



# Development and Validation of the Parental Assistance with Child Emotion Regulation (PACER) Questionnaire

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## Abstract

Caregivers play a central role in promoting emotion regulation throughout infancy, childhood, and adolescence. However, there are no existing psychometric measures to assess how parents assist children in employing emotion regulation strategies for negative emotions. We therefore developed the Parental Assistance with Child Emotion Regulation (PACER) Questionnaire to assess the degree to which parents assist their children in their use of ten different regulation strategies. In this paper, we describe the development of the PACER and examine its psychometric properties ( $N=407$  parents of children ages birth to 17 years). In so doing, we also use the PACER to comprehensively explore the links between parent-assisted emotion regulation and indices of parent and child stress, symptomatology, and attachment. Confirmatory factor analyses of the PACER items supported its intended ten-factor structure (corresponding to ten specific regulation strategies), which was invariant across different child age and sex categories. PACER scale scores had excellent internal consistency and generally acceptable test–retest reliability over a one-week period. Convergent validity was established via correlations between PACER scales and indices of parental emotion sensitivity, expressivity, and regulation, as well as parents' perception of the efficacy of their assistance with children's execution of emotion regulatory strategies. Lower parental facilitation of stereotypically adaptive emotion regulatory strategies was associated with higher child internalizing and externalizing problems and with poorer parent–child relationship quality. Overall, these findings suggest that the PACER may be a useful tool for the assessment of parental assistance with child emotion regulation across development.

**Keywords** Parent emotion socialization · Emotion regulation · Emotion · Development · Parent–child relationships

## Introduction

Across development, a central role of caregivers is to provide external regulation for children's emotions and to support development of children's intrinsic capacity for self-regulation (Gianino & Tronick, 1988; Hofer, 1978). Parents support children's development of emotion regulation via both explicit and implicit attempts to teach children to identify, express,

and regulate their emotions (Saarni, 1999). The nature of this support varies across development, from responding sensitively to infant distress following a stressor (e.g., Dozier et al., 2018), to establishing synchrony between children's bids for support and parental responses to these bids in childhood (Pratt et al., 2015), to parental influences on adolescents' beliefs about various emotion regulatory strategies (Katz & Hunter, 2007). Although the exact nature of parental involvement in child emotion regulation shifts substantially across development with the changing needs of the developing child, parental involvement in child emotion regulation is a core contributor to children's development of the intrinsic capacity to self-regulate from birth through adolescence.

## Parental Emotion Socialization

A large body of work has focused on documenting patterns and correlates of parental emotion socialization

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of offspring in both normative and clinical samples, most notably Gottman's study of parental meta-emotion philosophy (Gottman et al., 1996; Katz & Windecker-Nelson, 2004). Gottman proposes that parents have an organized set of beliefs and attitudes about their children's emotions—including their awareness, acceptance, and assistance of their children's negative emotions—that translate into specific parental behaviors with regard to children's negative emotions. Gottman posits that these beliefs play a central role in shaping children's developmental outcomes across a number of domains ranging from biological responsivity to stress to cognitive development in both normative (Gottman et al., 1996) and clinical (e.g., Cohodes et al., 2016) samples.

Several questionnaire-based measures have been developed to capture parental beliefs, attitudes, and behaviors related to children's negative emotions and parents' tendencies to react to negative emotions in either positive or negative ways (Gottman et al., 1996). Notably, the Parents' Beliefs about Children's Emotions Questionnaire (PBACE; Halberstadt et al., 2013) assesses the degree to which parents believe that children's negative emotions are valuable or dangerous. The Coping with Children's Negative Emotions Scale (CCNES; Fabes et al., 1990) assesses parents' tendency to respond to children's negative emotions using six strategies comprising both supportive reactions (i.e., expressive encouragement, emotion-oriented focus, and problem-oriented focus) and non-supportive reactions (i.e., punishment, minimization, and personal distress) by querying parents' hypothetical responses to a series of vignettes. Although the CCNES does query parental engagement in children's emotion regulation, it does not exclusively assess parental assistance of specific emotion regulation strategies. Rather, the six coping styles assessed encompass responses such as parental distress or punishment of a child who is experiencing negative emotions. Additionally, several measures assess parental awareness of their children's own intrinsic emotion regulatory processes, such as the Emotion-Related Parenting Styles Self-Test (ERPSST; Hakim-Larson et al., 2006), which queries parents' perception of their children's awareness of negative emotion and receptivity to discussing emotional content with others.

### **Importance of Assessing Parental Assistance of Emotion Regulation Strategies at the Strategy-Specific Level**

Despite the growing number of tools to query parental beliefs, awareness, and behaviors related to children's emotions (e.g., Halberstadt et al., 2013), studies have not

assessed the degree to which parents assist their child, instrumentally, in executing specific emotion regulation strategies in daily life. It is important to fill this gap, because the measurement of parental assistance of children's regulatory capacities is essential to understanding normative emotional development and may be particularly relevant to investigations of etiological pathways to the development of psychopathology (Lunkenheimer et al., 2020).

The development of strategy-specific assessments of intrinsic emotion regulation has contributed to the field's understanding of the adaptive function of different emotion regulatory strategies in adulthood (Garnefski & Kraaij, 2007; Gross & John, 2003; Izadpanah et al., 2019). Certain strategies (e.g., reappraisal, problem-solving, acceptance) are more effective at changing an individual's affective state, as compared to other strategies (e.g., suppression, rumination, and avoidance), which have been conceptualized as maladaptive regulation strategies due to their theorized contribution to the development of psychopathology (e.g., Aldao & Nolen-Hoeksema, 2010). Application of strategy-specific measurement in the context of extrinsic emotion regulation is likely to yield a rich understanding of the nuanced patterns of parental assistance with child emotion regulation. Further, this measurement will lay the groundwork for mapping the degree to which caregivers' support of children's use of specific emotion regulation strategies differs across development as children become less reliant on parents for external regulation of emotions (Morris et al., 2007; Gee, 2016; Gee et al., 2014; Gunnar & Donzella, 2002; Hostinar et al., 2015). Psychometrically-sound measures of these emotion regulation processes at the strategy-specific level are thus required to delineate developmental trajectories of parental assistance with youth emotion regulation. Detailed understanding of the ways in which parental assistance of children's execution of specific emotion regulation strategies confers risk for the development of youth psychopathology will inform both prevention and intervention efforts targeting parents' support of children's socioemotional development. Highlighting the developmental trajectories of parental assistance with specific emotion regulation strategies will also facilitate the identification of age-appropriate intervention targets for dyadic psychotherapeutic interventions focused on bolstering parental assistance with child emotion regulation.

### **Parental Assistance in the Context of Development**

As previously noted, caregiver involvement in external regulation of children's emotions is a dynamic process that likely changes across development (see Callaghan & Tottenham, 2016 and Gee & Casey, 2015 for reviews). Burgeoning evidence suggests that caregivers directly impact children's emotional development by influencing

the neurobiological systems that govern emotion regulation (e.g., Gee, 2016; Gee et al., 2014; Gunnar & Donzella, 2002; Hostinar et al., 2015; Tottenham, 2015) and that there may be a normative decrease in the potency of a caregiver's presence on child emotion regulation across human development (Gee et al., 2014; Hostinar et al., 2015). Understanding the ways in which parents assist their offspring in regulating emotions at the strategy-specific level, and further, how parental support of specific strategies changes over time, will allow for a more nuanced understanding of how parents support children's development of competence in regulating their own emotions. Further, delineating how parental assistance of emotion regulation of specific strategies unfolds across development will allow for detailed mapping of the role of parents in providing effective coregulation across development. This mapping will highlight normative developmental trajectories for the role of parents in supporting the development of specific regulatory strategies to cope with negative emotions.

### Parental Assistance with Children's Emotion Regulation (PACER) Questionnaire

The goal of the present study was to develop a parent self-report measure of the degree to which parents assist their children with the execution of specific emotion regulation strategies. The Parental Assistance with Children's Emotion Regulation (PACER) Questionnaire was developed as a comprehensive measure to facilitate examination of the developmental trajectories of parental assistance in regulation of emotions using specific strategies drawn from each stage of the process model of emotion regulation (Gross, 1998; 2015). Gross's process model proposes that there are five temporal points at which an individual can choose to regulate their emotions, which can be mapped onto several distinct types of emotion regulatory processes: situation selection, situation modification, attentional deployment, cognitive change, and response modulation. Parent-child coregulation processes likely span all phases of this model, and therefore, in constructing the PACER, we selected two frequently studied regulation strategies for each of the five phases.

In terms of situation selection strategies, we designed PACER items to assess *avoidance* and *behavioral disengagement*; for situation modification strategies, *problem-solving* and *social support search*; for attentional deployment strategies, *distraction* and *rumination*; for cognitive change strategies, *reappraisal* and *acceptance*; and for response modulation strategies, *expressive suppression* and *venting*. Thus, ten scale scores were intended, indicating how frequently parents assisted their children in using each of these ten strategies. All items are answered on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*),

with higher scores indicating a greater degree of assistance with that particular strategy.

### The Present Study

Here we describe the PACER development process and report results for the first psychometric study of this instrument. We examine its factor structure, internal consistency, test-retest reliability, and convergent validity. With regard to tests of convergent validity, as previously mentioned, certain emotion regulation strategies are associated with adaptive outcomes (e.g., reappraisal) whereas others are associated with maladaptive outcomes (e.g., expressive suppression). Hence, we expected a general pattern whereby increased parental facilitation of maladaptive strategies (and less facilitation of adaptive strategies), would be associated with poorer outcomes in terms of parent-child relationships, symptomatology, well-being, intrinsic emotion regulation abilities, and parents' perceived efficacy of assistance with particular strategies. Further, we expected that parents who use a particular strategy when regulating their own emotions would encourage their children's use of that strategy to a greater degree; thus, we expected that the PACER scales would correlate with the equivalent strategy scales from measures of adult intrinsic emotion regulation.

### Method

#### Item Development and Selection and Pilot Studies

Item development and selection for the PACER is outlined in the supplemental materials (SM). Prior to the study we report in this paper, we first administered the initial 113-item pool across two pilot studies ( $N=185, 200$ , respectively) and conducted a series of analyses in order to inform selection of the best set of 50 items to retain in the final version of the measure. Results from these pilot studies, as well as a copy of the final 50-item PACER, are provided in the SM.<sup>1</sup>

#### Pre-Registration

We pre-registered our study hypotheses, detailed methods and procedures, and an initial data analysis plan (including exclusion criteria and data-stopping rules) using the Open Science Framework repository (<https://osf.io/>).

<sup>1</sup> Previous versions of the PACER (described in greater detail in the SM) included items in each strategy-specific scale that were designed to test parents' regulation efficacy.

## Participants

$N=407$  parents met inclusion criteria for the study (i.e., parents of children between birth and 17 years old, successful completion of survey advertised via Amazon TurkPrime [Litman et al., 2017] including correct responses to all attention checks).  $N=69$  of the original sample of participants responded to subsequent recruitment and successfully completed the retest portion of the study. Detailed information about recruitment and exclusion of study participants for test and retest surveys are presented in the SM. Demographic information for parents and their target children for the test and retest samples, as well as the subset of participants ( $n = 200$ ) who completed the battery of measures designed to assess convergent/discriminant validity) is presented in Table 1.

## Procedure

All study procedures were executed via distribution of a Qualtrics survey on Amazon TurkPrime and all consent and assessment procedures were approved by the Institutional Review Board at Yale University. Participants provided informed consent, completed a series of questionnaires including the validation target, and were thanked, debriefed, and compensated. One of three different attention checks was embedded in each questionnaire that comprised the overall battery; the exact text of the attention checks utilized, as well as a detailed description additional TurkPrime features used to ensure data quality, is provided in the SM.

Measures of parental emotion sensitivity, expressivity, regulation, perceived efficacy in assisting children regulate their emotions, as well as parent and child stress and symptomatology, were administered to a subset of the sample ( $n=200$ ) to assess convergent and discriminant validity. Full descriptions of all measures are reported in the SM. Participants who completed the full battery were compensated \$8 and participants who completed only the validation target were compensated \$1.50. In order to assess test–retest reliability, one week following the initial survey administration, an invitation to complete a retest survey was sent to a subset of participants who successfully completed all study procedures.

## Materials

### Demographics

Parents were asked to report on their sex and age, as well as the target child's sex and age, their relationship to the target child, the number of children in their family, the sex and age of each child, their marital and parenting status (e.g., single, co-parenting), years of education, and employment status (e.g.,

employed full-time, unemployed) prior to both the test and retest administrations of the validation target.

### Parental Assistance with Child Emotion Regulation (PACER) Questionnaire

Participants completed the 50-item PACER Questionnaire designed to assess parental assistance with child regulation of negative emotions using the following strategies: acceptance, avoidance, behavioral disengagement, distraction, expressive suppression, problem-solving, reappraisal, rumination, social support search, and venting. Each item for all strategy-specific scales, with the exception of the avoidance scale, represented a possible response to children's negative emotions (i.e., sentence completions for the phrase "When my child is having negative feelings..."). Each item for the avoidance scale represented a possible response to the prospect of a child experiencing negative emotions (i.e., sentence completions for the phrase "Before my child has negative feelings..."). Parents were given the following instructions: "The following questions relate to your experience of your child's negative emotion (e.g., sadness, anger, anxiety). Rate the degree to which the following statements are typically true of you on the following scale: 1 (*strongly disagree*) to 7 (*strongly agree*)." The ten strategy-specific PACER scales were created by summing the five items that correspond to that strategy. Although not part of the final measure, in the present study, in order to test parental regulation efficacy as an additional index of convergent validity, questions assessing parents' perceived efficacy of assistance with each emotion regulation strategy queried by the PACER were embedded into the administration of the measure. Specifically, for each of the ten strategies queried in the PACER, an item was included assessing parents' perceived overall *effectiveness* in facilitating that strategy (e.g., "Overall, how effective are you at helping your child distract themselves?").

## Analytic Strategy

### Factor Structure

We examined the factorial validity of the PACER using confirmatory factor analysis (CFA; maximum likelihood estimation with the Satorra-Bentler scaled  $\chi^2$  statistic) with *R* software (lavaan version 0.6–5; Rosseel, 2012). We tested a theoretically informed *ten-factor model* comprised of the ten intended strategy-specific scales as correlated factors, and a *one-factor model* as a comparative baseline.

Goodness-of-fit for these models was evaluated using three common fit indices: root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR), and the comparative fit index (CFI). RMSEA and SRMR values  $\leq 0.08$  suggest acceptable fit, and values  $\leq 0.06$  suggest

**Table 1** Demographic information for all study respondents (parents) and target children

Variable	Test sample (n = 407)	Retest sample (n = 69)	Convergent/discriminant validity sample (n = 200)
<b>Parent demographic variables</b>			
<b>Age</b>			
Mean ± SD	38.10 ± 8.22	39.26 ± 8.96	38.27 ± 7.32
Min–Max	18–65	26–64	25–61
Median (IQR)	36 (12)	37 (13)	37 (11)
<b>Sex</b>			
Male	191 (46.9%)	32 (46.4%)	108 (54%)
Female	215 (52.8%)	37 (53.6%)	92 (46%)
Missing	1 (0.2%)	-	-
<b>Ethnicity</b>			
Non-Hispanic White/Caucasian	294 (72.2%)	52 (75.4%)	148 (74%)
Hispanic/Latino	24 (5.9%)	3 (4.3%)	9 (4.5%)
Black/African American	33 (8.1%)	5 (7.2%)	8 (4%)
Asian	40 (9.8%)	8 (11.6%)	26 (13%)
Native American	8 (2.0%)	1 (1.4%)	5 (2.5%)
Other	7 (1.7%)	0 (0.0%)	3 (.5%)
Prefer not to Answer	1 (0.2%)	-	1 (.5%)
<b>Years of education</b>			
Mean ± SD	15.85 ± 3.32	15.64 ± 4.04	16.41 ± 2.91
Min–Max	1–24	1–23	4–24
Median (IQR)	16 (4)	16 (4)	16 (4)
<b>Parent’s relationship to target child</b>			
Biological	389 (95.6%)	67 (97.1%)	188 (94%)
Adoptive	18 (4.4%)	2 (2.9%)	12 (6%)
<b>Parent demographic variables</b>			
<b>Parent marital status</b>			
Married	338 (83%)	49 (71%)	171 (85.5%)
Single	35 (8.6%)	10 (14.5%)	14 (7%)
Separated/divorced	25 (6.1%)	7 (10.1%)	11 (5.5%)
Partnered	4 (1.0%)	2 (2.9%)	1 (.5)
Widowed	1 (0.2%)	0 (0.0%)	0 (0%)
Other	4 (1.0%)	1 (1.4%)	3 (1.5%)
<b>Parenting arrangement</b>			
Single parent	40 (9.8%)	9 (13%)	19 (9.5%)
Co-parent with spouse/live-in partner	337 (82.8%)	54 (78.3%)	171 (85.5%)
Co-parent with former spouse/partner	23 (5.7%)	6 (8.7%)	7 (3.5%)
Co-parent with other adult	4 (1.0%)	0 (0.0%)	2 (1%)
Other	3 (0.7%)	0 (0.0%)	1 (.5%)
<b>Child Demographic Variables</b>			
<b>Target child age</b>			
Mean ± SD	8.79 ± 4.95	8.78 ± 4.93	8.84 ± 4.78
Min–Max	0–17	1–17	0–17
Median (IQR)	9 (9)	9 (9)	9 (8)
<b>Target child sex</b>			
Male	210 (51.6%)	37 (53.6%)	95 (47.5%)
Female	197 (48.4%)	32 (46.4%)	105 (52.5%)

excellent fit. CFI values  $\geq 0.90$  suggest acceptable fit, and values  $\geq 0.95$  suggest excellent fit. We also used the Akaike Information Criterion (AIC) to directly compare the models; AIC accounts for model complexity (with less parsimonious models being penalized) and lower AIC values indicate a better fitting model (Byrne, 2016). For item factor loadings, loadings  $\geq 0.40$  were viewed as meaningful loadings (Stevens, 1992). Analyses of the measurement invariance of the best fitting factor structure across children of different sexes and ages are detailed in the SM.

### Reliability

PACER scale score reliabilities were examined in terms of internal consistency (calculated using Cronbach's alpha [ $\alpha$ ] and McDonald's omega [ $\omega$ ] coefficients) and test–retest reliability (calculated using Pearson  $r$  coefficients between each scale score at baseline and the 1-week retest [ $n=69$ ]). Reliability coefficients  $\geq 0.70$  were considered acceptable,  $\geq 0.80$  were considered good, and  $\geq 0.90$  considered excellent (Groth-Marnat, 2009).

### Convergent and Discriminant Validity

Pearson correlations were calculated to examine relations between the PACER scales and established measures of other theoretically relevant constructs in order to establish convergent validity with the following indices: parental responses to child's emotions, parental perception of child emotion regulation, parental perceived efficacy of regulation assistance, parental regulation of parent's own emotions, parental meta-emotion and attunement, parenting stress and parental stress, parent internalizing problems, and child symptomatology. *Parental response to children's emotions* was measured by the Children's Negative Emotions Scale (CCNES; Fabes et al., 1990) and Maternal Emotional Style Questionnaire (MESQ; Lagacé-Séguin & Coplan, 2005). *Parental perception of child emotion regulation* was measured by the Emotion Regulation Checklist (ERC; Shields & Cicchetti, 1998). *Parental perceived efficacy of regulation assistance* was measured by the ten items assessing regulation efficacy embedded in the PACER. *Parental regulation of parent's own emotions* was measured by the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003), Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004), and Heidelberg Form for Emotion Regulation Strategies (HFERST; Izadpanah et al., 2019). *Parental meta-emotion and attunement* were measured by the Parenting Beliefs about Anxiety Questionnaire (PBA-Q; Francis & Chorpita, 2010), Emotion-Related Parenting Styles Self-Test (ERPSST; Lee et al., 2000), and the Parental Beliefs about Children's Emotions Questionnaire

(PBACE; Halberstadt et al., 2013). *Parenting stress and parental stress* were measured by the Parenting Stress Index (PSI) and the Perceived Stress Scale (PSS; Cohen et al., 1994). *Parent internalizing problems* was measured by the Beck Depression Inventory (BDI-II; Beck et al., 1996) and Beck Anxiety Inventory (BAI; Beck & Steer, 1990). *Child symptomatology* was measured by the Child Behavioral Checklist (CBCL 1.5–5 and 6–18; Achenbach & Rescorla, 2001) and *parent–child attachment quality* was measured by the Child-Rearing Practices Report (CRPR Block, 1965). Exploratory analyses were also conducted in order to examine associations between frequency and efficacy of parental assistance with child regulation using each specific strategy queried by the PACER.

Pearson correlations were also calculated to examine relations between the PACER scales and indices of *parental beliefs about child behavior and development* in order to establish discriminant validity for the PACER, as this construct was hypothesized to be distally related to the specific construct assessed by the novel measure. *Parental beliefs about child behavior and development* were measured by the Parent Behavior Inventory (PBI; Lovejoy et al., 1999) and Parent Parental Acceptance-Rejection Questionnaire (Parent PARQ; Rohner & Ali, 2016).

## Results

### Factor Structure

Our CFAs highlighted that the intended *ten-factor model* was an excellent fit to the data ( $\chi^2 = 1458.604$ ,  $p < 0.001$ ,  $df = 1130$ , CFI = 0.978, RMSEA = 0.027 [90% CI = 0.023–0.030], SRMR = 0.046, AIC = 51,068.878), and substantially better fitting than the *one-factor model* ( $\chi^2 = 9810.408$ ,  $p < 0.001$ ,  $df = 1175$ , CFI = 0.413, RMSEA = 0.134 [90% CI = 0.132–0.136], SRMR = 0.176, AIC = 62,853.920), indicating that the PACER was assessing a multidimensional construct. For the *ten-factor model*, CFI, RMSEA, and SRMR values were all in the excellent range, and all 50 items loaded well ( $> 0.40$ ) on their intended strategy factor (for factor loadings and factor intercorrelations, see Tables 2 and 3). This 10-factor structure was invariant across the different child age and sex categories, with CFI values similar (i.e.,  $\Delta < 0.01$ ) across the configural, metric, scalar, and strict models (see Table 1 in SM).<sup>2</sup> All strategy-specific scales exhibited excellent variability in response patterns,

<sup>2</sup> If analyses are run on a reduced sample ( $n=350$ ) that excludes children under 3 years of age, the pattern of results remains the same. Ten-factor model: CFI = .973, RMSEA = .030 (.026–.033), SRMR = .047, AIC = 43,132.391.

**Table 2** Standardized factor loadings from confirmatory factor analysis (10-factor model) of PACER items

Factor/item	Factor loading
<i>Behavioral disengagement</i>	
1. I help my child remove themselves from situations that they are in that may be causing negative feelings.	0.79
2. I help my child leave whatever situation may be causing them to have negative feelings.	0.85
3. I help my child get out of the current situation that may be causing negative feelings and engage in other situations instead.	0.82
4. I help my child stop doing whatever is making them have negative feelings once they are in this situation.	0.82
5. I remove my child from a situation when it is causing them to have negative feelings.	0.82
<i>Problem solving</i>	
6. I help my child think carefully about different solutions to their problems.	0.81
7. I help my child solve problems that are causing those feelings.	0.84
8. I help my child think of different ways to solve problems.	0.85
9. I help my child think of solutions to their problems.	0.87
10. I help my child take steps to solving a problem.	0.81
<i>Social support search</i>	
11. I help my child find other people to help them (including myself).	0.76
12. I help my child find other people to engage with (including myself).	0.85
13. I help my child find friends and family members for support (including myself).	0.86
14. I help my child find other people to be around physically (including myself).	0.81
15. I encourage my child to reach out to others (including myself).	0.74
<i>Rumination</i>	
16. I help my child replay whatever is making them have negative feelings in their mind.	0.75
17. I help my child think again and again about whatever is making them have negative feelings.	0.91
18. I encourage my child to think over and over again about why they are having negative feelings.	0.92
19. I help my child replay the experience of negative feelings again and again in their mind.	0.95
20. I help my child think about situations that are upsetting or that cause negative feelings over and over again.	0.92
<i>Distraction</i>	
21. I help my child find ways to distract themselves from their negative feelings.	0.85
22. I help my child distract themselves from their negative feelings by finding other things to do.	0.89
23. I help my child take their mind off of things that are making them have negative feelings.	0.88
24. I help my child take their attention off something that is making them have negative feelings.	0.87
25. I help my child think about something other than what is making them have negative feelings.	0.84
<i>Reappraisal</i>	
26. I help my child think of a situation in a positive light.	0.86
27. I help my child see the situation from a different perspective.	0.81
28. I help my child try to see the positive aspects of a situation that is making them have negative feelings.	0.88
29. I help my child change their feelings by thinking differently about their current situation.	0.78
30. I encourage my child to think of the positive side to their negative feelings.	0.85
<i>Acceptance</i>	
31. I help my child understand that it's okay to have negative feelings.	0.82
32. I help my child accept their negative feelings.	0.85
33. I help my child accept the way they are feeling if they are unable to change the situation causing those feelings.	0.85
34. I tell my child that having negative feelings is okay.	0.83
35. I stress to my child that it can be helpful to accept negative feelings in some situations.	0.82
<i>Expressive suppression</i>	
36. I help my child to not show their negative feelings.	0.81
37. I help my child try to hide their feelings from others.	0.91
38. I help my child hide their physical expressions of their negative feelings.	0.91
39. I help my child hide their negative feelings so that it is very hard for other people to tell how they are feeling in the moment.	0.94
40. I encourage my child to hide negative feelings from others.	0.90

**Table 2** (continued)

Factor/item	Factor loading
<i>Venting</i>	
41. I help my child talk openly with other people.	0.80
42. I help my child talk about the situation or problem that caused them to feel this way.	0.77
43. I encourage my child to often talk about their feelings with others.	0.89
44. I help my child confide in others about what is bothering them.	0.85
45. I help my child express their negative feelings to other people.	0.68
<i>Avoidance</i>	
46. I help my child avoid entering potentially uncomfortable situations whenever possible.	0.86
47. I help my child stay away from entering situations that might make them have negative feelings.	0.91
48. I do things to prevent my child from entering a new situation that might cause them to have negative feelings.	0.93
49. I encourage my child to stay away from situations that could make them have negative feelings.	0.90
50. I help my child avoid doing things that could lead to negative feelings.	0.92

All factor loadings were statistically significant ( $p < 0.001$ ).

and there was relatively high mean-level endorsement of strategy use across all scales, with the notable exception of the rumination and expressive suppression scales.

### Reliability

As displayed in Table 4, all ten PACER scales had high internal consistency reliability with Cronbach's  $\alpha$  and McDonald's  $\omega$  values in the good to excellent range ( $> 0.85$ ). Similarly, test-retest reliability indicated generally acceptable stability over one week, with test-retest coefficients around 0.70 or higher for most PACER scales, though  $r$  coefficients for the distraction and venting scales were lower.

### Convergent and Discriminant Validity

Correlations between the PACER scales and the other administered measures were broadly in line with our

expectations with regard to related constructs, thus supporting the convergent validity of the PACER (see Table 5 for a full correlation matrix). High endorsement of a regulation strategy by a parent on the PACER was typically positively associated with parents' self-reported intrinsic use of that strategy to manage their own emotions. Moreover, parents with PACER scale scores reflecting high facilitation of maladaptive regulation strategies (e.g., expressive suppression, rumination) and low facilitation of adaptive regulation strategies (e.g., reappraisal, acceptance, social support search) were more likely to report poorer ability to regulate their own negative emotions, poorer parent-child attachment quality, poorer meta-emotion and attunement to their child's emotions, more negative responses to their child's emotions, poorer child emotion regulation, higher levels of parental stress and internalizing problems, and higher levels of

**Table 3** Factor intercorrelations among the ten factor scales of the PACER (from confirmatory factor analysis)

Factor	2	3	4	5	6	7	8	9	10
1. Behavioral disengagement	0.50***	0.43***	-0.06	0.62***	0.48***	0.16*	-0.08	0.30***	0.61***
2. Problem solving	-	0.58***	-0.09	0.42***	0.72***	0.45***	-0.23***	0.57***	0.22***
3. Social support search	-	-	-0.04	0.43***	0.51***	0.32***	-0.10	0.47***	0.16**
4. Rumination	-	-	-	-0.05	-0.02	0.05	0.43***	0.01	0.13*
5. Distraction	-	-	-	-	0.39***	0.17**	-0.02	0.29***	0.44***
6. Reappraisal	-	-	-	-	-	0.40***	-0.09	0.51***	0.25***
7. Acceptance	-	-	-	-	-	-	-0.25***	0.48***	-0.04
8. Expressive suppression	-	-	-	-	-	-	-	-0.16**	0.25***
9. Venting	-	-	-	-	-	-	-	-	0.08
10. Avoidance	-	-	-	-	-	-	-	-	-

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$



**Table 4** Descriptive statistics and reliability coefficients (Cronbach’s  $\alpha$ , McDonald’s  $\omega$ , Pearson’s  $r$  test–retest) for the PACER scales

PACER scales	Total sample ( $N=407$ )						Mothers ( $n=215$ )		Fathers ( $n=191$ )		Parents of female children ( $n=197$ )		Parents of male children ( $n=210$ )	
	$M$	$SD$	Range	$\omega$	$\alpha$	Test–retest coefficient (Pearson $r$ )	$M$	$SD$	$M$	$SD$	$M$	$SD$	$M$	$SD$
Behavioral disengagement	27.76	4.80	10–35	0.91	0.91	0.69*	28.33	4.74	27.14	4.81	27.87	4.57	27.66	5.01
Problem solving	29.78	4.33	14–35	0.92	0.92	0.73*	30.19	4.25	29.31	4.40	29.88	4.28	29.69	4.39
Social support search	28.00	4.90	5–35	0.90	0.90	0.61*	28.30	5.07	27.71	4.67	28.27	5.31	27.75	4.49
Rumination	17.37	8.42	5–35	0.95	0.95	0.73*	15.92	8.39	19.05	8.15	16.63	8.30	18.06	8.49
Distraction	27.94	5.31	5–35	0.94	0.94	0.49*	28.67	5.24	27.17	5.26	28.62	4.95	27.30	5.55
Reappraisal	29.16	4.78	9–35	0.92	0.92	0.69*	29.61	4.75	28.64	4.79	29.36	4.95	28.97	4.61
Acceptance	28.16	5.62	5–35	0.92	0.92	0.69*	29.00	5.19	27.26	5.93	28.91	5.49	27.46	5.66
Expressive suppression	14.69	7.74	5–35	0.95	0.95	0.67*	12.93	7.11	16.65	7.98	13.47	7.30	15.84	7.98
Venting	27.73	5.14	7–35	0.90	0.89	0.62*	28.27	4.92	27.14	5.34	27.71	5.38	27.75	4.92
Avoidance	24.83	7.37	5–35	0.96	0.96	0.69*	24.52	7.94	25.18	6.69	24.26	7.52	25.37	7.20

\*Pearson correlation  $p < 0.001$

child symptomatology.<sup>3</sup> Parental assistance with more maladaptive strategies, as assessed on the PACER, was also associated with more punitive parental beliefs about their child’s emotions and behaviors (assessed to test discriminant validity), indicating that parental assistance with child emotion regulation may be related to more distal, generalized beliefs about child development than originally hypothesized. In addition, parental assistance with each specific strategy scale was associated with parents’ perceived efficacy in assisting children with employment of that particular emotion regulatory strategy.

## Discussion

Parents play a key role in children’s development of the capacity to engage in specific emotion regulation strategies, and children undergo a remarkable shift from full reliance on parents for external regulation of emotions in infancy to the intrinsic capacity for self-regulation later in development (Grolnick et al., 2002; Thompson & Goodman, 2009). However, to date, research on parental assistance with children’s use of specific regulatory strategies has been hampered by a lack of available psychometric tools. The development and validation of the PACER therefore makes

an important contribution to the emotion socialization literature, being the first questionnaire to assess the degree to which parents support their children in executing specific strategies to regulate their negative emotions. Here we present evidence for the strong validity and reliability of the PACER as a measure of ten different strategies spanning each phase of the process model of emotion regulation (Gross, 2015). The development of this assessment tool therefore helps to establish a psychometric foundation for future studies to comprehensively examine the developmental trajectories of children’s reliance on parental support for emotion regulation.

## Validity and Reliability Evidence for the PACER

Confirmatory factor analyses of PACER items supported the intended ten-factor structure for the instrument, a structure which operated similarly regardless of the age or sex of the target child. PACER scale scores had good internal consistency and variability in response patterns, and, with the exception of the rumination and expressive suppression scales, all strategy-specific scales had relatively high mean-level endorsement. Convergent validity was successfully established via correlations between PACER scales and indices of parental emotion sensitivity, expressivity, regulation, and reported perceptions of efficacy in assisting children with execution of

<sup>3</sup> CBCL raw scores were used in the present study given the inclusion of children under 18 months of age. In addition to the correlations presented in Table 5, all analyses involving the CBCL were re-run using a hierarchical multiple regression framework controlling for child age and sex. Results of these analyses yielded

an identical pattern of results to the correlation results presented in Table 5, with the exception of a significant positive association between parental assistance with expressive suppression and externalizing problems in the 1.5–5 sample when controlling for child age and sex.

**Table 5** Pearson correlations between the PACER and concurrent validity measures

PACER										
	Behavioral dis- engagement	Problem solving	Social support search	Rumination	Distraction	Reappraisal	Acceptance	Expressive suppression	Venting	Avoidance
<i>PACER (Regulation Efficacy)</i>										
Behavioral disengagement	1	0.46**	0.39**	-0.05	0.58**	0.44**	0.15**	-0.07	0.26**	0.58**
Problem solving	0.46**	1	0.53**	-0.07	0.40**	0.67**	0.41**	-0.21	0.52**	0.21**
Social support search	0.39**	0.53**	1	-0.03	0.41**	0.48**	0.30**	-0.09	0.43**	0.15**
Rumination	-0.05	-0.07	-0.03	1	-0.04	-0.02	0.07	0.40**	0.04	0.12*
Distraction	0.58**	0.40**	0.41**	-0.04	1	0.37**	0.15**	-0.00	0.27**	0.42**
Reappraisal	0.44**	0.67**	0.48**	-0.02	0.37**	1	0.37**	-0.08	0.46**	0.24**
Acceptance	0.15**	0.41**	0.30**	0.07	0.15**	0.37**	1	-0.24**	0.45**	-0.04
Expressive suppression	-0.07	-0.21**	-0.09	0.40**	-0.00	-0.08	-0.24**	1	-0.16**	0.24**
Venting	0.26**	0.52**	0.43**	0.04	0.27**	0.46**	0.45**	-0.16**	1	0.07
Avoidance	0.58**	0.21**	0.15**	0.12*	0.42**	0.24**	-0.04	0.24**	0.07	1
<i>DEERS</i>										
Total scale	-0.24**	-0.34**	-0.37**	0.15*	-0.20**	-0.38**	-0.25**	0.25**	-0.21**	0.01
<i>ERQ</i>										
Reappraisal	0.31**	0.35**	0.26**	-0.01	0.32**	0.51**	0.10	-0.05	0.23**	0.08
Suppression	-0.15*	-0.19*	-0.22**	0.06	-0.17*	-0.13	-0.28**	0.46**	-0.31**	0.08
<i>HFERST</i>										
Rumination	0.14	0.10	0.05	0.11	0.06	0.04	0.08	0.00	0.03	0.14
Reappraisal	0.26**	0.35**	0.35**	0.02	0.23**	0.53**	0.07	-0.02	0.24**	0.10
Acceptance	0.23**	0.29**	0.20**	0.03	0.17*	0.29**	0.22**	-0.03	0.20**	0.04
Problem solving	0.30**	0.44**	0.26**	-0.06	0.32**	0.44**	0.20**	-0.17*	0.22**	0.12
Suppression of emotional expression	-0.10	-0.11	-0.12	-0.01	-0.06	-0.09	-0.12	0.35**	-0.24**	0.03
Suppression of emotional experience	0.02	-0.04	-0.10	0.11	0.15*	0.08	-0.20**	0.40**	-0.12	0.24**
Avoidance	0.16*	0.03	0.05	-0.21**	0.19**	0.06	-0.11	0.10	-0.04	0.34**
Social support	0.19**	0.23**	0.29**	0.10	0.18**	0.19**	0.23**	-0.08	0.43**	0.11
<i>ERC</i>										
Emotion regulation	0.24**	0.41**	0.33**	-0.21**	0.13	0.33**	0.42**	-0.39**	0.35**	0.02
<i>PBA-Q</i>										
Total scale	-0.07	0.02	0.14*	-0.16*	-0.11	0.05	0.11	-0.16*	0.10	-0.33**

Table 5 (continued)

PACER										
	Behavioral dis- engagement	Problem solving	Social support search	Rumination	Distraction	Reappraisal	Acceptance	Expressive suppression	Venting	Avoidance
<i>PSS</i>										
Total scale	-0.01	-0.10	-0.03	0.02	0.05	-0.22**	0.03	0.08	0.00	0.04
<i>BAI</i>										
Total scale	-0.22**	-0.18*	0.19**	0.24**	-0.15*	-0.22**	-0.10	0.20**	-0.03	-0.07
<i>BDI</i>										
Total scale	-0.16*	-0.17*	-0.21**	0.09	-0.14	-0.26**	-0.07	0.15*	-0.10	-0.02
<i>CCNES</i>										
Emotion-focused reactions	0.55**	0.56**	0.42**	-0.01	0.56**	0.47**	0.35**	-0.21**	0.43**	0.28**
<i>MESQ</i>										
Emotion coaching	0.43**	0.48**	0.37**	0.02	0.40**	0.41**	0.32**	-0.16*	0.43**	0.21**
Emotion dismissing	0.34**	0.20**	0.16*	0.13	0.41**	0.26**	-0.07	0.28**	0.10	0.54**
<i>ERPSST</i>										
Emotion coaching	0.52**	0.54**	0.41**	-0.06	0.34**	0.41**	0.49**	-0.37**	0.43**	0.19**
Parental rejection of negative emotion	0.05	-0.08	-0.05	0.20**	0.14*	0.02	-0.25**	0.38**	-0.09	0.28**
Parental acceptance of negative emotion	0.00	0.13	0.20**	0.02	0.03	0.09	0.32**	-0.22**	0.21**	-0.14
<i>PBACE</i>										
Parental knowledge	0.37**	0.32**	0.28**	-0.13	0.31**	0.24**	0.15*	-0.21**	0.26**	0.21**
<i>PARQ</i>										
Indifference and neglect	0.35**	0.38**	0.30**	-0.17*	0.29**	0.36**	0.40**	-0.39**	0.23**	0.05
Undifferentiated rejection	0.24**	0.26**	0.30**	-0.20**	0.17*	0.21**	0.33**	-0.41**	0.15*	-0.03
<i>PBI</i>										
Supportive/engaged	0.42**	0.50**	0.43**	-0.13	0.28**	0.42**	0.50**	-0.46**	0.49**	0.07
Hostile/coercive	-0.10	-0.16*	-0.27**	0.30**	-0.08	-0.13	-0.26**	0.32**	-0.09	0.12
<i>CRPR</i>										
Total scale	0.28**	0.35**	0.18*	0.22**	0.26**	0.29**	0.21**	0.07	0.30**	0.23**
<i>CBCL (1.5-5; n = 58)</i>										
Internalizing	-0.13	-0.30*	-0.40**	0.17	-0.08	-0.15	-0.43**	0.48**	-0.31**	0.23

Table 5 (continued)

PACER										
	Behavioral dis- engagement	Problem solving	Social support search	Rumination	Distraction	Reappraisal	Acceptance	Expressive suppression	Venting	Avoidance
Externalizing	-0.13	-0.30*	-0.60**	-0.02	-0.11	-0.42**	-0.35**	0.26	-0.35**	0.25
<i>CBCL (6–18; n = 142)</i>										
Internalizing	-0.11	-0.15	-0.096	0.23**	-0.03	-0.15	-0.12	0.31**	-0.07	-0.04
Externalizing	-0.08	-0.06	-0.12	0.18*	-0.02	-0.10	-0.11	0.20*	0.03	-0.00
PSI-4-SF										
<i>Child Age</i>	-0.088	0.066	-0.051	-0.077	-0.059	0.042	0.101*	0.044	-0.097*	-0.061
Total scale	-0.25**	-0.30**	-0.31**	0.19*	-0.19*	-0.35**	-0.26**	0.34**	-0.18*	0.02

*BAI*: Beck Anxiety Inventory; *BDI*: Beck Depression Inventory; *CCNES*: Coping with Children's Negative Emotions Scale; *MESQ*: Maternal Emotional Style Questionnaire; *ERPSSST*: Emotion-Related Parenting Styles Self-Test-Likert; *PBACE*: Parental Beliefs about Children's Emotions Questionnaire; *PARQ*: Parental Acceptance-Rejection Questionnaire (parent version); *PBI*: Parent Behavior Inventory; *CRPR*: Child-Rearing Practices Report; *CBCL 1.5–5/6–18*: Child Behavioral Checklist *PSI-4 SF*: Parenting Stress Inventory, Short Form; *DEERS*: Difficulties in Emotion Regulation Scale; *ERQ*: Emotion Regulation Questionnaire; *HFERST*: Heidelberg Form for Emotion Regulation Strategies; *ERC*: Emotion Regulation Checklist; *PBA-Q*: Parenting Beliefs about Anxiety Questionnaire; *PSS*: Perceived Stress Scale.

\**p* < 0.05; \*\**p* < 0.01

emotion regulation strategies. Test–retest reliability indicated generally acceptable stability over one week for many of the PACER scales, though the distraction and venting scales were less stable. This might indicate that actual facilitation of those strategies is more variable than other strategies, or it may reflect a psychometric quality of the PACER. Future studies will be needed to contribute to test–retest reliability evidence for this novel measure.

### Variability in Parental Assistance by Parent and Child Stress and Symptomatology

Results of the present study suggest that parents with higher levels of stress and internalizing problems are more likely to assist their children with emotion regulatory strategies that have been conceptualized as less effective in relieving negative affect and that are believed to contribute to risk for development of psychopathology (Aldao & Nolen-Hoeksema, 2010; Izadpanah et al., 2019). This pattern of findings with the PACER therefore highlights one potential mechanism by which parent psychopathology may pose a risk factor for children's development of psychopathology (e.g., Burstein et al., 2010; Goodman & Gotlib, 1999).

Providing evidence for this hypothesized mechanism, child internalizing and externalizing problems was also negatively associated with the degree to which parents assist their children with stereotypically adaptive regulatory strategies (i.e., problem-solving, social support search, reappraisal, and acceptance) and positively associated with the degree to which parents assist their children with stereotypically maladaptive strategies (i.e., expressive suppression and rumination). Highly related to this set of findings, results of the present study revealed that parents' tendency to engage in a given emotion regulation strategy when they themselves are experiencing negative affect is associated with the degree to which they assist their child with this specific regulatory strategy. These results further underscore a pathway by which parental socialization of specific strategies may contribute to risk or resilience for offspring development of psychopathology. Conversely, children with higher levels of internalizing and externalizing behaviors may elicit specific patterns of parental assistance. Parents of children with more difficult behaviors may be more likely to engage in a pattern of regulatory assistance characterized by more stereotypically maladaptive regulation strategies.

Although the patterns of findings reported in the manuscript are generally in the hypothesized direction, it is important to note that there are several associations between PACER scales and indices used to assess convergent validity that were not expected, as well as some hypothesized associations that were not significant. For example, unexpectedly, emotion coaching and emotion dismissing scales of the MESQ were both related, non-specifically, to

many PACER scales. These unexpected findings suggest that strategy-specific assistance may not map onto broader constructs such as coaching and dismissing, highlighting the importance of further research to examine nuanced patterns of association between parental assistance of child emotion regulation and related, but dissociable, concepts. In addition, although there were several associations between PACER and CBCL scales, there were also several non-significant findings that may shed light on future research directions. Future research examining age-specific associations between parental assistance of emotion regulation and child symptomatology, which may also vary by specific strategy, will contribute to our understanding of the specificity of convergent validity of this novel measure.

Given that parental assistance with child regulation of negative emotions varied as a function of parent internalizing problems and child symptomatology, future research should examine the psychometric characteristics of the PACER in clinical samples, in order to further delineate how parental assistance with specific emotion regulatory strategies may contribute to risk or resilience for the development of psychopathology. The ability to measure the degree to which a parent actively supports their child's development of specific regulatory strategies will allow clinicians to detect family-level patterns in emotion socialization that may enhance conceptualization of youth psychopathology and treatment planning.

Consistent with previous findings (e.g., Waters et al., 2010), the present study also identified the strength of the parent-child attachment relationship as a correlate of parental assistance of adaptive emotion regulation strategies. Future studies in clinical samples should aim to identify how additional indices of the parent-child relationship (e.g., parent-child relationship conflict) affect the degree to which a parent serves as an effective source of external emotion regulation, which may deepen our understanding of intervention targets for dyadic therapies for children. Furthermore, future studies should examine the sensitivity of the PACER to detect changes in parental assistance with child emotion regulation across therapeutic interventions that aim to enhance parental involvement in emotion socialization (e.g., Parent-Child Interaction Therapy; Hembree-Kigin & McNeil, 2013).

### Limitations and Future Directions

Several limitations of the current work should be addressed in future studies. First, all data collection was conducted via convenience samples online with parents as sole reporters and, further, it is possible that parents were thinking about their emotion socialization and parenting tendencies with regard to multiple children in responding to questionnaires. Future studies should aim

to replicate validation efforts via in-person data collection that includes children. Future measure validation efforts should focus on developing a child-report version of the PACER that asks children to report on the degree to which they perceive their parent as assisting with their capacity to execute a range of specific emotion regulation strategies. In addition, novel technologies such as ecological momentary assessment will facilitate real-time recording of the degree to which parents provide external support for their children's emotion regulation throughout the day and will provide an important index of convergent validity for the PACER.

Second, although our findings provide substantial evidence of convergent validity, indices of parental behavior that were hypothesized to contribute to evidence for discriminant validity for the PACER were also related to PACER scale scores. Specifically, parental beliefs about child behavior and development were associated with parental assistance with child emotion regulation, as reported on the PACER, suggesting that parental behaviors related to facilitating children's regulatory strategies may be more broadly related to generalized beliefs about child development and the role of parents in supporting children. Though unexpected, these results represent additional evidence of convergent validity for the PACER and suggest that punitive and positive beliefs about child development may differentially relate to parental assistance with specific emotion regulation strategies. Future validation studies for the PACER should examine more distal indices of parental behavior and personality as candidates to establish discriminant validity. In future work, assessing concordance between parental report of assistance with child emotion regulation and video-based coding of parent-child interactions and in-vivo parental regulation of children's emotions (e.g., Feldman, 2015) will also serve as an important marker of convergent validity for the PACER.

Third, future studies should assess the degree to which parents are involved in supporting strategies to regulate positive emotions given that emotion regulation processes are not only relevant to negative emotions (Gross & Thompson, 2007; Preece et al., 2018). Fourth, it is important to note that emotion socialization is theorized to differ across cultures (e.g., Cole & Tan, 2015; Keller et al., 2004; Myruski et al., 2019) and by both parent and child gender (Gottman et al., 1996). Therefore, future studies should aim to establish evidence of validity for this new measure in culturally-diverse samples in line with recent exemplar approaches (e.g., Halberstadt et al., 2013) and should examine how parental gender identity influences parents' tendency to assist children in their execution of specific strategies. Fifth, though results of the present study suggest that the frequency of parental assistance with specific strategies may be more stable across development

than hypothesized, it is important to note that these findings are based on cross-sectional analyses. Finally, in light of parents' relatively high mean-level endorsement of all strategies, with the exception of rumination and expressive suppression, it is possible that parents were responding to demand characteristics in reporting high levels of assistance with more stereotypically positive strategies.

It is important to note that the PACER differs from other measures of child emotion regulation due to the fact that the PACER was designed to query *parental assistance* with emotion regulation, rather than children's own execution of emotion regulatory strategies. Although very young children are unlikely to engage in some of the intrinsic self-regulatory processes for which parental assistance is queried in the PACER, parents scaffold children's development of more complex emotion regulatory strategies prior to children's own adoption and execution of these strategies to regulate their own emotions (e.g., Kochanska et al., 2001; Volling et al., 2002). Akin to many parents' commitment to reading preverbal infants and toddlers books with plotlines and vocabulary that are likely too complex for young children to understand, parents can scaffold their young children's use of more complex emotion regulatory strategies through modeling and coaching starting at birth.

The granularity of the PACER (i.e., the assessment of parental assistance with child execution of specific strategies) allows for a more detailed mapping of the specific ways in which parental support of children's developing emotion regulation shifts across time. This initial validation invites future work that fully delineates developmental trajectories of parental socialization of emotion regulation via direct assistance with specific strategies in a larger, longitudinal sample that employs prospective data collection, in line with recent efforts (e.g., Cole et al., 2020). Future work with larger samples will also enable more comprehensive examinations of the measurement invariance of the PACER, across a more differentiated set of demographic categories. Moreover, recent work has characterized the neural signatures of parental assistance with emotion regulation (Grabell et al., 2019; Myruski et al., 2019) and lays the groundwork for future longitudinal neuroimaging studies comparing the effect of parental presence on child amygdala activation among parent-child dyads with differing profiles of parental assistance of emotion regulation.

## Conclusion

In conclusion, the present study suggests that the PACER has good psychometrics and may therefore be a useful tool for the assessment of parental assistance with child emotion regulation across development in research and

clinical settings. Results highlight the importance of future studies aimed at understanding the antecedents and correlates of the degree to which parents are engaged in supporting their children's capacities for emotion regulation via direct assistance with specific regulation strategies. In addition, validation of this novel measure facilitates an important arm of research that aims to establish normative developmental trajectories of the degree to which parents assist children in executing specific emotion regulation strategies. In clinical settings, use of the PACER will allow for accurate capture of the degree to which parents assist their children with execution of specific emotion regulation strategies, and, crucially, how profiles of parental involvement in these processes vary by strategy and in the context of developmental psychopathology. In sum, the PACER initiates a novel line of research that aims to delineate the mechanisms by which humans undergo a phenomenal developmental shift from reliance on external regulation of emotions by parents in infancy to the capacity for intrinsic self-regulation in adulthood, and how variation in these processes may relate to risk for psychopathology.

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**Author Contributions** All authors contributed to the study conception and design. Material preparation and data collection were performed by Emily Cohodes, Sarah McCauley, and Dylan Gee. Analysis was performed by David Preece and Emily Cohodes, with input from Dylan Gee and James Gross. Emily Cohodes, David Preece, Marisa Rogers, and Sarah McCauley created all tables and appendices for the manuscript. The first draft of the manuscript was written by Emily Cohodes, and all authors made substantive contributions to manuscript revisions. All authors read and approved the final manuscript.

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**Data Availability** All study data is available by request from the corresponding author.

## Compliance with Ethical Standards

**Conflicts of Interest/Competing Interests** The authors declare that they have no conflict of interest.

**Ethical Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The study was approved by the Institutional Review Board at Yale University.

**Consent to Participate** Informed consent was obtained from all individual participants included in the study.

## References

- Achenbach, T. M., & Rescorla, L. (2001). Manual for the ASEBA school-age forms & profiles: An integrated system of multi-informant assessment. ASEBA.
- Aldao, A., & Nolen-Hoeksema, S. (2010). Specificity of cognitive emotion regulation strategies: A transdiagnostic examination. *Behaviour Research and Therapy*, 48(10), 974–983. <https://doi.org/10.1016/j.brat.2010.06.002>.
- Beck, A., Steer, R., & Brown, G. (1996). *Manual for the Beck Depression Inventory-II (BDI-II)*. <https://www.scienceopen.com/document?vid=9feb932d-1f91-4ff9-9d27-da3bda716129>
- Beck, A. T., & Steer, R. A. (1990). *Manual for the Beck Anxiety Inventory*. San Antonio, TX: Psychological Corporation.
- Block, J. H. (1965). *The Child-Rearing Practices Report (CRPR): A set of Q items for the description of parental socialization attitudes and values*.
- Burstein, M., Ginsburg, G. S., & Tein, J.-Y. (2010). Parental anxiety and child symptomatology: An examination of additive and interactive effects of parent psychopathology. *Journal of Abnormal Child Psychology*, 38(7), 897–909.
- Byrne Barbara, M. (2016). *Structural equation modeling with AMOS: Basic concepts, applications, and programming*. New York: Routledge.
- Callaghan, B. L., & Tottenham, N. (2016). The neuro-environmental loop of plasticity: A cross-species analysis of parental effects on emotion circuitry development following typical and adverse caregiving. *Neuropsychopharmacology*, 41(1), 163–176.
- Cohen, S., Kamarck, T., & Mermelstein, R. (1994). *Perceived Stress Scale* (p. 10). Measuring Stress: A Guide for Health and Social Scientists.
- Cohodes, E., Hagan, M., Lieberman, A. F., & Dimmler, M. H. (2016). Maternal meta-emotion philosophy and cognitive functioning in children exposed to violence. *Journal of Child & Adolescent Trauma*, 9(3), 191–199.
- Cole, P. M., Loughheed, J. P., Chow, S.-M., & Ram, N. (2020). Development of emotion regulation dynamics across early childhood: A multiple time-scale approach. *Affective Science*. <https://doi.org/10.1007/s42761-020-00004-y>.
- Cole, P. M., & Tan, P. Z. (2015). *Emotion socialization from a cultural perspective*.
- Dozier, M., Roben, C. K. P., Caron, E., Hoye, J., & Bernard, K. (2018). Attachment and Biobehavioral Catch-up: An evidence-based intervention for vulnerable infants and their families. *Psychotherapy Research*, 28(1), 18–29. <https://doi.org/10.1080/10503307.2016.1229873>.
- Fabes, R. A., Eisenberg, N., & Bernzweig, J. (1990). *The coping with children's negative emotions scale: Procedures and scoring*. Available from Authors: Arizona State University.
- Feldman, R. (2015). Mutual influences between child emotion regulation and parent-child reciprocity support development across the first 10 years of life: Implications for developmental psychopathology. *Development and Psychopathology*, 27(4pt1), 1007–1023. <https://doi.org/10.1017/S0954579415000656>
- Francis, S. E., & Chorpita, B. F. (2010). Development and evaluation of the Parental Beliefs about Anxiety Questionnaire. *Journal of Psychopathology and Behavioral Assessment*, 32(1), 138–149. <https://doi.org/10.1007/s10862-009-9133-5>.
- Garnefski, N., & Kraaij, V. (2007). The Cognitive Emotion Regulation Questionnaire. *European Journal of Psychological Assessment*, 23(3), 141–149. <https://doi.org/10.1027/1015-5759.23.3.141>.
- Gee, D. G. (2016). Sensitive periods of emotion regulation: Influences of parental care on frontoamygdala circuitry and plasticity: Sensitive periods of emotion regulation. *New Directions for Child and Adolescent Development*, 2016(153), 87–110. <https://doi.org/10.1002/cad.20166>.
- Gee, D. G., & Casey, B. J. (2015). The impact of developmental timing for stress and recovery. *Neurobiology of Stress*, 1, 184–194. <https://doi.org/10.1016/j.ynstr.2015.02.001>.
- Gee, D. G., Gabard-Durnam, L., Telzer, E. H., Humphreys, K. L., Goff, B., Shapiro, M., et al. (2014). Maternal buffering of human amygdala-prefrontal circuitry during childhood but not during adolescence. *Psychological Science*, 25(11), 2067–2078. <https://doi.org/10.1177/0956797614550878>.
- Gianino, A., & Tronick, E. Z. (1988). The mutual regulation model: The infant's self and interactive regulation and coping and defensive capacities. In *Stress and coping across development* (pp. 47–68). Lawrence Erlbaum Associates, Inc.
- Goodman, S. H., & Gotlib, I. H. (1999). Risk for psychopathology in the children of depressed mothers: A developmental model for understanding mechanisms of transmission. *Psychological Review*, 106(3), 458.
- Gottman, J. M., Katz, L. F., & Hooven, C. (1996). Parental meta-emotion philosophy and the emotional life of families: Theoretical models and preliminary data. *Journal of Family Psychology*, 10(3), 243.
- Grabell, A. S., Huppert, T. J., Fishburn, F. A., Li, Y., Hlutkowsky, C. O., Jones, H. M., et al. (2019). Neural correlates of early deliberate emotion regulation: Young children's responses to interpersonal scaffolding. *Developmental Cognitive Neuroscience*, 40, 100708.
- Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment*, 26(1), 41–54.
- Gross, J. J. (1998). Antecedent-and response-focused emotion regulation: Divergent consequences for experience, expression, and physiology. *Journal of Personality and Social Psychology*, 74(1), 224.
- Grolnick, W. S., & Farkas, M. (2002). Parenting and the development of children's self-regulation. *Handbook of parenting*, 5, 89–110.
- Gross, J. J. (2015). The Extended Process Model of Emotion Regulation: Elaborations, applications, and future directions. *Psychological Inquiry*, 26(1), 130–137. <https://doi.org/10.1080/1047840X.2015.989751>.
- Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology*, 85(2), 348.

- Gross, J. J., & Thompson, R. A. (2007). Emotion regulation: Conceptual foundations. In *Handbook of emotion regulation* (pp. 3–24). The Guilford Press.
- Groth-Marnat, G. (2009). *Handbook of Psychological Assessment*. John Wiley & Sons.
- Gunnar, M. R., & Donzella, B. (2002). Social regulation of the cortisol levels in early human development. *Psychoneuroendocrinology*, 27(1–2), 199–220.
- Hakim-Larson, J., Parker, A., Lee, C., Goodwin, J., & Voelker, S. (2006). Measuring parental meta-emotion: Psychometric properties of the emotion-related parenting styles self-test. *Early Education and Development*, 17(2), 229–251. [https://doi.org/10.1207/s15566935eed1702\\_2](https://doi.org/10.1207/s15566935eed1702_2).
- Halberstadt, A. G., Dunsmore, J. C., Bryant, A., Jr., Parker, A. E., Beale, K. S., & Thompson, J. A. (2013). Development and validation of the Parents' Beliefs About Children's Emotions Questionnaire. *Psychological Assessment*, 25(4), 1195–1210. <https://doi.org/10.1037/a0033695>.
- Hembree-Kigin, T. L., & McNeil, C. B. (2013). *Parent—Child interaction therapy*. Springer Science & Business Media.
- Hofer, M. A. (1978). Hidden regulatory processes in early social relationships. In *Social Behavior* (pp. 135–166). Springer.
- Hostinar, C. E., Johnson, A. E., & Gunnar, M. R. (2015). Parent support is less effective in buffering cortisol stress reactivity for adolescents compared to children. *Developmental Science*, 18(2), 281–297.
- Izadpanah, S., Barnow, S., Neubauer, A. B., & Holl, J. (2019). Development and validation of the Heidelberg Form for emotion regulation strategies (HFERST): Factor structure, reliability, and validity. *Assessment*, 26(5), 880–906.
- Katz, L. F., & Windecker-Nelson, B. (2004). Parental meta-emotion philosophy in families with conduct-problem children: Links with peer relations. *Journal of Abnormal Child Psychology*, 32(4), 385–398.
- Katz, L., & Hunter, E. (2007). Maternal Meta-emotion Philosophy and Adolescent Depressive Symptomatology. *Social Development*, 16(2), 343–360.
- Keller, H., Lohaus, A., Kuensemueller, P., Abels, M., Yovsi, R., Voelker, S., Jensen, H., Papaligoura, Z., Rosabal-Coto, M., & Kulks, D. (2004). The bio-culture of parenting: Evidence from five cultural communities. *Parenting: Science and Practice*, 4(1), 25–50.
- Kochanska, G., Coy, K. C., & Murray, K. T. (2001). The Development of Self-Regulation in the First Four Years of Life. *Child Development*, 72(4), 1091–1111. <https://doi.org/10.1111/1467-8624.00336>.
- Lagacé-Séguin, D. G., & Coplan, R. J. (2005). Maternal emotional styles and child social adjustment: Assessment, correlates, outcomes and goodness of fit in early childhood. *Social Development*, 14(4), 613–636.
- Lee, C. H., Hakim-Larson, J., & Voelker, S. (2000). *The Parenting Styles Self-Test: Psychometric properties*. Ottawa, Ontario: Poster Presented at the Annual Meeting of the Canadian Psychological Association.
- Litman, L., Robinson, J., & Abberbock, T. (2017). TurkPrime.com: A versatile crowdsourcing data acquisition platform for the behavioral sciences. *Behavior Research Methods*, 49(2), 433–442.
- Lovejoy, M. C., Weis, R., O'Hare, E., & Rubin, E. C. (1999). Development and initial validation of the Parent Behavior Inventory. *Psychological Assessment*, 11(4), 534.
- Lunkenheimer, E., Diercks, C., Lobo, F., Cole, P., & Olson, S. (2020). The Role of Dynamic, Dyadic Parent-Child Processes in Parental Socialization of Emotion. *Developmental Psychology*, 56, 566–577. <https://doi.org/10.1037/dev0000808>.
- Morris, A. S., Silk, J. S., Steinberg, L., Myers, S. S., & Robinson, L. R. (2007). The Role of the Family Context in the Development of Emotion Regulation. *Social Development (Oxford, England)*, 16(2), 361–388. <https://doi.org/10.1111/j.1467-9507.2007.00389.x>.
- Myruski, S., Birk, S., Karasawa, M., Kamikubo, A., Kazama, M., Hirabayashi, H., & Dennis-Tiway, T. (2019). Neural signatures of child cognitive emotion regulation are bolstered by parental social regulation in two cultures. *Social Cognitive and Affective Neuroscience*, 14(9), 947–956. <https://doi.org/10.1093/scan/nsz070>.
- Pratt, M., Singer, M., Kanat-Maymon, Y., & Feldman, R. (2015). Infant negative reactivity defines the effects of parent-child synchrony on physiological and behavioral regulation of social stress. *Development and Psychopathology*, 27(4pt1), 1191–1204.
- Preece, D. A., Becerra, R., Robinson, K., Dandy, J., & Allan, A. (2018). Measuring emotion regulation ability across negative and positive emotions: The Perth Emotion Regulation Competency Inventory (PERCI). *Personality and Individual Differences*, 135, 229–241.
- Rohner, R. P., & Ali, S. (2016). Parental acceptance-rejection questionnaire (PARQ). In *Encyclopedia of personality and individual differences* (pp. 1–4). Springer, Cham.
- Rosseel, Y. (2012). *lavaan: An R package for structural equation modeling and more Version 0.5–12 (BETA)*. 37.
- Saarni, C. (1999). *The development of emotional competence*. Guilford Press.
- Shields, A., & Cicchetti, D. (1998). Reactive aggression among maltreated children: The contributions of attention and emotion dysregulation. *Journal of Clinical Child Psychology*, 27(4), 381–395.
- Stevens, J. P. (1992). *Applied multivariate statistics for the social sciences*. Hillsdale, NJ: Erlbaum.
- Thompson, R. A., & Goodman, M. (2009). Development of Emotion Regulation: More than Meets the Eye. In A. M. Kring & D. M. Sloan (Eds.), *Emotion Regulation and Psychopathology: A Transdiagnostic Approach to Etiology and Treatment*. Guilford Press.
- Tottenham, N. (2015). Social scaffolding of human amygdala-mPFC circuit development. *Social Neuroscience*, 10(5), 489–499. <https://doi.org/10.1080/17470919.2015.1087424>.
- Volling, B. L., McElwain, N. L., Notaro, P. C., & Herrera, C. (2002). Parents' emotional availability and infant emotional competence: Predictors of parent-infant attachment and emerging self-regulation. *Journal of Family Psychology*, 16(4), 447–465. <https://doi.org/10.1037/0893-3200.16.4.447>.
- Waters, S. F., Virmani, E. A., Thompson, R. A., Meyer, S., Raikes, H. A., & Jochem, R. (2010). Emotion Regulation and Attachment: Unpacking Two Constructs and Their Association. *Journal of Psychopathology and Behavioral Assessment*, 32(1), 37–47. <https://doi.org/10.1007/s10862-009-9163-z>.

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