stability have higher levels of aggression and low frustration tolerance (Kim-Spoon et al., 2013; Reyes et al., 2020; Rosen & Factor, 2015). Based on prior work, emotion stability is further broken down into three subcomponents: threshold, intensity, duration (Hare & Parent, under review). While these subcomponents are related, as they represent the larger component of emotion stability, no current measure individually assesses threshold, duration, and

intensity. Therefore, more work is needed to determine if there is added benefit to assessing each subcomponent on its own. Similar to emotion reasoning, the current study will examine if an overall emotion stability measure is sufficient or if these three subcomponents should be assessed separately. Additionally, in order to understand related constructs in the field of emotion, Hare and Parent (under review) noted that irritability is a narrower subcomponent of emotion stability, representing excessive reactivity to negative emotional stimuli (Leibenluft & Stoddard, 2013; Stringaris, 2011). Given the increased scientific interest in irritability within the field (Beauchaine & Tackett, 2020; Stringaris, 2011), a subscale of irritability will also be examined within the current study.

The next component, emotion regulation, is defined as extrinsic and intrinsic processes responsible for monitoring, evaluating, and modulating emotional arousal to generate and sustain emotions to accomplish one's goal (Thompson, 1994). Emotion regulation includes increasing or decreasing the frequency or intensity of emotion experience, expression, or physiology (i.e., emotion stability). Emotion regulation has been linked to better peer relationships and fewer internalizing and externalizing disorders, while children with maladaptive emotion regulation (i.e., emotion dysregulation) predicted a wide range of physical and mental health symptoms (e.g., obesity, depression, ADHD) (Leehr et al., 2015; Sloan et al., 2017).

The fourth component, empathy, is the ability to feel and/or express emotions/behaviors that are consistent with the emotional experience of others, based on the relevance of the experience/situation to that person (Eisenberg et al., 2015; Saarni, 1999). Empathy can occur whether or not an individual has experienced the same situation or understands exactly what another person is feeling (i.e., emotion reasoning). High levels

of empathy are related to more positive social interactions, less aggression, and greater life satisfaction (Findlay et al., 2006; Williams et al., 2014). Within the current study, two alternative theories will be tested. The first is consistent with prior work that posits that empathy is comprised of two components (i.e., cognitive and affective). The second is based on the new unifying theoretical framework which posits that empathy is best represented by only the affective component of empathy, whereas what was labeled cognitive empathy in prior work, perhaps may be best conceptualized as the interpersonal subcomponent of emotion reasoning (Hare & Parent, under review). Accordingly, the current study will test whether empathy is represented by two subcomponents (i.e., cognitive and affective empathy) as proposed by others in the field (Eisenberg et al., 1997; Ze et al., 2014), or best represented by one latent factor (i.e., empathy), as proposed by Hare and Parent (under review). Importantly, these components are not diagnostic labels. As each component/subcomponent represents a spectrum of functioning, they illustrate interpretations of adaptive/non-impairing behaviors to maladaptive/impairing behaviors. The goal is to allow the data based on associations to guide the understanding of when each component and/or subcomponent is adaptive or maladaptive, for whom and for what outcomes, and under what circumstances.

In addition to conceptual inconsistencies that led to the development of the unifying EC framework (Hare & Parent, under review), most available measures of EC also have inadequate psychometric properties, such as poor reliability and inconsistent validity (Lilienfeld & Strother, 2020; Mazefsky et al., 2021). For example, few measure development studies have considered discriminant validity, which may contribute to replication failures (Lilienfeld & Strother, 2020). In addition, many measures were

developed and tested in middle class, White, Non-Hispanic samples, yet they are used with diverse populations. Many EC measures were also developed for use across a large age range, spanning different developmental periods (e.g., Penza-Clyve & Zeman, 2002), or are used in younger/older populations than the validation sample (e.g., Susa et al., 2014). Measurement invariance refers to the extent to which the same underlying construct or content of each item is being perceived and interpreted in the same way across groups (Hoyle, 2012). Without establishing measurement invariance, which is rarely done in child and family research (Stevanovic et al., 2017), researchers and clinicians cannot be confident that measures are operating similarly across various groups. Moreover, the strength of predictive associations can be over-estimated and may lead to false conclusions (e.g., Chen, 2008). Thus, the current study sought to develop an integrated EC measure with strong psychometric properties and measurement invariance across race, ethnicity, gender (i.e., how the child or caregiver identifies, not biological sex), and developmental stage to increase usability across diverse groups.

Lastly, there are only a few parent-report EC measures available, limiting the ability to gauge EC functioning in younger children. Parent-report tools make use of parents' unique perspective on their child's behavior and activities in various natural settings, rather than relying on observation of the child in an unfamiliar setting. Parent-report tools are quick and inexpensive compared to coding observational tasks and those completed by mental health professionals (Disabilities, 2001). Further, as parents play a key role in treatment, especially for younger children, understanding how parents view their children's emotional functioning is critical for informing treatment recommendations. Therefore, a

parent-report measure of the components of EC would allow for a better understanding and monitoring of treatment progress.

The Current Study

Therefore, the current study sought to validate the unifying theoretical framework of EC (Hare & Parent, under review) through the development of a parent-report measure of EC and its components. Recommended methods in measurement development (Clark & Watson, 1995; Matsunaga, 2010; Sellbom & Tellegen, 2019) will be used to thoroughly assess psychometric properties, including examining validity and measurement invariance across parent race, ethnicity, gender, socioeconomic status, and child gender and developmental stage.

II. METHOD

Measure development

Based on recommendations from Clark and Watson (2019), to clearly articulate the constructs and the hypothesized overlap and distinctiveness of each construct, items were based on a literature review on the components of EC and related topics (e.g., prosocial behaviors). Items were included from previous measures stated to assess the current constructs (see Appendix A). Some items that were taken from previous measures were modified in order to increase clarity and ensure appropriate reading level. In addition, new items were developed that mapped directly onto definitions of each component of EC and assessed clinical treatment targets. The goal was to have equivalent items per component of EC that aligned with definitions presented by Hare and Parent (under review): (emotion reasoning n = 18 items, emotion stability n = 24 items, emotion regulation n = 19 items, empathy = 19 items). However, given inconsistent definitions in the field and potential

overlap of constructs, some items were included that could assess multiple components of EC (e.g., emotion stability and emotion regulation), while other items that assessed related constructs (e.g., aggression) were included in order to determine theoretical overlap (n = 9 additional items). Additionally, as many previous measures only assess for positive or negative emotional functioning (e.g., Gratz & Roemer, 2004), the initial measure included questions capturing both positive and negative emotions across all scales. Reading level for the measure was also examined at each stage, using the Flesch-Kincaid Grade Level, to ensure that the measure was at or below a 6th grade reading level. Two doctoral-level and two Master-level psychologists reviewed all items for content and grammar. The initial item pool included 89 items.

The Likert-style rating scale was informed by the Anxiety Disorders Interview Schedule (ADIS; Silverman & Albano, 2004), which was designed to capture clinical impairment, relative to normal functioning. The current rating scale was designed as a means to help capture developmental functioning and what the parent perceives as appropriate/adaptive or inappropriate/maladaptive behavior. For example, a child may throw intense tantrums frequently, demonstrating low emotion stability. However, it may be more developmentally normative for a 4-year-old to express big feelings like this compared to an 11-year-old. Therefore, the response scale was the following: 1 = Never; 2 = Rarely; 3 = Occasionally; less than other children their age; 4 = About the same as other children their age; 5 = Sometimes; more than other children their age; 6 = Most of the time; 7 = Always.

Procedure

A total of 695 parents completed two separate studies through Amazon's Mechanical

Turk (MTurk), with recruitment managed through Cloud Research (Litman et al., 2017): study 1 (N = 395) and study 2 (N = 300). Both studies were approved by Florida International University's IRB. For Study 1 and Study 2, parents responded to a study that was listed separately for two age groups: young childhood (3 to 6 years old; Study 1 n = 208; Study 2 n = 146) and middle childhood (7 to 12 years old; Study 1 n = 187; Study 2 n =154). This approach was taken to ensure approximately equal sample sizes in each group to allow for measurement invariance testing across developmental stage. Parents were informed that they should answer questions about one child; if they had more than one child in the age range, they were asked to answer questions based on their *youngest* child in that age range for study 1. For study 2, parents were asked to complete questions based on their *oldest* child in that age range. Participants had to be at least 18 years old and have a child between the ages of 3-12. Recruitment was stratified through Cloud Research such that at least 50% of participants reported they identify with an ethnic or racial minority group to increase diversity within the sample and to support a sufficient sample size for measurement invariance analyses. Based on previous MTurk research (Litman & Robinson, 2020), participants who missed more than 1 out of 5 attention check questions for study 1 and more than 2 out of 10 attention checks for study 2 were excluded from analyses. Example attention check questions were: "please type out the word 'happy' below" and "please select 'c' from the answer choices below." Further, participants who participated in study 1 were excluded from participating in study 2.

MTurk. MTurk is currently the dominant crowdsourcing application in the social sciences (Chandler et al., 2014) and can help overcome some of the barriers of recruiting a normative sample of parents, such as increasing diversity of the sample. Prior research has

demonstrated that data obtained via crowdsourcing methods are as reliable and valid as those obtained via more traditional data collection methods (Hauser & Schwarz, 2016), including research conducted with children and families (Jensen-Doss et al., 2021). In addition to attention checks, additional data quality measures were implemented at the time of recruitment, including blocking duplicate IP addresses and suspicious geocode locations, the prevention of ballot box stuffing, and other participant recruitment criteria (e.g., HIT approval rate).

Study 1. There were 402 participants that initially completed the survey. Seven participants were removed for missing more than 1 attention check question. Therefore, the final sample included 395 parents. Participants completed one survey, that included a demographics questionnaire and the initial EC item pool. The survey took an average of 18.33 minutes to complete (range = 13-26 minutes). Participants were compensated $2.00 for completing the survey.

Study 2. There were 309 participants that initially completed the survey. Nine parents missed over 2 attention checks and were removed. The final sample included 300 parents. The first survey included a demographic questionnaire, the novel ECIC measure, and questionnaires assessing internalizing symptoms, externalizing behaviors, sleep, and emotion functioning. The survey took an average of 38.68 minutes to complete (range = 31-50 minutes). Two weeks later, participants received a follow-up survey through their MTurk-generated ID. This follow-up survey only included a brief demographic questionnaire and the ECIC measure (M_{time} = 6.6 minutes, range = 5-11 minutes). Completion of the follow-up survey marked the end of participation. Participants were compensated $4.00 for the first survey and $1.00 for the survey two weeks later.

Participants

Across the two studies, participants were on average 37 years old (*SD* = 6.29) with 64.0% identifying as female. Almost all participants reported English as their primary language (96.9%; study 1: 95.7%; study 2: 98.0%). Participants' children were 6.97 years old (*SD* = 2.93) on average, with 46.4% identifying as female. See Table 1 for full demographic information.

Measures

Study 1 and 2

The Emotional Competence in Children scale (ECIC) assesses the four domains of EC (i.e., emotion reasoning, emotion stability, emotion regulation, empathy). Parents responded to each item using a 7-point Likert-style rating scale from 1 (*never*), 4 (*about the same as other kids their age*), to 7 (*always*). The initial measure included 86 items assessing a wide range of emotion functioning.

Study 2

Child Functioning

The Disruptive Behavior Disorder (DBD; Pelham et al., 1992) Rating Scale assesses the degree to which children display symptoms of ADHD, ODD, and conduct disorder, using a 4-point scale ranging from 0 (not at all) to 3 (very much). A mean rating for ADHD symptoms, hyperactivity/impulsivity (a = .92) and inattention (a = .94), and oppositional defiant disorder (ODD; a = .93) symptoms were examined. Validity and reliability are well-established on these scales of the DBD (Pillow et al., 1998). This measure was used to examine the concurrent validity of all scales/subscales to more specific domains of externalizing behavior problems.

The Revised Children's Anxiety and Depression Scale- Short Version (RCADS; Chorpita et al., 2000; Chad Ebesutani et al., 2012) examined anxiety and depression. Items comprising the Anxiety Total scale were pulled from the 5 anxiety-related content domains from the original RCADS (Chorpita et al., 2000) and has significant correspondence with anxiety diagnostic groups based on structured clinical interviews. Items comprising the Depression Total scale have also demonstrated reliability within the clinic-referred and school-based samples (Chad Ebesutani et al., 2012). The total scores for anxiety (a =.90) and depression (a =.90) were used to examine the concurrent validity of each scale to more specific domains of internalizing symptoms.

The Patient Reported Outcomes Measurement Information System (PROMIS) Pediatric Measures – Sleep Disturbances and Sleep-Related Impairment (Forrest et al., 2018), which are short parent-report instruments that independently assess sleep disturbances and daytime impairment due to poor sleep in youth. The PROMIS Parent Proxy Sleep-Related Impairment (SRI) is an 8-item questionnaire that assesses a full range of sleep-related impairments (e.g., "*My child was sleepy during the daytime*). The measure was developed through a rigorous process, including concept elicitation with children, parents, and pediatric sleep experts, a theoretical concept base, and cognitive interviews of items established content validity. Further, the measure has demonstrated good psychometric properties (Bevans et al., 2019; Forrest et al., 2018). An overall score of sleep-related impairment (a =.96) was used to examine the concurrent validity of each scale.

The Affective Reactivity Index (ARI; Stringaris et al., 2012) assesses irritability (a =.87) via a three-point scale from 0 (*not true*) to 2 (*certainly true*). The ARI has seven

items, with items 1-6 summed for a total score, while item 7 reflects impairment. Research has shown support for the reliability and validity of the ARI as a concise measure of youth irritability (DeSousa et al., 2013; Stringaris et al., 2012; Wilson et al., 2021). The total score was used to examine convergent validity of the Emotion Stability scale and subscales, the irritability subscale, and discriminant validity for the Emotion Regulation scale. While items are similar, there are no overlapping questions for the total ARI score and the novel ECIC measure.

The Griffith Empathy Measure (GEM; Dadds et al., 2008) is a measure that captures an overall dimension of empathy, as well as two subscales of affective and cognitive empathy. Participants answer each item on a nine-point Likert scale from -4 (strongly disagree) to +4 (strongly agree). The GEM is an established measure of cognitive and affective empathy, with a stable factor structure across age and gender groups, inter-parental agreement, and convergence with child reports (Dadds, El Masry, et al., 2008; Dadds, Hunter, et al., 2008). The affective subscale (a = .83) was used to examine convergent validity for the empathy scale and discriminant validity for the emotion reasoning scale. In addition, the cognitive subscale (a = .84) was used to examine convergent validity for the emotion reasoning scale and discriminant validity for the empathy scale. There are no overlapping questions between the GEM and the novel ECIC measure.

The Conners 3rd Edition, Parent Short Form (Conners, 2008) assesses a broad range of child functioning. The Conners includes scales for inattention, hyperactivity-impulsivity, learning problems, executive functioning, aggression, and peer problems, with items rated on a three-point scale from 0 (*never*) to 2 (*always*). The Conners has

demonstrated strong internal reliability and validity in addition to a reliable measurement structure (Conners, 2008; Thorell et al., 2018). For the purposes of this study, three subscales were used: executive functioning, peer relationships, and aggression. The executive functioning subscale (*a*=.86) was used to examine discriminant validity for our scales/subscales of Emotion Reasoning, Emotion Stability, and Emotion Regulation, while the peer relationships (*a*=.90) measure was used to examine discriminant validity for the Emotion Reasoning and Empathy scales. The aggression subscale (*a*=.91) of the Conners was used to examine discriminant validity for the Emotion Stability and Emotion Regulation scales. Further, all three subscales were used to examine unique concurrent validity across all EC scales/subscales.

The Emotion Regulation Checklist (ERC; Shields & Cicchetti, 1997) examines emotion functioning and creates two subscales: emotion regulation and emotion negativity/lability. The emotion regulation scale (*a*=.72) was used to examine convergent validity of our emotion regulation scale, and discriminant validity of our emotion stability scale. Additionally, the negativity/lability scale (*a*=.86) was used to examine convergent validity of our emotion stability scale, and discriminant validity of our emotion regulation scale. Therefore, any questions that overlapped with any scales in ECIC measure were removed within the ERC.

The Inventory of Callous-Unemotional Traits (ICU; Frick, 2004) is a measure of callous-unemotional (CU) behavior. Items were rated using a four-point Likert scale (0 = not at all true to 3 = definitely true), with higher scores indicating greater callous-unemotional behaviors. The reliability and construct validity of the ICU total score have been supported across samples (Ciucci et al., 2014; Kimonis et al., 2008; Muñoz et al.,

2008). A total overall score (a = .89) was used to examine convergent validity for our novel empathy scale and to examine whether CU behaviors and empathy represent the same spectrum of symptoms or two separate constructs. There are no overlapping questions between the ICU and the ECIC measure.

Data Analytic Plan

The data analytic plan was broken down into six separate stages: 1) exploratory factor analyses (EFA); 2) confirmatory factor analyses (CFA); 3) measurement invariance, 4) reliability, 5) validity, and 6) test-retest reliability. Additionally, given the increased interest in irritability within the field, a post-hoc seventh stage focused on the creation of a subscale of irritability from the final measure. Analyses for the EFA only included data from study 1 (N=395). Analyses for the CFA included only participants from study 2 (N=300). To increase power and examine multiple forms of measurement invariance, analyses for measurement invariance and reliability combined data from studies 1 and 2 (N=695). The completion of these stages led to the final items to be included in the measure. Lastly, to examine validity and test-retest reliability, analyses included only data from study 2 (N=300).

Stage 1: **EFA** (Study 1; N=395).

Using maximum likelihood estimation with promax rotation (i.e., an oblique rotation, which allows factors to be correlated), an EFA was conducted in Jamovi (Jamovi 1.6, 2021). These analyses were data-driven and iterative based on four criteria: (a) item factor loadings above .50, (b) not having a cross-loading above .25, (c) theoretical relevance of items and factors, and (d) overlap or redundancy of items to ensure a brief overall scale. Items were also removed if there was evidence of cross loading onto three or more factors,

even if cross loadings were below .25. These stringent criteria were chosen to reduce the number of items to ensure that the final measure was relatively brief given the demand for short but psychometrically strong measures (Ebesutani et al., 2012). Retained items were included in the next stage of analysis (i.e., CFA). It was hypothesized that a four-factor solution, mirroring the four main components of EC would be found.

Stage 2: CFA (Study 2; N=300).

CFAs were conducted in R using Lavaan, with the goal of building an explicit model of the factor structure underlying the data that demonstrated good model fit. The following fit statistics were used to evaluate model fit: chi-square ($\chi 2 > .05$ excellent), comparative fit index (CFI; >.90 acceptable, >.95 excellent), root mean square error of approximation (RMSEA; <.08 acceptable; <.05 excellent), and the standard root mean square residual (SRMR; <.08 acceptable, <.05 excellent).

First, CFA analyses were used to examine a priori hypotheses surrounding subscales for Emotion Reasoning, subscales for Emotion Stability, and how Emotion Reasoning and Empathy relate. To test the theoretical model by Hare and Parent (under review), subscales for emotion reasoning were examined by comparing a one-factor model (one latent factor of Emotion Reasoning) to a two-factor model (i.e., Emotion Reasoning-Interpersonal and -Intrapersonal). To examine the subscales of Emotion Stability, a one-factor model of emotion stability (one latent factor of Emotion Stability) will be compared to a three-factor model (i.e., Emotion Stability-Threshold, -Intensity, and -Duration). The third CFA analysis tested if the construct of 'cognitive empathy' is best represented as a facet of Emotion Reasoning (i.e., Interpersonal), rather than Empathy, consistent with the new theoretical framework. A model testing Emotion Reasoning-Interpersonal, Emotion

Reasoning-Intrapersonal, and Empathy as three separate constructs was compared to a more traditional framework whereby Empathy will be represented by two subdimensions (i.e., Affective, Cognitive) and Emotion Reasoning will only reflect Intrapersonal facets (see Figure 2). Within these analyses, questions measuring Emotion Reasoning-Interpersonal and cognitive empathy are assessed via the same subscale in the novel ECIC measure.

Once the above analyses are conducted, in order to determine how many factors should be included, CFA analyses were run examining the overall model fit, including examining how all components load onto a larger, overall factor of EC. Additional items were removed at this stage based on replication of results across an independent sample and retaining the most robust items in each subscale. The goal of the final set of factor analyses is to balance model fit, scale length, and subscale reliability.

Stages 3 & 4: Measurement invariance and reliability (Study 1 & 2; N=695).

Three different forms of measurement invariance were tested using multiple group CFAs: 1) configural, identical factor structure for each stage, 2) metric, factor loadings are held equal across groups, and 3) scalar, factor loadings and intercepts/thresholds are held equal across groups. Measurement invariance was examined across parent race (i.e., Black, Asian, White), parent ethnicity (i.e., parents who identified as Hispanic were compared to parents who identified as non-Hispanic), SES, parent gender, child developmental stage (i.e., 3-6 and 7-12), and child gender. Regarding parental race, parents who reported being Black were compared to non-Black parents, parents who reported being Asian were compared to non-Asian parents, and parents who identified as White were compared to non-White parents, to examine if the same underlying construct or content of each item is

being perceived and interpreted in the same way across groups. For SES, we will examine invariance across families 150% below the poverty line compared to those above. For parent and child gender, invariance analyses only compared males to females given low response rates for other categories (i.e., non-binary [0.3-0.4%], other [0.0-0.1%]). As recent research has suggested that omega is a preferable index of internal consistency over alpha (Dunn et al., 2014; McNeish, 2018) coefficient omega was calculated for each scale and subscale after the final factor structure was decided. For comparison purposes, alpha coefficients were also calculated.

Stage 5 & 6: Validity and test-retest reliability (Study 2; N=300).

To determine construct validity, convergent and discriminant validity was examined. In line with previous research, while there are no firm cut offs for what constitutes convergent/discriminant validity, correlations with related constructs should be higher than with unrelated constructs (Abma et al., 2016; Terwee et al., 2007). Although correlations across all nine external constructs with each scale and subscale will be explored, there are specific correlations of interest. Specifically, as irritability has been proposed to reflect aspects of Emotion Stability, but not overlap entirely, a strong positive correlation was expected. Additionally, as irritability represents a specific aspect of Emotion Stability, it was used to evaluate discriminant validity with all other scales/subscales.

Next, to ensure that the Emotion Reasoning and Empathy scales are not purely assessing peer relationships or social problems, the peer problem subscale was used to examine discriminate validity. Also related to Empathy, there are inconsistences regarding the association of callous-unemotional traits and Empathy (Waller et al., 2020). Therefore,

the current study examined how a measure of CU behaviors (i.e., the ICU), relates to the ECIC Empathy scale in an exploratory manner. Lastly, research has demonstrated strong links between executive functioning and Emotion Reasoning and Emotion Regulation (Blankson et al., 2017; Zelazo & Cunningham, 2007). Specifically, studies have shown executive functioning may play a large role in the development of social-emotional competence, such as Emotion Reasoning and Emotion Regulation (Denham et al., 2012; Riggs et al., 2006; Rueda & Paz-Alonzo, 2018). As the current study suggests that these constructs are related, but represent distinct constructs, a measure of executive functioning was used to examine discriminant validity.

In addition, cross-sectional associations between each component of EC and indices of internalizing symptoms, externalizing behaviors, and sleep problems were examined for each scale and subscales' concurrent validity. Given each ECIC scale and subscale represent transdiagnostic factors in the development of internalizing and externalizing disorders, it was expected that all scales/subscales will be significantly correlated across all external constructs.

To test the unique concurrent validity of the scales, the four main scales (i.e., Emotion Reasoning, Emotion Stability, Emotion Regulation, Empathy) were entered into the same regression model. Sensitivity analyses were then be conducted by entering the subscales for Emotion Reasoning (i.e., Intrapersonal and Interpersonal), along with the subscales for Emotion Stability (i.e., Threshold, Duration, and Intensity) and Emotion Regulation and Empathy into the same regression model. Lastly, to examine test–retest reliability, longitudinal test–retest analyses were utilized to examine correlations between subscale factors across the baseline and 2-week time point.

Stage 7: **Irritability subscale**

Although Hare and Parent (under review) presented irritability as a part of Emotion Stability, it was not conceptualized as a formal subcomponent. Therefore, as an aim of this study was to validate the model, it was not included as a formal component when determining model fit and the final structure. However, given the importance of irritability in the literature and its relation to the construct of emotion stability, an irritability subscale was developed post-hoc using available items from final derived measure. After this subscale was created, internal consistency and test-retest reliability, utilizing the same methods describe above, were examined. In addition, cross-sectional association with a validated measure of irritability was examined.

III. RESULTS

Stage 1: EFA (Study 1; N=395).

Results of the EFA provided strongest support for a four-factor model (see Table 2). Emergent factors described the following components of EC: Emotion Reasoning (e.g., "My child correctly knows/understands how others are feeling"); Emotion Stability (e.g., "My child loses their temper or has a tantrum when frustrated, angry or upset"); Emotion Regulation (e.g., *"*My child will seek out help/advice when they feel strong emotions"), and Empathy (e.g., *"*If another child starts to cry, my child tries to comfort him/her*"*).

Stage 2: CFA (Study 2; N=300).

Subscales. A chi-square difference test comparing a one-factor (Emotion Reasoning) to a two-factor (Interpersonal and Intrapersonal) solution for Emotion Reasoning, indicated that a two-factor solution fit the data better ($\Delta\chi^2(1) = 66.36$, $p < .001$). When comparing a one-factor solution for Emotion Stability compared to a three-factor solution (Threshold,

Duration, and Intensity), results indicated that the three-factor solution provided a better fit to the data ($\Delta\chi^2(3) = 50.17, p < .001$). Lastly, when comparing the current theoretical model of EC (which proposes empathy as unidimensional) verse separating Empathy into affective/cognitive empathy, results showed that the theoretical model of EC, with empathy as one unidimensional factor, provided a better fit to the data ($\Delta\chi^2(3) = 56.87, p < .001$).

Overall EC model. The final model included Emotion Reasoning (which included Intrapersonal and Interpersonal subcomponents), Emotion Stability (which included Threshold, Intensity, and Duration subcomponents), Empathy as one latent factor, and Emotion Regulation with the initial 45 items identified in the EFA. As recommended (Curby et al., 2015), we then examined modification indices, which revealed several items with correlated errors that were substantive. Thus, additional changes to the scale were made in an effort to improve model fit. Specifically, one item had significant cross-loadings, while six other items had high residual covariances indicating potential overlap. Therefore, these seven items were removed, leaving 38 items. The CFA model, which did not include testing an overall EC factor at this stage, demonstrated adequate fit: $\chi^2(653) = 1509.638$, $p < .001$, RMSEA = .072, 90% CI .067 - .077, CFI = .84, SRMR = .071.

Stage 3: Measurement invariance (Study 1 & 2; N=695).

The ECIC measure, with 38 items, demonstrated configural, metric, and scalar invariance across all scales for child gender, parent ethnicity, and SES (i.e., 150% below the poverty line), indicating that parents are interpreting and responding similarly across child gender, parental ethnicity, and SES. Seven items demonstrated potential biases across parent race (i.e., Asian), parental gender, and child developmental stage, and were therefore removed. With the removal of these items, the EC scale demonstrated configural, metric,

and scalar invariance across parent race (i.e., Asian), parent gender, and developmental stage. The removal of these items resulted in a 32-item measure, which demonstrated acceptable model fit, χ^2 (420) = 879.325, $p < .001$, RMSEA = .060, 90% CI .055 - .065, CFI = .90, SRMR = .066, see Table 3 for final CFA results. For parents identifying as Black, the chi-square difference test was significant ($p = .04$) for scalar invariance. This implies that the measure demonstrated the same factors (i.e., configural) and similar factor loadings (i.e., metric) across Black and non-Black families, suggesting that the latent constructs and that the strength of the causal relationships between items and their underlying dimensions are the same across groups. However, as the measure did not demonstrate scalar invariance across parents identifying as Black compared to those identifying as non-Black, caution is warranted when directly comparing latent factor means for parents who identify as Black compared to those that do not.

Stage 4: Reliability (Study 1 & 2; N=695).

Coefficient omega and alpha were calculated for each of the four main scales and all subscales. Reliability was good for Emotion Reasoning (Ω = .93, α = .92), Emotion Stability (Ω = .93, α = .92), Emotion Regulation (Ω = .87, α = .87), and Empathy (Ω = .87, α = .86). Further, reliability was good for all of the subscales: Emotion Reasoning-Interpersonal (Ω = .88, α = .88), Emotion Reasoning-Intrapersonal (Ω = .89, α = .89), Emotion Stability-Threshold (Ω = .82, α = .81), Emotion Stability-Intensity (Ω = .78, α = .77), and Emotion Stability-Duration (Ω = .84, α = .84).

Stage 5: Validity (Study 2; N=300).

Convergent, Discriminate, and Concurrent Validity

Emotion Reasoning. In line with previous work suggesting cognitive empathy

represents one's ability to comprehend the affective or cognitive status of another, correlations with the Cognitive Empathy scale of GEM were stronger with the Emotion Reasoning-Interpersonal (r = .48) subscale compared to -Intrapersonal (r = .41) subscale (see Table 4). The Affective Empathy scale of the GEM was used to examine discriminate validity, with results suggesting this scale and the Emotion Reasoning scale and subscales reflect different constructs. Further, the executive functioning (r's = -.28 to -.31) and the peer problem scales (r's = -.29 to -.33) of the Conners were used to examine discriminant validity, with results demonstrating that the Emotion Reasoning scale and subscales represent separate constructs than executive functioning and peer functioning. The Emotion Reasoning scale and subscales were significantly correlated with symptoms of externalizing and internalizing behaviors, albeit low correlations, especially for depression (r's = -.14 to -.15; see Table 5). The Emotion Reasoning scale and subscales were also related to sleep functioning, although similarly, correlations were small (r's = -.14 to -.16).

Emotion Stability. Convergent validity analyses revealed the Emotion Stability scale and three subscales were similar to the construct of Irritability (rs= -.61 to -.71), but not completely overlapping (see Table 4). This is consistent with previous work (Liu et al., 2019; Maire et al., 2020) suggesting that Irritability is a separate construct and only represents a small portion of Emotion Stability. Further, the Emotion Stability scale and subscales were significantly correlated with the Lability/Negativity scale of the ERC (rs= -.72 to -.64), which support convergent validity. As expected, low correlations between Emotion Stability and Emotion Regulation as assessed via the ERC (rs = .29 to.39) and aggression (rs = -.32 to -.46) support discriminant validity. The Emotion Stability scale and subscales were significantly correlated with symptoms of externalizing (rs= -.67 to -

.54) and internalizing (*r*s=-.46 to -.32), behaviors to support concurrent validity, with the strongest correlations for ODD and hyperactivity/impulsivity. The Emotion Stability scale and subscales were also significantly related to sleep impairment (*r*s = -.40 to -.33).

Emotion Regulation

The Emotion Regulation scale was significantly correlated with the Emotion Regulation scale of the ERC to support convergent validity (see Table 4). Although the correlation between Emotion Regulation and the lability/negative scale of the ERC was higher than expected (*r* = -.45), it was still lower than other convergent validity correlations. This is likely due to the weak psychometric properties of the ERC, as previous research has shown this scale is not unidimensional even after overlapping questions are removed (Mazefsky et al., 2021). As expected, the correlations between the executive functioning scale of the Conners and the ECIC Emotion Regulation scale (*r* = -.42) support discriminant validity. Supportive of concurrent validity, the Emotion Regulation scale was significantly correlated with symptoms of externalizing behaviors (*r*s = -.52 to -.33), with the strongest associations found with symptoms of inattention and hyperactivity/impulsivity. Additionally, Emotion Regulation was only significantly correlated with symptoms of depression, and not anxiety or sleep (see Table 5).

Empathy

The Empathy scale was significantly correlated with the affective empathy scale of the GEM (*r* = .55), suggesting potential overlap (see Table 5). In addition, results from discriminant validity analyses suggest that the ECIC Empathy scale and the Cognitive Empathy scale of GEM represent separate constructs (*r* = .35). Moreover, CU behaviors and Empathy were strongly correlated (*r* = -.65), which suggests that the constructs are

highly related. Further, correlations between the ECIC Empathy scale and the executive functioning (r= -.32) and the peer scales (r = -.29) of the Conners support discriminant validity. Empathy was significantly correlated across all symptoms of externalizing problems which supports concurrent validity. Additionally, Empathy was significantly associated with internalizing symptoms and sleep, although correlations were relatively small (*r*'s = -.13 to -.17; see Table 5).

Unique Concurrent Validity

We examined the unique concurrent associations of each component by including all four scales within the same regression model. Results revealed that Emotion Stability was the most consistent subscale uniquely relating to all outcomes (see Table 6). Emotion Regulation was uniquely associated with most outcomes, with the exception of symptoms of ODD. Emotion Reasoning was only uniquely related to symptoms of anxiety, while Empathy was uniquely associated with symptoms of anxiety and executive functioning.

Sensitivity analyses, which included the Interpersonal and Intrapersonal scales of Emotion Reasoning, the Threshold, Duration, and Intensity scales of Emotion Stability, the Emotion Regulation Scale, and the Empathy scale in the same regression model yielded more nuanced findings. Namely, the Threshold subscale was uniquely associated with almost all outcomes, with the exception of symptoms of anxiety (see Table 7). The Emotion Stability-Duration subscale was uniquely related to symptoms of hyperactivity/impulsivity, anxiety, and executive functioning, while the Emotion Stability-Intensity subscale was uniquely associated with symptoms of ODD, anxiety, depression, aggression, and sleep. Emotion Regulation was uniquely associated with symptoms of inattention, hyperactivity/impulsivity, depression, executive functioning, aggression, and

sleep, while Empathy was only uniquely related to peer problems. Lastly, Emotion Reasoning-Intrapersonal was uniquely associated with anxiety, executive functioning, and peer problems, while Emotion Reasoning-Interpersonal was related to anxiety, aggression, and peer problems.

Stage 6: Test-retest reliability (Study 2; N=300).

For study 2, the study sample was re-assessed two weeks after baseline (81% retention) to establish test-retest reliability. Bivariate correlations among the four overall components and five subscales revealed that two-week test-retest reliability was strong, as indicated by high correlations for Emotion Reasoning (r = .79, p < .001), Emotion Reasoning-Interpersonal (r = .76, p < .001), Emotion Reasoning-Intrapersonal (r = .74, p < .001), Emotion Stability (r = .85, p < .001), Emotion Stability-Threshold (r = .76, p < .001), Emotion Stability-Duration (r = .80, p < .001), Emotion Stability-Intensity (r = .81, p < .001), Emotion Regulation (r = .80, p < .001), and Empathy (r = .82, p < .001).

Stage 7: **Irritability subscale**

To develop the subscale for irritability, two prior items from Wiggins et al., (2018) that have been found to identify clinical significantly irritability were used as a reference: "easily frustrated" and "destructive tantrums." The two questions from the final ECIC measure that aligned with these items include: "My child is easily frustrated" from the Emotion Stability-Threshold subscale and "My child does things like slam doors or throw/break things when they get upset/frustrated" from the Emotion Stability-Intensity subscale. Additionally, we used the impairment question from a commonly used measure of irritability (Stringaris et al., 2012) ("Irritability causes my child problems" from the Emotion Stability-Duration subscale) to create a three-item subscale of irritability. The

Irritability subscale demonstrated good internal reliability (Ω = .80, α = .79) and strong two-week test-retest reliability (r = .80, p < .001). This subscale of Irritability also demonstrated strong convergent validity with a previously validated measure of irritability (r = .81, p <.001), suggesting it may be a valid and efficient way to assess irritability.

IV. DISCUSSION

As the field moves towards new ways of classifying psychopathology, it highlights the importance of considering transdiagnostic vulnerabilities, such as EC, when screening, assessing, mitigating risk for, and treating disorders. Yet, our ability to measure different components of EC remains extremely limited, as current measures have limited psychometrics properties (e.g., low reliability) and have not used measurement invariance to understand measurement functioning across groups. Empirically elucidating each component of EC will enhance practices related to assessment, diagnosis, prevention, and treatment. The specific aim of the current study was to examine the psychometric properties of a multidimensional measure of EC informed by a unifying theoretical framework (Hare & Parent, under review). The broad goal was to advance a precise and comprehensive measure for use with diverse populations in clinical and research settings. The ECIC measure was designed and tested through six rigorous empirically-based stages, resulting in increased methodological rigor for item selection (Matsunaga, 2010), along with one post-hoc analysis focused on the irritability construct. Overall, results support the theoretical model of EC presented by Hare and Parent (under review) and demonstrate strong psychometric properties for a parent-report measure informed by the model.

First, EFA and CFA results suggested that a four-factor model, comprised of Emotion Reasoning, Emotion Stability, Emotion Regulation, and Empathy, fit the data

best. Additionally, in line with the model presented by Hare and Parent (under review), a priori CFA analyses revealed that Emotion Reasoning is better explained by separating the Inter- and Intrapersonal subscales, while there may also be an added benefit to examining three subscales of Emotion Stability (i.e., Threshold, Duration, Intensity). Further validating the framework, analyses suggest that Empathy represents an overall affective component, while the construct that has previously been referred to as cognitive empathy, aligns better with Emotion Reasoning-Interpersonal. Additionally, when examining the content of the items (i.e., face validity) they appear to be in line with definitions present for each component and subcomponent, representing a first step in validating the theoretical framework for EC presented. Furthermore, all four scales loaded onto an overall EC factor (β's .58-.97), offering support that these constructs are related but represent separate components of EC functioning. While this is an important contribution, an overall score of EC may not provide researchers or clinicians enough information to draw meaningful conclusions, with the scales/subscales providing more useful information.

Additionally, the final ECIC measure demonstrated full measurement invariance across parent race (Asian, White), parent ethnicity, parent gender, family SES, child gender, and developmental stage, as well as configural and metric invariance across parents who identify as Black. This is notable given the scarcity of measures with established measurement invariance, especially across diverse groups. Results also demonstrated strong internal reliability for most scales/subscales as evidenced by omega and alpha coefficients above .80. Although the Emotion Stability-Intensity subscale (Ω = .78, α = .77) was within the acceptable range (above .70), it may be slightly lower due to the low item count (i.e., 3 items). Additionally, two-week test-retest reliability was strong for most

scales/subscales and acceptable for Emotion Reasoning, Emotion Reasoning-Interpersonal, Emotion Reasoning-Intrapersonal, and Emotion Stability-Threshold *(r's* = .74-.79). The slightly lower test-retest reliability may reflect a lack of parents' understanding of their children's emotion reasoning. In addition, it is possible that threshold may be more variable and fluctuate week-to-week compared to the other constructs.

With respect to convergent validity, results suggested meaningful overlap between conceptually similar measures, while discriminant validity supported a distinction between ECIC scales/subscales and other emotion or mental health variables. For example, as measured in the current study, results suggest that Empathy and callous-unemotional behaviors are similar (r=-.65), but not entirely overlapping. Future work is needed to further tease apart the relation between CU behaviors and Empathy. Correlations between irritability and Emotion Stability also suggest the constructs are related, but not identical, further validating that irritability represents an even smaller subcomponent of emotion stability (Liu et al., 2019; Maire et al., 2020). Results also suggest that the ECIC scales and subscales are assessing separate constructs from aggression, executive functioning, peer problems and other related emotion concepts. For example, correlations between a measure of cognitive empathy and the ECIC Empathy scale suggest they are assessing separate constructs, supporting the model proposed by Hare and Parent (under review).

Regarding concurrent validity, results were in line with previous work and expectations suggesting that Emotion Reasoning is related to internalizing and externalizing problems (Trentacosta & Fine, 2010). Namely, the current study indicated a stronger association with externalizing behaviors and anxiety. Concurrent validity results

also demonstrated that Emotion Stability is associated with symptoms across the internalizing and externalizing spectrum consistent with prior work (Graziano et al., 2013; Skoranski & Lunkenheimer, 2021), in addition to sleep functioning (Lustig et al., 2021). Regarding Emotion Regulation, results demonstrated significant correlations across depression and externalizing behaviors, with stronger associations with inattention and hyperactivity/impulsivity. These findings are consistent with prior research suggesting emotion regulation is a core component of ADHD (Graziano & Garcia, 2016). However, inconsistent with previous work (Cisler et al., 2010; Lustig et al., 2021), Emotion Regulation was not significantly associated with anxiety. It may be that the ECIC Emotion Regulation scale relates more to specific anxiety disorders than the broader ECIC measure captured. It is also important to note that correlations across all ECIC scales and subscales with the study's measure of anxiety were relatively lower (-.12 to -.37). It may be the case that emotion regulation, and potentially the other components as well, may be more predictive of clinical anxiety. As the current sample was comprised of typically developing children, future work should examine these associations within clinical samples. Lastly, the Empathy scale was significantly correlated to internalizing symptoms, externalizing problems, and sleep. While empathy has been previously related to internalizing and externalizing symptoms (Bray et al., 2021; Deschamps et al., 2018), limited work has examined empathy and sleep. It may be the case that empathy impacts sleep indirectly. For example, children with low empathy may have limited social skills and increased internalizing symptoms (Bray et al., 2021), which leads to worse sleep (Brown et al., 2018). Importantly, when examining all the scales and subscales together, empathy did not remain a significant predictor of sleep.

Looking at the unique associations of all scales and subscales (Table 7), several interesting findings emerged. Emotion Reasoning-Intrapersonal and -Interpersonal, along with Emotion Stability-Threshold and -Intensity, were uniquely related to symptoms of anxiety. It may be that children displaying deficits in understanding emotions in themselves and others, have difficulties interacting with others and pull away from social interactions. Deficits in emotion reasoning during social interactions may also trigger inappropriate responses (e.g., aggression, withdrawing) when not warranted, and over time, the formation of maladaptive emotion–cognition relations may lead to the formation of anxiety. For example, a friendly, smiling child may approach another child with poor emotion reasoning. If the child with poor emotion reasoning cannot correctly understand the emotions and/or emotion cues from another child, they may interpret that child as aggressively coming towards them. This may form a pattern whereby incorrect encoding of others' emotion functioning may eventually lead to the child's erroneous intent attributions, which over time could lead to hostile attributional biases and anxiety (Fine et al., 2003; Lemerise & Arsenio, 2000). This may also provide insight into why Emotion Reasoning-Interpersonal was uniquely related to aggression (Denham et al., 2002).

Importantly, these responsive behaviors mentioned above (e.g., withdrawing) are better captured under a measure of prosocial/peer functioning. Importantly, the current Emotion Reasoning scale does not assess children's reactions to peers, only their ability to correctly identify emotions in themselves and others, suggesting it may be important to include both emotion reasoning and prosocial measures when trying to understand children's behavior. As the current analyses cannot determine directionality, it may be the case that children who experience anxiety (e.g., social anxiety) also demonstrate social

deficits (e.g., limited eye contact), leading to lower emotion reasoning-interpersonal and -intrapersonal skills (McClure & Nowicki, 2001). As these relations are likely reciprocal, future work should investigate these bidirectional associations over time with more specific types of anxiety disorders.

Notably, Emotion Stability-Threshold almost ubiquitously related to the various dimensions of children's mental health, with the exception of anxiety. This suggests that children's threshold (i.e., children's ability to withstand intense positive and negative emotions) may be an important protective factor against a large range of symptoms and a possible treatment target to be added across interventions. For example, a core module in Dialectical Behavior Therapy for Adolescents is distress tolerance (Rathus & Miller, 2014), where youth learn to tolerate strong thoughts or emotions. Implementing similar skills with children may be an important component to add to current treatments and universal prevention strategies. Emotion Regulation was also uniquely associated with multiple outcomes, such as symptoms of inattention, hyperactivity/impulsivity, depression, executive functioning, aggression, and sleep. These findings align with previous work suggesting that emotion regulation is a transdiagnostic predictor of multiple health outcomes (Sloan et al., 2017) and an important target in children's overall functioning.

Interestingly, Empathy was only related to peer problems, along with Emotion Reasoning-Interpersonal and -Interpersonal. These results emphasize the critical role that empathy plays in social development, in addition to emotion reasoning. Given that peer problems can lead to a host of subsequent maladjustment (e.g., internalizing and externalizing problems; Kupersmidt & DeRosier, 2004), empathy still represents a critical part in children's healthy development and overall functioning. However, it is important to

note that empathy did relate to other domains of functioning when examining just the four overall factors (see Table 6).

Examination of the unique concurrent associations of scales and subscales provided valuable insight into the ability for these constructs to differentially relate to child health outcomes that can be used to inform prevention and intervention efforts. Specifically, not assessing these constructs at the subscale level can lead to a masking of results and important clinical information. For example, when examining all primary scales together, all four components uniquely relate to symptoms of anxiety. However, including subscales of Emotion Reasoning and Emotion Stability, a more precise picture is presented. Namely, only Emotion Reasoning-Interpersonal and -Intrapersonal, Emotion Stability-Duration and -Intensity were significantly associated with anxiety. Accordingly, the subscales provided in this measure may allow for a more nuanced understanding of the development of psychopathology and offer key treatment targets for children. Thus, the current measure likely represents a step forward in personalized medicine approaches. For example, given the heterogeneity and comorbidity of ADHD and ODD, the Emotion Regulation scale and subscales of Emotion Stability within the current ECIC measure, may aid in the early identification and tailored treatment of behavioral phenotypes.

Limitations

These findings should be considered within the context of the study's limitations. First and foremost, data was exclusively obtained through parent-report, which may result in shared method bias. Further, parent-report measures can be influenced by both child and parental factors (De Los Reyes & Kazdin, 2005). For example, mothers with a history of depression or anxiety can report higher levels of negative child characteristics and rate their

children as less happy than mothers with no such history (Durbin & Wilson, 2012; Gartstein et al., 2009). However, while limitations of parent-report exist, these types of measures are extremely important in understanding how parents view their child. For example, while emotion reasoning may be harder to assess via parent-report, as it is more of an internal process, how a parent understands and views their child's emotion reasoning skillset is critical. If a parent thinks their child already has good emotion reasoning, they may not teach their children about how to differentiate emotions. Therefore, parent's perceptions hold significant implications for development and treatment. Further, parent report allows parents to fill out information on their children's behaviors based on their own backgrounds and cultural norms compared to observational report. For example, when answering the question "My child has an inappropriate, intense reaction to positive situations" parents from one cultural background may not view their child's positive reaction as inappropriate and would score low on that item. However, a parent from a different cultural background may view the same behavior in their child as inappropriate, scoring higher. On the other hand, an observational report based on an unbiased coder, may code the two children from the above example identical. Future work should develop an observational coding system and child self-report measure that maps onto these constructs to get an even more complete and nuanced picture of children's EC abilities as it may offer a unique vantage point. Additionally, an adult self-report measure would provide important insight into how parents' own EC may influence perceptions of their child's EC.

Next, while measurement invariance testing is a significant strength of the current measure, it is important to note that we were unable to analyze measurement invariance across racial subgroups. We also did not examine immigration status nor levels of

acculturation, which may have the potential to influence measurement invariance results (Meyer, 2003). Given the heterogeneity that can occur within racial and ethnic groups, future work should examine these analyses across more diverse racial and ethnic subgroups, including assessing for immigration status, nationality, and acculturation. Additionally, given the sample size, the current study was unable to examine potential differences considering intersectionality. As intersecting identities can have unique social meanings and nuanced forms of marginalization created by multiple layers of oppression, future work should examine potential EC differences within an intersecting framework (Buchanan & Wiklund, 2020). Data sharing across diverse samples would increase power and allow for exploration of measurement invariance across such important areas. Overall, while the current measure demonstrated invariance across multiple domains, further replication is needed across diverse samples.

In addition, the current sample is more representative of typically developing children. The current factor structure and analyses should be replicated in a clinical sample. A clinical sample would also allow for the development of clinical cutoffs and normed scores. Lastly, the study was conducted entirely during the COVID-19 pandemic and therefore results should be considered in light of that fact. Given drastic changes in families' daily life due to highly stressful circumstances (e.g., illness, financial insecurity, caregiving burden) and increased time spent together between parent and child (Prime et al., 2020), future replication studies are warranted.

V. CONCLUSION

Taken together, the novel ECIC measure developed in this study represents the first step in validating a unifying theoretical framework for EC. Second, the current measure

combats significant limitations of previous measures by utilizing advanced statistical methods for developing and evaluating new measures, including separate samples for each set of factor analyses, examining convergent, discriminant, and concurrent validity, and determining measurement invariance across a range of important demographic factors. Further, the current measure included both positive and negative emotional reactions across all scales. Future work should examine how positive and negative responses across each component differently relate to later impairment. Lastly, the ECIC measure allows for a more nuanced understanding of how different EC components relate to child functioning. As more treatments move towards a modular approach (e.g., Weisz & Bearman, 2020) and target similar transdiagnostic constructs (Southam-Gerow, 2013), this measure could provide a more comprehensive assessment of treatment gains and identify possible mechanisms of treatment.

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Table 1. Demographic Information

	Study 1 & 2	Study 1 (N=395)	Study 2 (N=300)
	Mean (standard deviation) or %		
Parent Age (in years)	37.00 (6.29)	37.22 (6.20)	36.87 (6.42)
Parent Gender %			
Female	63.9%	65.6%	61.3%
Male	35.1%	33.7%	36.7%
Agender / Non-binary	0.4%	0.3%	1.0%
Other	0.1%	0.0%	0.0%
Prefer not to say	0.7%	0.5%	1.0%
Parent Race % [+]			
Asian	19.3%	19.7%	18.7%
Black	28.3%	24.6%	33.3%
White	56.4%	54.7%	58.7%
Native American or Alaskan Native	1.7%	1.5%	2.0%
Native Hawaiian or Pacific Islander	0.6%	0.5%	0.7%
Middle Eastern or North African	0.6%	0.5%	0.7%
Other	1.0%	0.8%	1.3%
Prefer not to say	0.4%	0.5%	0.3%
Parent Ethnicity, Hispanic/Latinx	16.0%	14.7%	17.7%
Parent Marital Status %			
Single	13.1%	10.9%	16.0%
Married or in a domestic partnership	76.5%	79.2%	73.0%
Separated	2.7%	2.8%	2.7%
Divorced	7.5%	6.8%	8.3%
Widowed	0.1%	0.3%	0.0%
Parent Education %			
Less than a HS diploma	0.3%	0.5%	0.0%
HS degree or equivalent	8.8%	6.9%	11.3%
Some college, no degree	20.8%	18.9%	23.3%
Associate degree	12.3%	11.2%	13.7%
Bachelor's degree	41%	44.1%	37.0%
Master's degree	14.5%	16.6%	11.7%
Professional degree or Doctorate	2.3%	1.8%	3%
Parent Employment status % [+]			
Employed full time (40 hours or more)	62.6%	61.3.%	64.3%
Employed part-time	11.2%	12.7%	9.3%
Student	2.2%	2.0%	2.3%
Unemployed, not looking for work	1.4%	1.5%	1.3%
Unemployed, currently looking	5.6%	6.8%	4.0%
Retired	0.1%	0.0%	0.3%
Homemaker	13.7%	12.7%	15.0%
Self-employed	6.9%	7.8%	5.7%
Unable to work	1.0%	1.0%	1.0%
Household Income %			
Less than $20,000	7.9%	7.6%	8.3%
20,000 to 34,999	14.2%	13.4%	15.3%
35,000 to 49,999	13.1%	13.4%	12.7%

50,000 to 74,999	23.9%	23.8%	24.0%
75,000 to 99,000	17.4%	17.2%	17.7%
Over 100,000	23.5%	24.6%	22.0%
Child Age	6.97 (2.93)	6.87 (2.83)	8.3
Child Gender %			
Female	46.4%	47.2%	45.3%
Male	52.9%	52.0%	54.0%
Agender / Non-binary	0.3%	0.3%	0.3%
Other	0.0%	0.0%	0.0%
Prefer not to say	0.5%	0.5%	0.3%
Child Race % [+]			
Asian	19.7%	20.3%	19.0%
Black	29.8%	25.8%	35.0%
White	62.0%	60.3%	64.3%
Native American or Alaskan Native	2.7%	2.0%	3.7%
Native Hawaiian or Pacific Islander	1.3%	0.8%	2.0%
Middle Eastern or North African	0.6%	0.5%	1.0%
Other	2.2%	2.3%	2.0%
Prefer not to say	0.6%	0.5%	0.7%
Child Ethnicity, Hispanic/Latinx %	18.7%	16.2%	22.0%

[+] Participants could choose more than one option, therefore percentages may not equal 100%;

Table 2. Final Exploratory Factor Results

	Factor			
	1	**2**	**3**	**4**
My child is easily annoyed by others	.869			
My child loses their temper or has a tantrum when frustrated, angry or upset	.856			
When my child feels a strong emotion(s) (e.g., anger/excitement), it takes them a long time to calm down	.856			
When my child gets upset, it takes them a long time to calm down	.801			
My child does things like slam doors or throw/break things when they get upset/frustrated	.780			
My child exhibits strong mood swings; their emotional state is difficult to predict because they move quickly from positive to negative emotions	.773			
My child feels emotions very intensely	.747		.201	
When my child gets overly excited, it takes them a long time to calm down	.716			
My child is easily frustrated	.666			
Irritability causes problems	.664			
My child is easily excited	.654			
If a task is too difficult for my child, how likely will they get frustrated and quit?	.548			
My child has an inappropriate, intense reaction to positive situations (e.g., screams excessively when happy)	.533			
My child can correctly identify when they feel positive emotions (e.g., happy, excited)		1.024		
My child can understand different levels/intensity of emotions in themselves (e.g., recognizes they feel stronger emotions over something important than something less important)		.970		
My child can understand different levels/intensity of emotions in others (e.g., recognizes others feel stronger emotions over something important than something less important)		.859		
My child can correctly identify when they feel negative emotions (e.g., sadness, anger)		.796		
My child is able to correctly identify their own emotions (e.g., they are able to say they feel sad)		.783		
My child can correctly identify when they are feeling fearful, worried, or scared		.786		
My child can correctly identify negative emotions in others (e.g., they see a child crying, they know that child is probably experiencing negative emotions)		.739		
My child can correctly identify positive emotions in others (e.g., they see a child smiling, they know that child is probably experiencing positive emotions)		.737		
My child correctly knows/understands how others are feeling		.714		
My child can describe how their body feels along with an emotion (e.g., when they feel an intense emotion, their heart races)		.658		
My child uses facial expressions, behaviors, and situational information to make correct predictions about the emotional states of others		.611		
My child can calm themselves down when experiencing strong emotions (e.g., anger, excitement)			.855	
My child has good coping skills			.737	
My child can calm themselves down when experiencing positive emotions (e.g., happiness, excitement)			.715	
My child can calm themselves down when experiencing negative emotions (e.g., anger, sadness)			.708	
My child knows more than 1 coping skill (e.g., deep breathing and distracting themself)			.683	

After receiving a disappointing gift from someone, how likely is my child to pretend to like the gift?	.214	.670	
My child can have a calm conversation, even though they are upset		.607	
My child will seek out support when they feel strong emotions		.602	
My child is able to wait for good things (delay gratification)		.591	
My child likes to share positive/good news		.561	.206
My child is empathetic/caring towards others			.779
When another child gets frightened, my child tries to help him/her			.771
My child is concerned about the feelings of others			.770
If another child starts to cry, my child tries to comfort him/her			.761
My child feels bad when they see another child or tv character upset			.726
My child shows remorse when they have hurt someone			.712
My child does things to make others feel good	-.223		.610
My child takes pleasure in the distress of others (e.g., laughs when another person gets hurt or punished)	.238		-.544
My child can get emotional over a movie or TV show (e.g., gets sad or cries during a sad scene			.544

Note. This represents the final EFA, where only factor loadings above .50 and cross loadings below .25 were retained. Factor 1 = Emotion Stability, Factor 2 = Emotion Reasoning, Factor 3 = Emotion Regulation, Factor 4 = Empathy.

Table 3. Final Confirmatory Factor Analysis Results

	B	SE	β	z-value
Emotion Reasoning-Intrapersonal				
Correctly identify positive emotions in self	0.253***	0.048	0.742	5.275
Understand different levels of emotions in self	0.270***	0.052	0.804	5.22
Describe how body feels	0.259***	0.051	0.742	5.096
Correctly identify negative emotions in self	0.285***	0.054	0.769	5.232
Emotion Reasoning-Interpersonal				
Understand different levels of emotions in others	0.237***	0.045	0.688	5.264
Correctly identify negative emotions in others	0.239***	0.045	0.657	5.289
Uses facial expressions and behaviors to predict emotions	0.244***	0.046	0.738	5.26
Correctly identify positive emotions in others	0.252***	0.047	0.730	5.399
Emotion Reasoning				
Intrapersonal	1.000		0.969	
Interpersonal	1.000		0.969	
Emotion Stability-Threshold				
My child is easily frustrated (R)	0.757***	0.103	0.755	7.336
If task is too difficult, how likely will they quit? (R)	0.604***	0.091	0.648	6.636
Is easily annoyed by others (R)	0.714***	0.106	0.712	6.764
My child is easily excited (R)	0.864***	0.109	0.748	7.901
Emotion Stability-Duration				
My child exhibits strong mood swings (R)	0.635***	0.119	0.751	5.354
When upset, it takes them a long time to calm down (R)	0.614***	0.12	0.749	5.133
Irritability causes my child problems (R)	0.685***	0.132	0.787	5.173
When excited, it takes them a long time to calm down (R)	0.441***	0.095	0.583	4.629
Emotion Stability-Intensity				
Slam doors or throw/break things when upset (R)	0.687***	0.065	0.711	10.486
Feels emotions strongly (R)	0.837***	0.055	0.844	15.144
Inappropriate, intense reaction to positive situations (R)	0.738***	0.06	0.806	12.317
Emotion Stability				
Intensity	1.000		0.775	
Duration	1.151***	0.321	0.816	3.583
Threshold	0.796***	0.183	0.698	4.353
Emotion Regulation				
Good coping skills	0.456***	0.064	0.633	7.126
Calms down when experiencing positive emotions	0.457***	0.069	0.646	6.648
Seek support when they feel strong emotions	0.492***	0.057	0.633	8.601
Wait for good things (delay gratification)	0.475***	0.072	0.61	6.592
Calm down when experiencing negative emotions	0.575***	0.069	0.779	8.305
Calm conversation, even when upset	0.467***	0.063	0.538	7.457
Empathy				
Is empathetic/caring towards others	0.444***	0.055	0.761	8.111
Shows remorse when they hurt someone	0.509***	0.067	0.745	7.595
Takes pleasure in the distress of others	0.332***	0.055	0.537	6.07
Concerned about the feelings of others	0.515***	0.070	0.820	7.341
If another child starts to cry, my child tries to comfort them	0.503***	0.073	0.734	6.888
Feels bad when they see another child or tv character upset	0.376***	0.062	0.556	6.062
Overall Emotional Competence				
Emotion Reasoning	3.790***	0.783	0.967	4.837
Emotion Stability	0.708***	0.134	0.578	5.290
Emotion Regulation	1.470***	0.235	0.827	6.260
Empathy	1.913***	0.304	0.886	6.289
Covariances				

Intrapersonal with				
Interpersonal	-0.296	0.626	-0.296	-0.473
Threshold with				
Intensity	0.923***	0.063	0.923	14.668
Duration	0.866***	0.115	0.866	7.555
Duration with				
Intensity	0.904***	0.073	0.904	12.42

Note. (R) = indicates the question is reverse coded; Questions are shortened. ***p<.001

Table 4. Convergent and Discriminate Validity

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Emotion Reasoning	1																	
2. Emotion Reasoning: Intrapersonal	**.94**	1																
3. Emotion Reasoning: Interpersonal	**.93**	**.76**	1															
4. Emotion Stability	**.33**	**.33**	**-.29**	1														
5. Emotion Stability: Threshold	**.27**	**-.25**	**-.25**	**.92**	1													
6. Emotion Stability: Duration	**.31**	**-.32**	**-.26**	**.91**	**.74**	1												
7. Emotion Stability: Intensity	**.33**	**-.32**	**-.30**	**.92**	**.78**	**.76**	1											
8. Emotion Regulation	**.64**	**.60**	**.59**	**.47**	**.44**	**.45**	**-.40**	1										
9. Empathy	**.74**	**.68**	**.73**	**.32**	**.26**	**-30**	**-32**	**.57**	1									
10. Cognitive Empathy (GEM)	**.48**	**.41**	**.48**	**.32**	**.32**	**.31**	**.31**	**.33**	**.35**	1								
11. Affective Empathy (GEM)	**.32**	**.31**	**.29**	.06	.05	.07	.05	**.19**	**.55**	**.40**	1							
12. Executive Functioning (Conners)	**-.31**	**-.30**	**-.28**	**-.56**	**-.51**	**-.52**	**-.49**	**-.42**	**-.32**	**.47**	-.02	1						
13. Aggression (Conners)	**-.19**	**-.17**	**-.23**	**-.42**	**-.32**	**-.39**	**-.46**	-.09	**-.21**	**.55**	.10	**.45**	1					
14. Peer Problems (Conners)	**-.30**	**-.29**	**-.33**	**-.37**	**-.37**	**-.30**	**-.34**	**-.15**	**-.29**	**.54**	**.18**	**.50**	**.70**	1				
15. Negativity/Lability (ERC)	**-.39**	**-.36**	**-.37**	**-.72**	**-.65**	**-.64**	**-.68**	**-.45**	**-.40**	**.59**	-.08	**.63**	**.60**	**.57**	1			
16. Emotion Regulation (ERC)	**.41**	**.39**	**.38**	**.36**	**.32**	**.29**	**.39**	**.50**	**.45**	**-.43**	**.32**	**-.38**	**-.42**	**-.43**	**-.58**	1		
17. Irritability (ARI)	**-.30**	**-.32**	**-.24**	**-.71**	**-.66**	**-.61**	**-.70**	**-.31**	**-.29**	**.53**	-.11	**.49**	**.63**	**.43**	**.68**	**-.43**	1	
18. CU Behaviors (ICU)	**-.41**	**-.39**	**-.40**	**.55**	**.47**	**.52**	**.54**	**-.38**	**-.65**	**.61**	**-.35**	**.57**	**.58**	**.55**	**.71**	**-.71**	**.61**	1

Note. Bolded values are significant; GEM = Griffith Empathy Measure; Conners = Conners 3rd Edition, Parent Short Form; ERC = Emotion Regulation Checklist; ARI = Affective Reactivity Index; ICU = Inventory of Callous-Unemotional Traits

Table 5: Concurrent Validity

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Emotion Reasoning	1														
2. Emotion Reasoning: Intrapersonal	**.94**	1													
3. Emotion Reasoning: Interpersonal	**.93**	**.76**	1												
4. Emotion Stability	**.33**	**.33**	**-.29**	1											
5. Emotion Stability: Threshold	**.27**	**-.25**	**-.25**	**.92**	1										
6. Emotion Stability: Duration	**.31**	**-.32**	**-.26**	**.91**	**.74**	1									
7. Emotion Stability: Intensity	**.33**	**-.32**	**-.30**	**.92**	**.78**	**.76**	1								
8. Emotion Regulation	**.64**	**.60**	**.59**	**.47**	**.44**	**.45**	**-.40**	1							
9. Empathy	**.74**	**.68**	**.73**	**.32**	**.26**	**.30**	**.32**	**.57**	1						
10. Inattention (DBD)	**-.27**	**-.25**	**-.25**	**-.62**	**-.63**	**-.54**	**-.53**	**-.48**	**-.28**	1					
11. Hyperactive (DBD)	**-.34**	**-.31**	**-.32**	**-.66**	**-.63**	**-.60**	**-.59**	**-.52**	**-.33**	**.78**	1				
12. ODD (DBD)	**-.27**	**-.26**	**-.25**	**-.67**	**-.63**	**-.56**	**-.65**	**-.33**	**-.31**	**.69**	**.71**	1			
13. Anxiety (RCADS)	**-.20**	**-.18**	**-.24**	**-.36**	**-.32**	**-.32**	**-.37**	-.13	**-.13**	**.45**	**.40**	**.55**	1		
14. Depression (RCADS)	**-.15**	**-.14**	**-.14**	**-.46**	**-.43**	**-.39**	**-.47**	**-.25**	**-.17**	**.56**	**.50**	**.67**	**.86**	1	
15. Sleep (SRI)	**-.16**	**-.16**	**-.14**	**-.40**	**.36**	**-.33**	**-.41**	-.10	**-.15**	**.36**	**.37**	**.51**	**.60**	**.71**	1

Note. Bolded values are significant; DBD = Disruptive Behavior Disorder; ODD = oppositional defiant disorder; RCADS = Revised Children's Anxiety and Depression Scale- Short Version; SRI = Sleep-Related Impairment

Table 6. Unique Concurrent Validity Across the Four Main Components of EC

	B	SE	β	z-value
Inattention				
Emotion Reasoning	0.009	0.006	0.105	1.48
Emotion Stability	**-0.031*** **	**0.003**	**-0.509**	**-10.196**
Emotion Regulation	**-0.036*** **	**0.008**	**-0.286**	**-4.634**
Empathy	-0.005	0.009	-0.035	-0.523
Hyperactivity				
Emotion Reasoning	0.002	0.006	0.019	0.276
Emotion Stability	**-0.033*** **	**0.003**	**-0.538**	**-11.417**
Emotion Regulation	**-0.034*** **	**0.007**	**-0.269**	**-4.62**
Empathy	-0.002	0.008	-0.018	-0.277
ODD				
Emotion Reasoning	-0.002	0.005	-0.025	-0.362
Emotion Stability	**-0.035*** **	**0.003**	**-0.651**	**-13.24**
Emotion Regulation	0.004	0.007	0.036	0.588
Empathy	-0.010	0.008	-0.081	-1.234
Anxiety				
Emotion Reasoning	**-0.014** **	**0.004**	**-0.259**	**3.148**
Emotion Stability	**-0.017*** **	**0.002**	**-0.436**	**-7.305**
Emotion Regulation	**-0.012***	**0.006**	**-0.153**	**2.013**
Empathy	**-0.017** **	**0.006**	**-0.212**	**-2.777**
Depression				
Emotion Reasoning	-0.004	0.005	-0.066	-0.802
Emotion Stability	**-0.022*** **	**0.002**	**-0.53**	**-9.181**
Emotion Regulation	**-0.020** **	**0.006**	**0.238**	**-3.347**
Empathy	-0.007	0.007	-0.085	-1.099
Executive Function				
Emotion Reasoning	-0.056	0.031	-0.135	-1.827
Emotion Stability	**-0.13*** **	**0.016**	**-0.437**	**-8.111**
Emotion Regulation	**-0.139*** **	**0.042**	**-0.226**	**-3.31**
Empathy	**-0.099***	**0.044**	**-0.154**	**-2.245**
Aggression				
Emotion Reasoning	-.062	0.033	-0.141	-1.906
Emotion Stability	**-0.1*** **	**0.013**	**-0.466**	**-7.97**
Emotion Regulation	**0.12*** **	**0.032**	**0.272**	**3.763**
Empathy	-0.068	0.036	-0.147	-1.865
Peer Problems				
Emotion Reasoning	0.033	0.028	0.094	1.149
Emotion Stability	**-0.094*** **	**0.015**	**-0.378**	**-6.35**
Emotion Regulation	**0.076***	**0.039**	**0.149**	**1.968**
Empathy	**-0.171*** **	**0.041**	**-0.32**	**-4.21**
Sleep				
Emotion Reasoning	-0.125	0.064	-0.164	-1.955
Emotion Stability	**-0.269*** **	**0.032**	**-0.49**	**-8.355**
Emotion Regulation	**0.408*** **	**0.082**	**0.362**	**4.975**
Empathy	-0.106	0.093	-0.09	-1.14

*p<.05, **p<.01, ***p<.001. Note. EC = emotional competence; ODD = oppositional defiant disorder. Significant values are bolded

Table 7. Unique Concurrent Validity Across Subscales and Scales

	B	SE	β	z-value
Inattention				
Emotion Reasoning-Intrapersonal	0.008	0.012	0.049	0.651
Emotion Reasoning-Interpersonal	0.007	0.011	0.042	0.58
Emotion Stability-Threshold	**-0.067*** **	**0.012**	**0.421**	**5.497**
Emotion Stability-Duration	-0.014	0.012	0.088	1.202
Emotion Stability-Intensity	-0.008	0.014	0.045	0.577
Emotion Regulation	**-0.033*** **	**0.008**	**-0.265**	**-4.285**
Empathy	-0.006	0.009	-0.046	-0.682
Hyperactivity				
Emotion Reasoning-Intrapersonal	-0.008	0.012	-0.052	-0.715
Emotion Reasoning-Interpersonal	0.009	0.011	0.06	0.866
Emotion Stability-Threshold	**-0.045*** **	**0.012**	**-0.281**	**-3.843**
Emotion Stability-Duration	**-0.028* **	**0.011**	**-0.17**	**-2.425**
Emotion Stability-Intensity	-0.025	0.014	-0.138	-1.84
Emotion Regulation	**-0.033*** **	**0.007**	**-0.263**	**-4.45**
Empathy	-0.002	0.008	-0.013	-0.207
ODD				
Emotion Reasoning-Intrapersonal	0.001	0.011	0.006	0.083
Emotion Reasoning-Interpersonal	-0.003	0.010	-0.024	-0.342
Emotion Stability-Threshold	**-0.042*** **	**0.011**	**-0.296**	**-3.931**
Emotion Stability-Duration	-0.005	0.01	-0.032	-0.442
Emotion Stability-Intensity	**-0.061*** **	**0.013**	**-0.375**	**-4.856**
Emotion Regulation	0.002	0.007	0.027	0.278
Empathy	-0.009	0.008	-0.078	-1.184
Anxiety				
Emotion Reasoning-Intrapersonal	**-0.029*** **	**0.008**	**-0.291**	**-3.802**
Emotion Reasoning-Interpersonal	**-0.046*** **	**0.006**	**-0.501**	**-7.292**
Emotion Stability- Threshold	-0.005	0.009	-0.045	-0.528
Emotion Stability-Duration	**-0.018* **	**0.008**	**-0.177**	**-2.154**
Emotion Stability-Intensity	**-0.026** **	**0.01**	**-0.223**	**-2.538**
Emotion Regulation	0.009	0.006	0.118	1.633
Empathy	-0.008	0.006	-0.095	-1.301
Depression				
Emotion Reasoning-Intrapersonal	-0.002	0.01	-0.02	-0.222
Inter Emotion Reasoning	-0.004	0.009	-0.041	-0.488
Emotion Stability-Threshold	**-0.022* **	**0.009**	**-0.204**	**-2.285**
Emotion Stability-Duration	-0.007	0.009	-0.064	-0.751
Emotion Stability-Intensity	**-0.037*** **	**0.011**	**-0.305**	**-3.324**
Emotion Regulation	**-0.019** **	**0.006**	**-0.222**	**-3.076**
Empathy	-0.007	0.007	-0.081	-1.039
Executive Function				
Emotion Reasoning-Intrapersonal	**-0.109* **	**0.049**	**-0.151**	**-2.241**
Emotion Reasoning-Interpersonal	-0.023	0.062	-0.028	-0.37
Emotion Stability-Threshold	**-0.157* **	**0.065**	**-0.203**	**-2.433**
Emotion Stability-Duration	**-0.132* **	**0.063**	**-0.166**	**-2.085**
Emotion Stability-Intensity	-0.09	0.077	-0.1	-1.172
Emotion Regulation	**-0.139*** **	**0.043**	**-0.226**	**-3.265**

Empathy	-0.083	0.046	-0.129	-1.804
Aggression				
Emotion Reasoning-Intrapersonal	-0.047	0.051	-0.081	-0.918
Emotion Reasoning-Interpersonal	**-0.176*** **	**0.041**	**-0.308**	**-4.273**
Emotion Stability-Threshold	**-0.104***	**0.05**	**-0.186**	**-2.081**
Emotion Stability-Duration	0.042	0.049	0.074	0.859
Emotion Stability-Intensity	**-0.253*** **	**0.06**	**-0.389**	**-4.248**
Emotion Regulation	**0.107*** **	**0.032**	**0.243**	**3.357**
Empathy	-0.062	0.036	-0.133	-1.695
Peer Problems				
Emotion Reasoning-Intrapersonal	**-0.19*** **	**0.051**	**-0.288**	**-3.684**
Emotion Reasoning-Interpersonal	**0.189*** **	**0.042**	**0.319**	**4.542**
Emotion Stability- Threshold	**-0.153** **	**0.057**	**-0.237**	**-2.693**
Emotion Stability-Duration	-0.025	0.056	-0.037	-0.445
Emotion Stability-Intensity	-0.085	0.068	-0.114	-1.262
Emotion Regulation	0.069	0.038	0.136	1.839
Empathy	**-0.127** **	**0.04**	**-0.238**	**-3.18**
Sleep				
Emotion Reasoning-Intrapersonal	-0.174	0.119	-0.124	-1.459
Emotion Reasoning-Interpersonal	-0.059	0.132	-0.04	-0.449
Emotion Stability-Threshold	**-0.266***	**0.13**	**-0.186**	**-2.038**
Emotion Stability-Duration	-0.108	0.128	-0.074	-0.844
Emotion Stability-Intensity	**-0.446** **	**0.156**	**-0.268**	**-2.868**
Emotion Regulation	**0.393*** **	**0.083**	**0.349**	**4.717**
Empathy	-0.107	0.094	-0.091	-1.138

*p<.05, **p<.01, ***p<.001. Note. ODD = oppositional defiant disorder. Significant values are bolded

Figure 1. The theoretical framework of emotional competence.

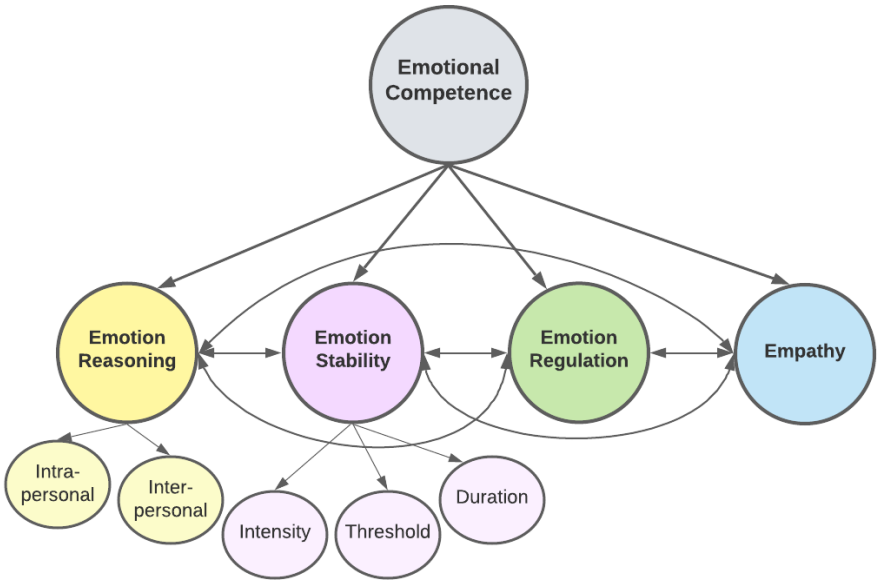
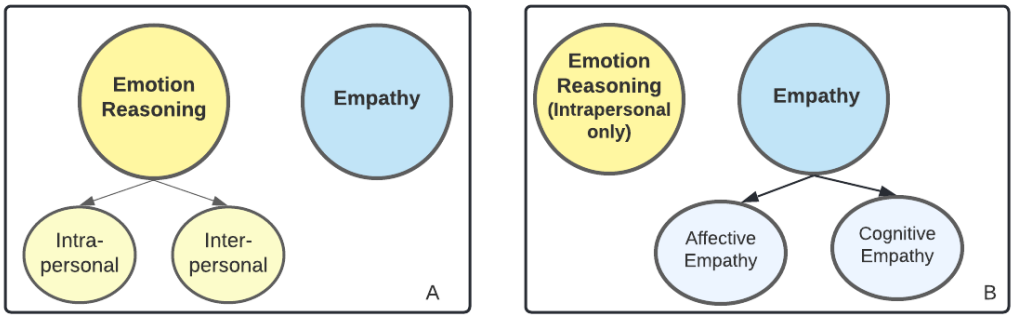


Figure 2. Unifying Theoretical Framework of EC versus Theory of Cognitive and Affective Empathy



Note. Figure A represents the theoretical model where emotion reasoning is represented by two components: emotion reasoning-intrapersonal and emotion reasoning- interpersonal (similar to the construct of cognitive empathy). Figure B represents the theoretical model where empathy is represented by two components: cognitive empathy (similar to the construct of interpersonal emotion reasoning) and affective empathy. Questions measuring emotion reasoning-interpersonal and cognitive empathy are assessed via the scale subscale in the novel ECIC measure.

Appendix A. Initial Items of the ECIC measure

Initial Items	Where the item came from?	Proposed component
1. My child can understand different levels/intensity of emotions in themselves (e.g., recognizes they feel stronger emotions over something important than something less important)	New item development	Emotion Reasoning
2. My child seems to know "right" from "wrong"	Inventory of Callous-Unemotional Traits (ICU)	Empathy
3. My child takes pleasure in the distress of others (e.g., laughs when another person gets hurt or punished)	Emotion Regulation Checklist (ERC) - Negativity/Lability scale	Empathy / Callous-unemotional behaviors
4. My child is easily frustrated	Adapted from Affective Reactivity Index (ARI) - ("Is easily annoyed by others")	Emotion Stability
5. My child shows appropriate negative emotions (anger, fear, frustration, distress) in response to hostile, aggressive or intrusive acts by peers	ERC – Emotion Regulation scale	Prosocial / peer functioning
6. My child can correctly identify when they feel positive emotions (e.g., happy, excited)	New item development	Emotion Reasoning
7. My child is impatient	New item development	Emotion Regulation
8. My child disobeys or break rules when frustrated, angry or upset	Multidimensional Assessment of Preschool Disruptive Behavior (MAP-DB) – Noncompliance scale	Noncompliance / Oppositional defiant disorder
9. In a more serious setting, such as church or a funeral, how likely is your child to behave appropriately to the solemn situation?	*The Emotion Regulation Rating Scale*	Emotion Regulation
10. My child loses their temper or has a tantrum when frustrated, angry or upset	MAP-DB – Temper Loss scale	Emotion Stability
11. My child can understand different levels/intensity of emotions in others (e.g., recognizes others feel stronger emotions over something important than something less important)	New item development	Emotion Reasoning
13. My child cares about my feelings	Adapted from MAP-DB - Low Concern for Others ("Does not seem to care about parent's feelings")	Empathy
14. My child will seek out support when he/she feels strong emotions	New item development	Emotion Regulation
15. My child feels emotions very intensely	New item development	Emotion Stability
16. My child can correctly identify when they feel sad	Adapted from ERC – Emotion	Emotion Reasoning

	Regulation scale ("Can say when s/he is feeling sad, angry or mad, fearful or afraid")	
17. My child displays flat affect (child seems emotionally absent)	ERC – Emotion Regulation scale	Empathy
18. My child does not have temper tantrums	New item development	Emotion Stability
19. My child is easily annoyed by others	ARI	Emotion Stability
20. My child can calm themselves down when experiencing negative emotions (e.g., anger, sadness)	New item development	Emotion Regulation
21. If another child starts to cry, my child tries to comfort them	Empathy Questionnaire (EmQue)	Empathy
22. My child can correctly identify when they feel negative emotions (e.g., sadness, anger)	New item development	Emotion Reasoning
23. My child's emotion seems to appropriately match the situation	New item development	Emotion Reasoning or Emotion Regulation
24. My child is not easily frustrated	New item development	Emotion Stability
25. My child stays angry for a long time	ARI	Emotion Stability and Emotion Regulation
26. My child does not care who he/she hurts to get what he/she wants	ICU	Empathy
27. When another child gets upset, my child tries to cheer him/her up	EmQue	Empathy
28. My child is able to correctly identify their own emotions (e.g., they are able to say they feel sad)	New item development	Emotion Reasoning
29. Irritability causes my child problems	ICU	Emotion Stability
30. If asked to keep a secret (e.g., not telling a sibling about a surprise birthday party), how likely is your child to keep the secret?	*The Emotion Regulation Rating Scale*	Emotion Regulation
31. When my child gets overly excited, it takes them a long time to calm down	New item development	Emotion Stability
32. My child exhibits strong mood swings; their emotional state is difficult to predict because they move quickly from positive to negative emotions	ERC - Negativity/Lability scale	Emotion Stability
33. The level and intensity of my child's emotion matches the situation	New item development	Emotion Stability
34. My child gets into fights	MAPS-DP – Aggression scale	Aggression
35. My child does not seem to care about parent's feelings	MAP-DB - Low Concern for Others scale	Empathy
36. My child finds it difficult to explain how they are feeling	New item development	Emotion Reasoning

37. My child is easily excited	New item development	Emotion Stability
38. When another child cries, my child gets upset too	EmQue	Empathy
39. My child is generally calm	New item development	Emotion Regulation
40. My child will stamp their feet or hold their breath during a temper tantrum	MAPS-DP – Temper Loss scale	Emotion Stability
41. My child is able to wait for good things (delay gratification)	ERC - Negativity/Lability scale	Emotion Regulation
42. Your child transitions well from one activity to another; does not become upset or overly excited when moving from one activity to another	ERC - Negativity/Lability scale	Emotion Regulation
43. When my child feels a strong emotion(s) (e.g., anger/excitement), it takes them a long time to calm down	New item development	Emotion Stability
44. My child displays negative emotions when attempting to engage others in play	ERC - Negativity/Lability scale	Prosocial / peer functioning
45. My child tries to hurt someone to get back at them	MAP-DB – Aggression scale	Empathy
46. My child feels bad when they see another child or tv character upset	New item development	Empathy
47. My child say why they are feeling a certain emotion (e.g., my child can say they are sad because they lost their toy)	New item development	Emotion Reasoning
48. My child gets angry frequently	ARI	Emotion Regulation or Emotion Stability
49. My child does things like slam doors or throw/break things when they get upset/frustrated	Adapted from MAPS–DB – Temper Loss scale (“Break or destroy things during a temper tantrum”)	Emotion Stability
50. My child can calm themselves down when experiencing positive emotions (e.g., happiness, excitement)	New item development	Emotion Regulation
51. My child can correctly identify negative emotions in others (e.g., they see a child crying, they know that child is probably experiencing negative emotions)	New item development	Emotion Reasoning
52. My child does not let feelings control him/her	ICU	Empathy
53. My child is prone to angry outbursts or tantrums easily	ERC - Negativity/Lability scale	Emotion Stability
54. When another child gets frightened, my child tries to help them	New item development	Empathy
55. My child can have a calm conversation, even though they are upset	Adapted from the CAMS (“I try to calmly deal with what is making me	Emotion Reasoning

	feel mad")	
56. When my child has a tantrum, it is a complete melt-down	MAPS	Emotion Stability
57. My child is concerned about the feelings of others	Adapted from ERC – Emotion Regulation ("Is empathic towards others; shows concern when others are upset or distressed")	Empathy
58. My child can correctly identify when they are feeling fearful, worried, or scared	New item development	Emotion Reasoning
59. My child has an inappropriate, intense reaction to positive situations (e.g., screams excessively when happy)	New item development	Emotion Stability
60. My child keeps on having a temper tantrum even when you tried to help calm down	MAPS	Emotion Regulation
61. My child can correctly identify positive emotions in others (e.g., they see a child smiling, they know that child is probably experiencing positive emotions)	New item development	Emotion Reasoning
62. If a task is too difficult for my child, how likely will they get frustrated and quit?	New item development	Emotion Stability
63. After receiving a disappointing gift from someone, how likely is my child to pretend to like the gift?	*The Emotion Regulation Rating Scale*	Emotion Regulation
64. My child can correctly identify when they are feeling mad or angry	New item development	Emotion Reasoning
65. My child has a short fuse	MAPS–DB – Temper Loss scale	Emotion Stability
66. My child is empathetic/caring towards others	ERC – Emotion Regulation scale	Empathy
67. My child can wait their turn	New item development	Emotion Regulation
68. My child is overly excited when trying to play with other children	Adapted from ERC - Negativity/ Lability scale ("Is overly exuberant when attempting to engage other in play")	Emotion Regulation
69. My child can recover quickly from episodes of stress (e.g., does not remain stressed or sad after emotionally distressing events)	Adapted from ERC - Negativity/ Lability scale ("Can recover quickly from episodes of upset or distress (eg. does not pout or remain sullen, anxious or sad after emotionally distressing events")	Emotion Regulation or Emotion Stability

70. My child can describe how their body feels along with an emotion (e.g., when they feel an intense emotion, their heart races)	New item development	Emotion Reasoning
71. My child shows remorse when he/she has hurt someone	Adapted from ICU ("Shows no remorse when he/she has done something wrong)	Empathy
72. My child has good coping skills	New item development	Emotion Regulation
73. My child uses facial expressions, behaviors, and situational information to make correct predictions about the emotional states of others	New item development	Emotion Reasoning
74. My child gets angry or upset very quickly	New item development	Emotion Stability
75. My child knows more than 1 coping skills (e.g., deep breathing and distracting themself)	New item development	Emotion Regulation
76. My child can get emotional over a movie or TV show (e.g., gets sad or cries during a sad scene	New item development	Empathy
77. My child correctly knows/understands how others are feeling	New item development	Emotion Reasoning
78. My child displays exuberance (i.e., full of energy) that others find bothersome or annoying	Adapted from ERC - Negativity/Lability scale ("Displays exuberance that others find intrusive or disruptive")	Prosocial / peer functioning
79. My child is angry most of the time	ARI	Emotion Regulation or more general mood questions
80. When my child gets upset, it takes them a long time to calm down	New item development	Emotion Stability
81.My child is happy / proud of others for their accomplishments	New item development	Empathy
82. My child able to correctly identify emotions in others? (e.g., if they see a kid crying, they know that child is sad)	New item development	Emotion Reasoning
83. My child loses their temper or has a tantrum during daily routines	MAPS–DB – Temper Loss scale	Emotion Stability
84. My child can calm themselves down when experiencing strong emotions (e.g., anger, excitement)	New item development	Emotion Regulation
85. When my child gets upset/frustrated, they can down quickly (under 1 min)	New item development	Emotion Stability
86. My child does things to make others feel good	New item development	Empathy
87. When my child gets happy/excited, they can down quickly (under 1 min)	New item development	Emotion Stability

88. My child likes to share positive/good news	New item development	Emotion Regulation
89. My child can correctly identify the emotions on TV/movie characters	New item development	Emotion Reasoning

Appendix B. Final Emotional Competence in Children (ECIC) Measure

Emotion Reasoning – 8 items

Intrapersonal

My child can correctly identify when they feel positive emotions (e.g., happy, excited)
My child can understand different levels/intensity of emotions in themselves (e.g., recognizes they feel stronger emotions over something important than something less important)
My child can describe how their body feels along with an emotion (e.g., when they feel an intense emotion, their heart races)
My child can correctly identify when they feel negative emotions (e.g., sadness, anger**)**

Interpersonal

My child can understand different levels of emotions in others (e.g., recognizes others feel stronger emotions over something important than something less important)
My child can correctly identify negative emotions in others (e.g., they see a child crying, they know that child is probably experiencing negative emotions)
My child uses facial expressions, behaviors, and situational information to make correct predictions about the emotional states of others
My child can correctly identify positive emotions in others (e.g., they see a child smiling, they know that child is probably experiencing positive emotions)

Emotion Stability – 11 items – all items reverse coded

Duration (4)

My child exhibits strong mood swings; their emotional state is difficult to predict because they move quickly from positive to negative emotions
When my child gets overly excited, it takes them a long time to calm down
When my child gets upset, it takes them a long time to calm down
Irritability causes my child problems

Threshold (4)

My child is easily frustrated
If a task is too difficult for my child, how likely will they get frustrated and quit?
My child is easily annoyed by others
My child is easily excited

Intensity (3)

My child does things like slam doors or throw/break things when they get upset/frustrated
My child feels emotions strongly
My child has an inappropriate, intense reaction to positive situations (e.g., screams excessively when happy)

Irritability (3)

Irritability causes my child problems
My child is easily frustrated
My child does things like slam doors or throw/break things when they get upset/frustrated

Emotion Regulation – 6 items

My child has good coping skills
My child can calm themselves down when experiencing positive emotions (e.g., happiness, excitement)
My child will seek out support when they feel strong emotions
My child is able to wait for good things (delay gratification)
My child can calm themselves down when experiencing negative emotions (e.g., anger, sadness)
My child can have a calm conversation, even though they are upset

Empathy – 6 items

My child is empathetic/caring towards others

My child shows remorse when they have hurt someone
My child takes pleasure in the distress of others (e.g., laughs when another person gets hurt or punished)
My child is concerned about the feelings of others
If another child starts to cry, my child tries to comfort them
My child feels bad when they see another child or tv character upset

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SELECTED PUBLICATIONS AND PRESENTATIONS

Hare, M., Dick, A., & Graziano, P. (2022) Adverse childhood experiences predict neurite density differences in young children with and without attention deficit hyperactivity disorder. *Developmental Psychobiology.*

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