Article

How Caregivers Support Children's Emotion Regulation: Construct Validation of the Parental Assistance With Child Emotion Regulation (PACER) Questionnaire

Assessment
2023, Vol. 30(4) 1040–1051

DOI: 10.1177/10731911221082708
journals.sagepub.com/home/asm
SAGE

Vincent O. Mancini[1,2], Brody J. Heritage[1], David Preece[2], Emily M. Cohodes[3], James J. Gross[4], Dylan G. Gee[3], and Amy Finlay-Jones[1]

Abstract

Caregivers play a crucial role in supporting the development of their children's emotion regulation. This study validated the Parental Assistance with Child Emotion Regulation (PACER) Questionnaire in a sample of 491 caregivers ($M = 32.89$ years) of young children ≤ 5 years. Exploratory structural equation modeling provided evidence of the instrument's ability to assess parental support for 10 distinct emotion regulation strategies that match the intended design of the instrument. Latent profile analysis revealed three distinct caregiver profiles characterized by above-average support for strategies that previously have been shown to be predictive of adaptive outcomes, maladaptive outcomes, or mixed-outcomes, respectively. Results add to existing literature that suggests the PACER is a valid and reliable assessment of caregiver-implemented support of emotion regulation strategies for children ≤ 5 years old. Evidence of distinct caregiver profiles highlights opportunities for prevention and intervention efforts to bolster extrinsic support for adaptive emotion regulation strategies. This instrument may be well-suited to capturing changes throughout the early developmental period, in addition to monitoring caregiver-facing interventions promoting optimal emotion regulation in children.

Keywords

PACER, emotion regulation, latent profile analysis, ESEM, parenting

Background

The foundation of one's ability to regulate one's emotions is established during the first years of life. Caregivers play a critical role during this early developmental period, scaffolding the development of children's self-regulation skills via co-regulation, cultivation of environments that engender self-regulatory capacities, and emotion socialization behaviors (Eisenberg et al., 1998; Murray et al., 2019). Emotion socialization behaviors comprise caregivers' own emotional expressiveness, as well as their responses to their children's emotions, including the deployment of specific strategies to support their children's emotion regulation (Hajal & Paley, 2020). These behaviors are thought to influence children's capacity and tendency to deploy different emotion regulation strategies that span the temporal spectrum of emotion regulation processes.

Such processes are well-articulated in the adult emotion regulation literature, with Gross' extended process model (EPM) of emotion regulation suggesting that there are 5 broad *families* of emotion regulation strategies: situation selection, situation modification, attentional deployment, cognitive change, and response modulation (Gross, 1998, 2015). A key tenet of the model is that the use of different types of strategies will have differential outcomes. Theoretically, these strategies may be classified as broadly adaptive or maladaptive, although their value may vary by context. Generally adaptive strategies (e.g., cognitive reappraisal, problem solving) are those that are associated with more positive long-term outcomes (Gross & John, 2003; Izadpanah et al., 2017) while generally maladaptive

[1]University of Western Australia, Perth, Australia
[2]Curtin University, Perth, Western Australia, Australia
[3]Yale University, New Haven, CT, USA
[4]Stanford University, CA, USA

Corresponding Author:
Vincent O. Mancini, Telethon Kids Institute, University of Western Australia, Perth, Western Australia, Northern Entrance, Perth Children's Hospital, 15 Hospital Avenue, Nedlands, WA 6009, Australia.
Email: Vincent.Mancini@curtin.edu.au

strategies (e.g., expressive suppression, rumination) are those that are consistently implicated in the onset and maintenance of psychopathology or interpersonal problems (Aldao et al., 2010). Although the isolated use of a specific strategy in response to a specific context is unlikely to determine long-term outcomes, it is the *pattern* of strategies used over time, and across contexts, that have led to the "adaptive" and "maladaptive" terminology. This broad approach to the classification of emotion regulation strategies continues to be implemented in the literature (e.g., Wooten et al., 2022), and is the approach taken in this study. However, it is important to differentiate this approach to complementary developments in the emotion regulation literature that highlight the nuance of the context and an individual's goals when determining whether any given emotion regulation strategy is either adaptive or maladaptive (Tull & Aldao, 2015).

Despite growing awareness of the role of caregivers in shaping child emotion regulation, insight into the specific strategies they support to enable their child to regulate negative emotion is limited, especially in the early years of life. This is largely due to the paucity of well-validated, strategy-specific assessments of caregiver support of children's use of specific emotion regulation strategies. To address this, Cohodes et al. (2021) recently piloted and validated a strategy-specific measure of caregiver support of children's use of emotion regulation strategies based on Gross' process model (Gross, 2015). The resultant work was the *Parental Assistance with Child Emotion Regulation* (PACER) Questionnaire, which comprises 50 caregiver-rated items that assess parental support with children's use of 10 distinct emotion regulation strategies. Specifically, the PACER queries parental support of children's acceptance, appraisal, avoidance, behavioral disengagement, distraction, expressive suppression, problem solving, rumination, social support search, and venting.

Each of the five families of emotion regulation outlined in the EPM (Gross & John's (Gross, 1998, 2015) are represented by items querying parental assistance with two strategies in the PACER. The 50 items selected to measure these strategies were retained following a comprehensive pilot phase, succeeded by a validation phase comprised of 407 parents of children under 17 years of age and residing in the United States. The authors performed both exploratory and then confirmatory factor analyses (CFA) to test the underlying factor structure of the PACER, finding strong support for the intended 10-factor model (each factor representing 1 of the 10 intended emotion regulation strategies). The 10-factor model returned good fit statistics, demonstrated an absence of problematic item cross-loadings, good internal reliability coefficients for each factor, and good test–retest reliability.

The convergent and discriminant validity of the PACER has been demonstrated via the pattern of correlations with several theoretically related constructs (Cohodes et al., 2021). For example, caregiver deployment of specific strategies to regulate their own emotion was often strongly and significantly correlated with the use of this same strategy to support their child's emotion regulation (Cohodes et al., 2021). Similarly, caregiver beliefs about emotions were significantly and positively correlated for 9 of the 10 PACER strategies (excluding rumination), suggesting that increased frequency of support for emotion regulation was positively associated with more adaptive generalized beliefs about child development and the role of parents in supporting children. For younger children (aged 1.5–5 years), caregiver's support of problem solving, social support search, acceptance, and venting were associated with lower levels of internalizing and externalizing problems, whereas caregiver support with expressive suppression was strongly and positively correlated with internalizing problems. For older children (aged 6–18 years), increased caregiver support with certain strategies (namely rumination and expressive suppression) was associated with increases in both internalizing and externalizing symptoms—congruent with previous research suggesting that the use of certain types of strategies may increase risk for maladaptive outcomes (Gross, 2015).

The PACER has not yet been validated in a sample beyond those recruited to develop the instrument, which included parents of children spanning the full spectrum of child development (0–17 years; $M = 8.79$ years). However, the rapid and dynamic nature of children's emotional development during early life (i.e., the first 5 years) is unique, marking this period as one that warrants specific investigation (Diener et al., 2002; Meyer et al., 2014; Röll et al., 2012). Whether the PACER demonstrates similarly suitable psychometric properties in a novel sample comprising caregivers of young children warrants further evaluation. Furthermore, it is not yet known whether there are distinct "profiles" of emotion regulation strategies supported by caregivers (i.e., subtypes of parents that may tend to support certain sets of strategies in combination), although natural variation in the type and frequency of emotion regulation support strategies is expected. The sources of this variability may be ecological (i.e., caregivers may gravitate toward supporting developmentally appropriate emotion regulation strategies) but may also reflect a pattern of strategies that caregivers prefer to support, based on factors such as their own parenting style and lived experiences. The identification of possible profiles of support for emotion regulation facilitates novel opportunities to identify changing patterns of support as children age, and to identify potentially at-risk groups, such as caregivers who may demonstrate inflexibility (e.g., implementing support of a limited number of strategies), caregivers who enact support strategies typically associated with maladaptive outcomes, or those who do not provide support at all.

In the present study, we tested the underlying factor structure of the PACER in a sample of caregivers of children aged 0 to 5 years of age using exploratory structural equation modeling (ESEM). ESEM benefits from a synergy of data-driven exploratory factor analysis (EFA) and theory-driven CFA approaches (Gomez et al., 2020). Using ESEM, the PACER items are specified to load onto an *a priori* factor (i.e., parental support of 1 of 10 specific emotion regulation strategies) and are also free to load onto non-targeted factors. We then sought to investigate whether scores on the PACER could be used to reveal different caregiver profiles based on the strategies they typically use to support the emotion regulation of their young children. This was accomplished via a latent-profile analysis (LPA). LPA is a person-centered modeling technique that identifies profiles of participants in a dataset based on similar patterns of responding across different variables.

Method

Participants

A total of 491 caregivers aged 18 to 57 years ($M = 32.89$ years, $SD = 5.56$ years; 79% female) completed the PACER as part of a larger study on parenting. All participants were the caregiver of at least one child aged 3 months to 5.5 years ($M = 2.21$ years, $SD = 1.27$ years; 52.5% male). Inclusion criteria for the current study was proficiency in the English language and currently raising at least one child younger than 5 years. All participants were residents of either the United Kingdom (75.4%), the United States (11.0%), Ireland (7.3%), Australia and New Zealand (3.3%), or Canada (1.2%). Most participants were born in the United Kingdom (62.9%), The United States (8.6%), Ireland (6.7%), or Australia and New Zealand (2.4%)—the remaining 19.4% of participants were born in 1 of 24 other countries.

Materials

The PACER Questionnaire is a 50-item caregiver-rated instrument that assesses the frequency with which parents support their children's use of 10 different emotion regulation strategies (see Table 1 for all items/strategies). Caregivers respond to each statement using a scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Higher levels of agreement indicate a higher engagement in behaviors that provide support for the targeted emotion regulation strategy, whereas lower levels of agreement indicate a lower frequency, or absence, of caregiver-implemented behaviors that support the targeted child emotion regulation strategy. The 5 items corresponding to each specific strategy are summed to provide a total score ranging from 1 to 35. Higher scores on a given scale indicate greater support of the child's use of that specific strategy. An example item from the "problem solving" strategy is "*I help my child solve problems that are causing those feelings*." The PACER has demonstrated internal reliability, test–retest reliability, and good convergent validity with constructs related to support for children's emotion regulation and emotional functioning (Cohodes et al., 2021).

Procedure

Approval to complete this study was granted by the INSTITUTION NAME REMOVED FOR MASKED REVIEW Human Research Ethics Committee (HREC). All measures were hosted on the Qualtrics platform and distributed via the Prolific platform (www.prolific.co)—a website that researchers use to advertise their studies to users who meet specific eligibility criteria. Participants provided informed consent and completed a series of questionnaires that included one attention check (i.e., *"Please select strongly disagree to this item."*). Participants were instructed to answer the PACER with their youngest child in mind. Only those participants who passed this attention check, and who provided a valid date of birth for the child (i.e., aged ≤ 5 years at the time of the study) were retained. Upon completion, participants were thanked, responses were verified, and participants were compensated. Participants who completed the full battery were awarded £9.50.

Analytic Strategy

To examine the factor structure of the PACER, ESEM was performed using version 7.4 of Mplus (Muthen & Muthen, 2020). Four ESEM models were tested. A single-factor ESEM that represents the most parsimonious model, a two-factor ESEM reflecting the broad "adaptive" and "maladaptive" types of strategies, a five-factor ESEM representing the five families of emotion regulation that were each represented by two specific items on the PACER (Gross, 2015), and a 10-factor ESEM consistent with the intended 10-factor structure supported by Cohodes et al. (2021). Robust maximum likelihood (MLR) estimation with a geomin rotation was used. Internal consistency was assessed using McDonald's omega coefficient. Model fit was examined in terms of comparative fit indices (CFI), Tucker–Lewis index (TLI), root mean square error of approximation (*RMSEA*), and standardized root mean square residual (SRMR). *CFI* and *TLI* values ≥.90 indicated acceptable model fit, and values ≥.95 indicated excellent fit. *RMSEA* and *SRMR* values ≤.08 indicated acceptable model fit, and values ≤.06 indicated excellent fit. Akaike's Information Criteria (AIC) and Bayesian Information criteria (BIC), which penalize for model complexity, were also used to directly compare the tested models, with lower values indicating a better fitting model (Byrne, 2010; Marsh et al., 2004).

Table 1. Standardized Factor Loadings From Exploratory Factor Analysis of the 50-Item Parental Assistance With Child Emotion Regulation (PACER) Questionnaire Among a Sample of Caregivers.

Factor/item	Factor loading for item
Behavioral disengagement ($M = 29.18$, $SD = 3.92$, $\omega = .889$)	
1. I help my child remove themselves from situations that they are in that may be causing negative feelings.	0.699
2. I help my child leave whatever situation may be causing them to have negative feelings.	0.830
3. I help my child get out of the current situation that may be causing negative feelings and engage in other situations instead.	0.766
4. I help my child stop doing whatever is making them have negative feelings once they are in this situation.	0.800
5. I remove my child from a situation when it is causing them to have negative feelings.	0.734
Problem solving ($M = 28.87$, $SD = 4.31$, $\omega = .931$)	
6 I help my child think carefully about different solutions to their problems.	0.756
7. I help my child solve problems that are causing those feelings.	0.710
8. I help my child think of different ways to solve problems.	0.827
9. I help my child think of solutions to their problems.	0.817
10. I help my child take steps to solving a problem.	0.707
Social support search ($M = 29.08$, $SD = 3.91$, $\omega = .877$)	
11. I help my child find other people to help them (including myself).	0.697
12. I help my child find other people to engage with (including myself).	0.811
13. I help my child find friends and family members for support (including myself).	0.819
14. I help my child find other people to be around physically (including myself).	0.785
15. I encourage my child to reach out to others (including myself).	0.610
Rumination ($M = 14.71$, $SD = 6.63$, $\omega = .934$)	
16. I help my child replay whatever is making them have negative feelings in their mind.	0.685
17. I help my child think again and again about whatever is making them have negative feelings.	0.899
18. I encourage my child to think over and over again about why they are having negative feelings.	0.925
19. I help my child replay the experience of negative feelings again and again in their mind.	0.923
20. I help my child think about situations that are upsetting or that cause negative feelings over and over again.	0.910
Distraction ($M = 28.96$, $SD = 4.00$, $\omega = .901$)	
21. I help my child find ways to distract themselves from their negative feelings.	0.810
22. I help my child distract themselves from their negative feelings by finding other things to do.	0.763
23. I help my child take their mind of things that are making them have negative feelings	0.783
24. I help my child take their attention of something that is making them have negative feelings.	0.720
25. I help my child think about something other than what is making them have negative feelings.	0.669
Reappraisal ($M = 26.69$, $SD = 4.98$, $\omega = .913$)	
26. I help my child think of a situation in a positive light.	0.618
27. I help my child see the situation from a different perspective.	0.582
28. I help my child try to see the positive aspects of a situation that is making them have negative feelings.	0.782
29. I help my child change their feelings by thinking differently about their current situation.	0.675
30. I encourage my child to think of the positive side to their negative feelings.	0.532
Acceptance ($M = 28.06$, $SD = 4.69$, $\omega = .887$)	
31. I help my child understand that it's okay to have negative feelings.	0.853
32. I help my child accept their negative feelings.	0.935
33. I help my child accept the way they are feeling if they are unable to change the situation causing those feelings.	0.868
34. I tell my child that having negative feelings is okay.	0.854
35. I stress to my child that it can be helpful to accept negative feelings in some situations.	0.646
Expressive suppression ($M = 11.42$, $SD = 5.55$, $\omega = .919$)	
36. I help my child to not show their negative feelings.	0.629
37. I help my child try to hide their feelings from others.	0.875
38. I help my child hide their physical expressions of their negative feelings.	0.872

(continued)

Table 1. (continued)

Factor/item	Factor loading for item
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.	0.891
40. I encourage my child to hide negative feelings from others.	0.801
Venting ($M = 27.37$, $SD = 4.71$, $\omega = .883$)	
41. I help my child talk openly with other people.	0.604
42. I help my child talk about the situation or problem that caused them to feel this way.	0.641
43. I encourage my child to often talk about their feelings with others.	0.940
44. I help my child confide in others about what is bothering them.	0.873
45. I help my child express their negative feelings to other people.	0.588
Avoidance ($M = 22.18$, $SD = 6.35$, $\omega = .926$)	
46. I help my child avoid entering potentially uncomfortable situations whenever possible.	0.629
47. I help my child stay away from entering situations that might make them have negative feelings.	0.801
48. I do things to prevent my child from entering a new situation that might cause them to have negative feelings.	0.891
49. I encourage my child to stay away from situations that could make them have negative feelings.	0.905
50. I help my child avoid doing things that could lead to negative feelings	0.884

Note. ω = McDonald's Omega coefficient.

Factor loadings ≥.40 were considered meaningful loadings (Stevens, 2012).

We used LPA to examine whether there were subtypes of caregivers who supported their child in executing different combinations of emotion regulation strategies to a greater degree than others. Variables included in the LPA were the mean-centered subscale scores from the ten PACER subscales. LPA was performed using the *TidyLPA* package with *R* software (R Core Team, 2020; Rosenberg et al., 2018). The *TidyLPA* package tested four different model-types (equal variances/covariances fixed at 0, varying variances/covariances fixed at 0, equal variances/equal covariances, and varying variances/varying covariances). Solutions for up to 6 profiles were tested for each model and then compared. The optimal solution was chosen following class enumeration for each LPA model that returned the best model-fit statistics. Model-fit was based on five common index values: the BIC, AIC, Appropriate Weight of Evidence Criterion (AWE), Classification Likelihood Criterion (CLC), and Kullback Information Criterion (KIC). Each of these information criteria have a smaller-is-better interpretation for their coefficients. An additional indication of overall model suitability was the scaled entropy values—representing a standardized index of model-based classification accuracy (Wang et al., 2017). High scaled entropy values provide greater certainty in the classification of participants into profiles, with values ≥ .80 typically considered acceptable. As it is typical for some models to report superior fit statistics in some metrics and not others, Akogul and Erisoglu's analytic hierarchy process (built into the *TidyLPA* package) using each of the abovementioned fit indices was used to aid in the identification the best-fitting solution based on previous recommendations (Akogul & Erisoglu, 2017). Chi-square test of contingencies and one-way analysis of variance (ANOVA) were performed to evaluate whether profile membership was associated with differences in either child's gender or age.

Results

Exploratory Structural Equation Modeling (ESEM)

The fit statistics of separate ESEM analyses for a 1-factor, 2-factor, 5-factor, and 10-factor solution of the 50-item PACER were obtained and compared. Based on conventional recommendations for assessments of model fit, the one-factor solution, two-factor solution, and five-factor solution all yielded poor fit to the data. However, the 10-factor solution provided excellent fit to the data in each of the criteria used to assess model fit. Model fit statistics for each ESEM model are presented in Table 2.

The pattern of standardized loadings (see Supplementary Materials) indicated that each factor comprised five items. Each item was characterized by strong (≥.50) loadings onto one factor each. This distinct pattern of item loadings also corresponds to the same 10-factor structure as observed by Cohodes et al. (2021). Compared to the 10-factor ESEM, a more-restrictive CFA of this 10-factor model also demonstrated good fit statistics (also presented in Table 2) but were unsurprisingly surpassed by the 10-factor ESEM. Overall, the 10-factor structure of the PACER provided the best fit for the present data. Standardized factor loadings and descriptive statistics for each strategy/item are

Table 2. Model Fit Indices for a One-Factor, Two-Factor, Five-Factor, and Ten-Factor Solution to the PACER Questionnaire (N = 491).

	ESEM models				CFA model
Fit indices	1-factor	2-factor	5-factor	10-factor	10-factor
CFI	.281	.435	.745	.959	.937
TLI	.250	.385	.683	.934	.932
SRMR	.126	.126	.061	.016	.050
RMSEA [95% CI]	.152 [.149, .154]	.137 [.135, .140]	.099 [.096, .101]	.045 [.042, .048]	.041 [.038, .043]
AIC	70612.331	67825.090	62242.165	58515.827	58662.320
BIC	71241.797	68660.183	63668.956	60844.854	59480.627

Note. PACER = Parental Assistance With Child Emotion Regulation; ESEM = exploratory structural equation modeling; CFA = confirmatory factor analyses; CFI = comparative fit indices. TLI = Tucker–Lewis index; SRMR = standardized root mean square residual; RMSEA = root mean square error of approximation; CI = confidence interval; AIC = Akaike's Information. BIC = Bayesian Information criteria.

presented in Table 1. Descriptive statistics and correlations between the 10 subscales are presented in Table 3.

Of note, most of the PACER domains were not related to the age or gender of the child. However, small but statistically significant positive correlations between children's age and caregiver support for problem solving, reappraisal, and venting were identified, suggesting that there was higher support for these emotion regulation strategies as children's age increased. Moreover, findings also demonstrated that caregivers of female children reported slightly increased support of social support search and distraction, compared to male children, evidenced by the small but statistically significant correlations in Table 3.

Latent Profile Analysis (LPA)

Results from the LPA indicated that the data was best represented by a three-profile solution (with the class-varying variances and covariances model specification being identified as the preferred model), representing three distinct profiles of caregiver's support of children's use of different emotion regulation strategies. This three-profile solution was identified as the best fitting model based on the analytic hierarchy process based on each of the obtained fit indices (Akogul & Erisoglu, 2017). Furthermore, the scaled entropy value was adequate (.81), no profile comprised $\leq$ 5% of participants, and theoretically meaningful distinctions between profiles could be made (see Figure 1).

The patterns of responses to the 10 emotion regulation strategies for which the PACER assesses parental support were used to inform descriptions for each profile. The chosen model included a profile class we named "mostly adaptive strategies" (n = 209; 42.57% of sample). The "mostly adaptive" strategies profile was characterized by above-average support for children's use of problem solving, social support search, reappraisal, acceptance, and venting (all mean-centered values for these strategies $<$ 0) and below-average support for behavioral disengagement, rumination, distraction, expression suppression, and avoidance (mean-centered values for these strategies $>$ 0) The next profile class was named "mostly maladaptive" strategies (n = 200; 40.73% of sample), characterized by above-average support for children's use of behavioral disengagement, rumination, distraction, expression suppression, and avoidance (mean-centered values for these strategies $>$ 0) and below-average support for problem solving, social support search, reappraisal, acceptance, and venting (all mean-centered values for these strategies $<$ 0). The final profile class was named "mixed strategies" (n = 82; 16.70% of sample) and was characterized by above-average support for children's use of all strategies except for expression suppression, which was below average. The discrepancies between the "mostly maladaptive" and "mostly adaptive" profiles was particularly pronounced, as evidenced by the absence of overlapping error bars for each of the 10 strategies (see Figure 2 for a visual representation of the LPA, plotted using the *"ggplot2"* package in *R*; Wickham, 2016).

Follow-up analyses were completed to determine whether profile membership could be predicted by the child's gender or age. Chi-square test of contingencies revealed that the frequency of male and female children in each of the three profiles did not differ significantly, $\chi^2(df = 4) = 1.49$, $p = .829$. There was also no significant difference in the average age of children in each of the profiles, $F(2, 488) = 1.08$, $p = .341$. These results suggest that children of caregivers assigned to each profile did not differ based on gender or age.

Discussion

The aims of this study were to validate the PACER in a novel sample of caregivers of young children (0–5 years) and to identify whether distinct profiles of parental emotion

Table 3. Correlations and Descriptive Statistics for the Ten Strategies Measured by the PACER Questionnaire, Child Gender, and Child Age (in Months).

	Correlations												Descriptive statistics		
PACER strategy	1	2	3	4	5	6	7	8	9	10	11	12	*M* (*SD*)	Range	ω
1. Behavioral Disengagement	—												29.18 (3.92)	14–35	.889
2. Problem Solving	.247**	—											28.87 (4.31)	12–35	.931
3. Social Support Search	.288**	.492**	—										29.08 (3.91)	16–35	.877
4. Rumination	.036	.078	.021	—									14.71 (6.63)	5–35	.934
5. Distraction	.494**	.271**	.349**	−.064	—								28.96 (4.00)	10–35	.901
6. Reappraisal	.124**	.581**	.372**	.134**	.245**	—							26.69 (4.98)	10–35	.913
7. Acceptance	.068	.449**	.329**	.048	.024	.527**	—						28.06 (4.69)	10–35	.887
8. Expressive Suppression	.007	−.010	−.105*	.321**	.014	.055	−.179**	—					11.42 (5.55)	5–35	.919
9. Venting	.138**	.430**	.389**	.035	.123**	.517**	.531**	−.204**	—				27.37 (4.71)	10–35	.883
10. Avoidance	.396**	.102*	.060	.075	.341**	.078	−.114*	.248**	−.018	—			22.18 (6.35)	5–35	.926
11. Child Gender	.082	.022	.090*	−.013	.135**	.003	.043	−.082	.042	.035	—		—	—	—
12. Child Age (Months)	−.076	.114*	−.016	.056	−.002	.126*	.025	.047	.099*	−.004	.029	—	25.73 (15.35)	1–77	—

Note. ω = McDonald's omega coefficient. $N = 491$. For child gender, male was coded as 0 and female coded as 1. PACER = Parental Assistance With Child Emotion Regulation.
*$p < .05$. **$p < .001$.

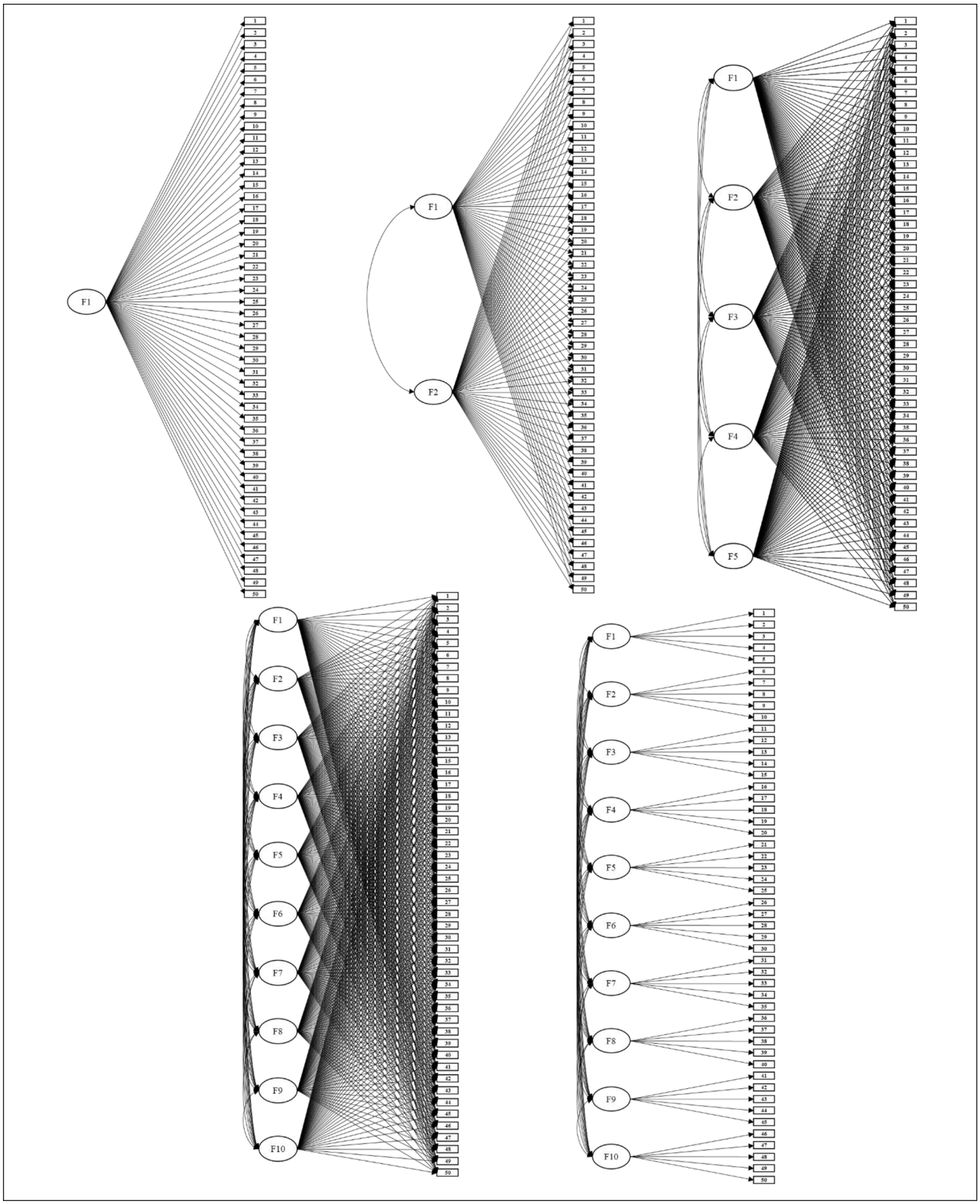

Figure 1. Visual Representation of Models Tested on the 50-Item Parental Assistance With Child Emotion Regulation (PACER) Questionnaire

Note. Exploratory structural equation models: 1-factor (top-left), 2-factor (top-middle), 5-factor (top-right), 10-factor (bottom-left). Confirmatory factor model: 10-factor (bottom-right).

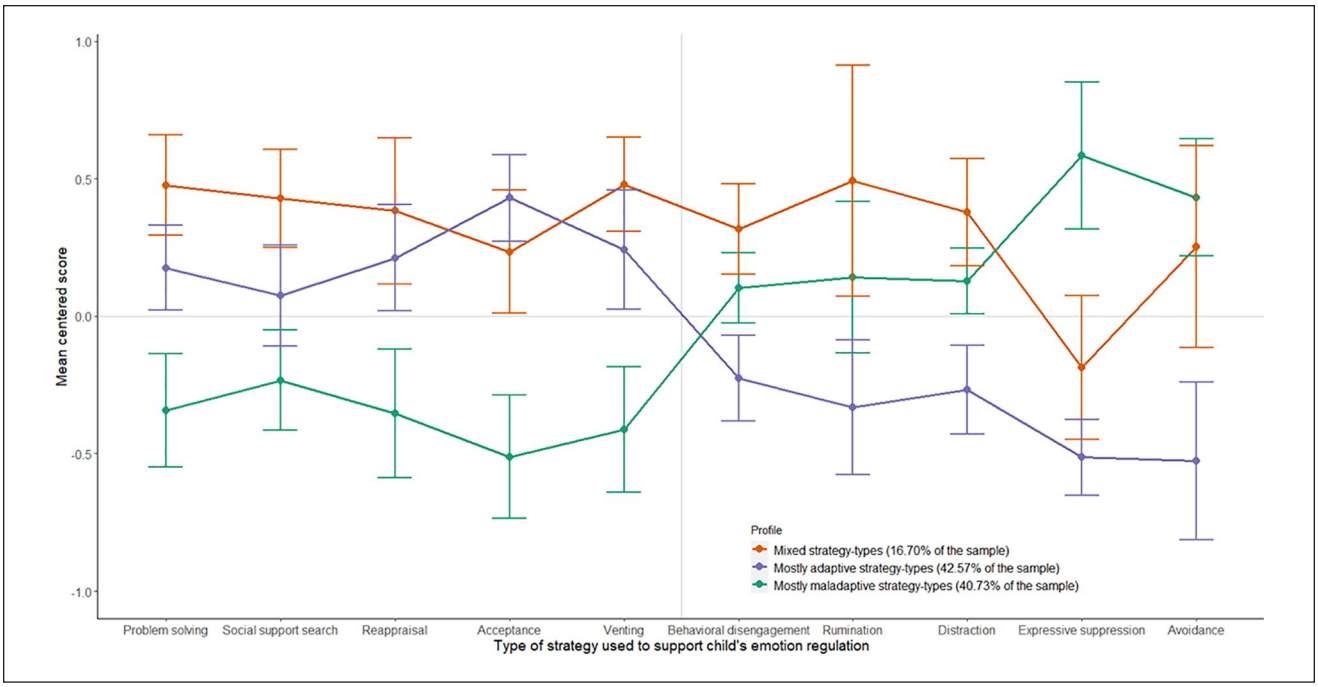

Figure 2. Visual Representation of the Three-Profile Solution (Varying Variances and Covariances) From the Latent Profile Analysis (LPA) Performed Using the TidyLPA Package in R Software on the Ten Specific Strategies Measured by the Parental Assistance With Child Emotion Regulation (PACER) Questionnaire

Note. Error bars represent the 95% confidence intervals for each point. The *mostly adaptive strategy-types* profile ($n = 209$; 42.57% of the sample) is plotted on the green line. The *mostly maladaptive strategy-types* profile ($n = 200$; 40.73% of the sample) is plotted on the red line. The *mixed strategy-types* profile ($n = 82$; 16.70% of the sample) is plotted on the purple line. The *y*-axis represents mean-centered scores, with a score of 0 representing the mean score for the entire sample. For ease of interpretation, the 10 strategies have been ordered to highlight the consistency in responses within and between the 3 profiles that were identified.

regulation support were observable in early childhood. This research represents an important extension upon recent efforts seeking to develop reliable and valid assessments of caregiver-implemented support of young children's emotion regulation strategy use (Cohodes et al., 2021). The results from theanalysis performed using ESEM provided support for the 10-factor model identified in the original PACER study, with each factor also demonstrating good internal reliability. The results from a person-level LPA identified three caregiver profiles, characterized by distinct patterns of parental support of children's emotion regulation strategies. These findings help to support the use of the PACER as a psychometrically valid assessment of parental support of 10 specific emotion regulation strategies derived from Gross' extended process model of emotion regulation (Gross, 2015) for use with parents of young children.

Caregivers are particularly critical for shaping and supporting their children's emotion regulation during early childhood. Moreover, the specific ways in which parents support their children's implementation of emotion regulation strategies fluctuates across development (Callaghan & Tottenham, 2016; Gee & Casey, 2015). Periods of heightened neuroplasticity represent sensitive periods for emotion regulation, positioning the first years of life as vital for laying the foundation for emotion regulation across the lifespan (Gee, 2016; Gee & Cohodes, 2021). Enduring emotion regulation difficulties during this time are associated with both immediate and prospective behavioral problems (Halligan et al., 2013; Hill et al., 2006). Inversely, longitudinal evidence garnered from samples of slightly older children (6 years +) suggests that better emotion regulation predicts improved social functioning and lower psychopathology in later life (Kim & Cicchetti, 2010; Kim-Spoon et al., 2013).

Optimizing children's emotion regulation during childhood should therefore be considered imperative in the effort to improve individual health and wellbeing, with caregivers at the forefront. Such efforts are supported by the availability of reliable and well-validated assessments of caregiver support for their young child's emotion regulation. These assessments underpin the ability for at-risk families to be identified and directed toward appropriate intervention efforts, and for caregivers' support of their children's use of specific emotion regulation strategies to be monitored across time (Halligan et al., 2013). The ability to evaluate the efficacy of such interventions is underpinned by the

availability of reliable and valid instruments that are also sensitive enough to detect change. The results of this study add further psychometric support for the PACER—namely its structural validity and internal consistency—that will help to inform future decisions about the measure's suitability in clinical practice and research.

This study is the first to validate the PACER in a sample comprising solely of caregivers of children ≤ 5 years of age, with the earlier work by Cohodes et al. (2021) including, but not limited to, this age group. Our findings regarding the structural validity and internal reliability of the PACER lend further support to the suitability of this instrument for assessing emotion regulation support strategies used by caregivers of young children. The same 10-factor structure of the PACER originally identified by the CFA performed by Cohodes et al. (2021) in a sample of 407 caregivers of children aged 0–17 was identified in our sample. These 10 strategies embody the 5 broad families of emotion regulation described in Gross' extended process model of emotion regulation (Gross, 2015). These strategies may be broadly categorized as generally "adaptive-type" or "maladaptive-type" strategies, although it must be reiterated that this terminology does not reflect whether an emotion regulation strategy is "good" or "bad" for the child in any specific situation. Instead, it reflects the type of outcomes that individuals are likely to experience when the strategy is used consistently over time and across contexts, as indicated by a wealth of previous research (Aldao et al., 2010; Gross & John, 2003; Izadpanah et al., 2017).

The various conceptualizations of the 10 strategies captured by the PACER (e.g., a 10-factor, 5-factor, or 2-factor) were compared, and results from the ESEM supported a 10-factor solution, fitting the 10 strategies for which the PACER measures parental support. These findings highlight the merit of assessing support for emotion regulation at the strategy-specific level that will enable nuanced differences between strategy-types to be observed, further supporting the use of strategy-specific approaches to understanding emotion regulation.

The purpose of the ESEM was to assess the structural validity of the PACER, rather than to assess the frequency with which caregivers supported their child's use of each of the 10 emotion regulation strategies. Importantly, the frequency with which caregivers support each of the 10 strategies measured by the PACER will likely vary as a function of developmental suitability. For example, support for emotion regulation strategies that require children to possess more developed cognitive and language abilities (i.e., problem-solving, reappraisal, and venting) were unsurprisingly correlated positively with the child's age, given the likely ineffectiveness of supporting such strategies in infancy—though these correlations were often small. Use of the PACER during this period of rapid development offers the ability to capture whether caregivers are engaging in developmentally-appropriate support strategies to help their child regulate negative emotions across a range of strategies.

Clinically, this information could help to identify a potential "mismatch" between the child's developmental capacity and strategies implemented by caregivers (e.g., encouraging a very young child to problem solve) that could be substituted for more developmentally appropriate strategies. Moreover, the PACER may be well-positioned to differentiate between a comprehensive set of key strategies used to support children's emotion regulation that could be strategically implemented over time to examine the temporal stability (or flexibility) of strategies supported by caregivers throughout early development, or to identify the developmental stage at which parents begin to support more sophisticated strategies to regulate emotion. However, the cross-sectional nature of the current study limits the ability to identify changes (or stability) in the pattern of caregiver support for emotion regulation strategies as children age.

Part of the rationale underpinning the development of the PACER was the goal to "*yield a rich understanding of the nuanced patterns of parental assistance with child emotion regulation*" (Cohodes et al., 2021, p. 2). The LPA undertaken as part of this study helps to realize this aim, as we tested whether distinct and meaningful caregiver profiles could be identified based on different patterns of caregiver support for different emotion regulation strategies. The results identified a three-profile solution as the best fitting to the data and yielded theoretically relevant findings. Caregivers were classified as a member of the "mostly adaptive strategies," "mostly maladaptive strategies," or "mixed strategies" profiles—representing approximately 42.57%, 40.73%, and 16.70% of sample, respectively.

The "mostly adaptive strategies" and "mostly maladaptive strategies" profiles demonstrated inverse patterns of caregiver support for specific emotion regulation strategies. Parents assigned to the "mostly adaptive strategies" group were characterized by above-average support of their children's use of five strategies (problem solving, social support search, reappraisal, acceptance, and venting) and below-average support of their children's use of five strategies (behavioral disengagement, rumination, distraction, expression suppression, and avoidance)—vice versa for parents assigned to the "mostly maladaptive strategies" profile. Further confidence in the distinction between these groups is evidenced by standard errors that do not overlap. Parents assigned to the "mixed strategies" profile were characterized by above average support of children's use of 9 of the 10 strategies (and below average use of expressive suppression). It is not yet clear whether caregivers in this profile represent those who routinely support children in engaging in many emotion regulation strategies, or who may still be in a process of "trying out" the effects of supporting their children's use of different strategies.

An implication of these findings is that, while all caregivers appear to support multiple emotion regulation strategies for their young child, most (i.e., approximately 83%) have a tendency to implement strategies that have been previously linked to either adaptive or maladaptive outcomes (Aldao et al., 2010; Gross & John, 2003; Izadpanah et al., 2017). Particular attention should be given to those caregivers in the "mostly maladaptive strategies" profile considering the well-established consequences of protracted use of maladaptive emotion regulation strategies (Aldao et al., 2010; Halligan et al., 2013). Future studies may seek to assess the stability of these different caregiver profiles over the course of caregiver-oriented intervention strategies designed to optimize the way that they support their young child's capacity to regulate negative emotions.

Limitations

The cross-sectional nature of this study is a limitation. The lack of relevant outcome data such as child behavior or emotional functioning limits the extent to which conclusions can be drawn about possible differences between the different caregiver-profile types. However, the grouping of these strategies to form distinct profiles builds upon the correlations between specific strategy-types and child emotional outcomes that were originally observed. Cohodes et al. (2021) demonstrated that a higher frequency of 5 of the 10 PACER strategies were concurrently associated with fewer internalizing problems. Parental support of children's use of these same five strategies characterized the "mostly-adaptive strategies" latent profile.

Despite the absence of longitudinal outcome data, the elucidation of these profiles in the current study will help to guide future planned analyses that seek to establish the longitudinal outcomes associated with parent support for implementation of emotion regulation strategies in early life. Such studies could also usefully establish whether the pattern and frequency of strategy support changes throughout their child's development. Similarly, future studies could also look at how the identified caregiver profiles are associated with other parenting practices and explore bidirectional associations with child behavior. The recruitment of a predominantly Western sample also limits generalizability across cultures where emotion socialization and parenting practices may differ.

Conclusions

The PACER appears to be a structurally valid and reliable measure of caregiver support of 10 emotion regulation strategies in their young child aged ≤ 5 years. Moving forward, use of the PACER should facilitate enhanced understanding of how different patterns of caregiver support for children's emotion strategies can influence child outcomes.

Author Contributions

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by VOM, BJH, and AFJ. The first draft of the manuscript was written by VM, and all authors commented on previous versions of the manuscript. DAP, EMC, DGG, and JJG all contributed to the writing of the manuscript. All authors read and approved the final manuscript.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This project was funded by the Raine Medical Research Foundation, Brightspark Award, awarded to Dr Amy Finlay-Jones.

ORCID iDs

Vincent O. Mancini https://orcid.org/0000-0002-4845-8104

David Preece https://orcid.org/0000-0003-1060-2024

Supplemental Material

Supplemental material for this article is available online.

References

Akogul, S., & Erisoglu, M. (2017). An approach for determining the number of clusters in a model-based cluster analysis. *Entropy*, *19*(9), 452. https://doi.org/10.3390/e19090452

Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review*, *30*(2), 217–237. https://doi.org/10.1016/j.cpr.2009.11.004

Byrne, B. M. (2010). *Structural equation modeling with AMOS: Basic concepts, applications, and programming (multivariate applications series)*. Taylor & Francis Group.

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. https://doi.org/10.1038/npp.2015.204

Cohodes, E. M., Preece, D. A., McCauley, S., Rogers, M. K., Gross, J. J., & Gee, D. G. (2021). Development and validation of the Parental Assistance with Child Emotion Regulation (PACER) Questionnaire. *Research on Child and Adolescent Psychopathology*, *50*, 133–148. https://doi.org/10.1007/s10802-020-00759-9

Diener, M. L., Mangelsdorf, S. C., McHale, J. L., & Frosch, C. A. (2002). Infants' behavioral strategies for emotion regulation with fathers and mothers: Associations with emotional expressions and attachment quality. *Infancy*, *3*(2), 153–174. https://doi.org/10.1207/S15327078IN0302_3

Eisenberg, N., Cumberland, A., & Spinrad, T. L. (1998). Parental socialization of emotion. *Psychological Inquiry*, *9*, 241–273. https://doi.org/10.1207/s15327965pli0904_1

Gee, D. G. (2016). Sensitive periods of emotion regulation: Influences of parental care on frontoamygdala circuitry and plasticity. *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., & Cohodes, E. M. (2021). Influences of caregiving on development: A sensitive period for biological embedding of predictability and safety cues. *Current Directions in Psychological Science*, *30*, 376–383. https://doi.org/10.1177/09637214211015673

Gomez, R., Stavropoulos, V., & Griffiths, M. D. (2020). Confirmatory factor analysis and exploratory structural equation modelling of the factor structure of the Depression Anxiety and Stress Scales-21. *PLOS ONE*, *15*(6), Article e0233998. https://doi.org/10.1371/journal.pone.0233998

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), 224–237. https://doi.org/10.1037/0022-3514.74.1.224

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), 348–362. https://doi.org/10.1037/0022-3514.85.2.348

Hajal, N. J., & Paley, B. (2020). Parental emotion and emotion regulation: A critical target of study for research and intervention to promote child emotion socialization. *Developmental Psychology*, *56*(3), 403–417. https://doi.org/10.1037/dev0000864

Halligan, S. L., Cooper, P. J., Fearon, P., Wheeler, S. L., Crosby, M., & Murray, L. (2013). The longitudinal development of emotion regulation capacities in children at risk for externalizing disorders. *Development and Psychopathology*, *25*(2), 391–406. https://doi.org/10.1017/S0954579412001137

Hill, A. L., Degnan, K. A., Calkins, S. D., & Keane, S. P. (2006). Profiles of externalizing behavior problems for boys and girls across preschool: The roles of emotion regulation and inattention. *Developmental Psychology*, *42*(5), 913–928. https://doi.org/10.1037/0012-1649.42.5.913

Izadpanah, S., Barnow, S., Neubauer, A. B., & Holl, J. (2017). Development and validation of the Heidelberg Form for Emotion Regulation Strategies (HFERST): Factor structure, reliability, and validity. *Assessment*, *26*(5), 880–906. https://doi.org/10.1177/1073191117720283

Kim, J., & Cicchetti, D. (2010). Longitudinal pathways linking child maltreatment, emotion regulation, peer relations, and psychopathology. *Journal of Child Psychology and Psychiatry*, *51*(6), 706–716. https://doi.org/https://doi.org/10.1111/j.1469-7610.2009.02202.x

Kim-Spoon, J., Cicchetti, D., & Rogosch, F. A. (2013). A longitudinal study of emotion regulation, emotion lability-negativity, and internalizing symptomatology in maltreated and nonmaltreated children. *Child Development*, *84*(2), 512–527. https://doi.org/https://doi.org/10.1111/j.1467-8624.2012.01857.x

Marsh, H. W., Hau, K. -T., & Wen, Z. (2004). In search of golden rules: Comment on hypothesis-Ttsting approaches to setting cutoff values for fit indexes and dangers in overgeneralizing Hu and Bentler's (1999) findings. *Structural Equation Modeling: A Multidisciplinary Journal*, *11*(3), 320–341. https://doi.org/10.1207/s15328007sem1103_2

Meyer, S., Raikes, H. A., Virmani, E. A., Waters, S., & Thompson, R. A. (2014). Parent emotion representations and the socialization of emotion regulation in the family. *International Journal of Behavioral Development*, *38*(2), 164–173. https://doi.org/10.1177/0165025413519014

Murray, D. W., Rosanbalm, K., & Christopoulos, C. (2019). An applied contextual model for promoting self-regulation enactment across development: Implications for prevention, public health and future research. *The Journal of Primary Prevention*, *40*, 367–403. https://doi.org/10.1007/s10935-019-00556-1

Muthén, L. K., & Muthén, B. O. (2020). *Mplus user's guide* (7th ed).

R Core Team. (2020). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. https://www.R-project.org/

Röll, J., Koglin, U., & Petermann, F. (2012). Emotion regulation and childhood aggression: Longitudinal associations. *Child Psychiatry & Human Development*, *43*(6), 909–923. https://doi.org/10.1007/s10578-012-0303-4

Rosenberg, J. M., Beymer, P. N., Anderson, D. J., Van Lissa, C. J., & Schmidt, J. A. (2018). tidyLPA: An R package to easily carry out Latent Profile Analysis (LPA) using open-source or commercial software. *Journal of Open Source Software*, *3*(30), 978. https://doi.org/10.21105/joss.00978

Stevens, J. P. (2012). *Applied multivariate statistics for the social sciences*. Routledge.

Tull, M. T., & Aldao, A. (2015). Editorial overview: New directions in the science of emotion regulation. *Current Opinion in Psychology*, *3*, iv–x. https://doi.org/10.1016/j.copsyc.2015.03.009

Wang, M.-C., Deng, Q., Bi, X., Ye, H., & Yang, W. (2017). Performance of the entropy as an index of classification accuracy in latent profile analysis: A Monte Carlo simulation study. *Acta Psychologica Sinica*, *49*(11), 1473–1482. https://doi.org/10.3724/SP.J.1041.2017.01473

Wickham, H. (2016). *ggplot2: Elegant graphics for data analysis*. Springer-Verlag. https://ggplot2.tidyverse.org

Wooten, W., Laubaucher, C., George, G. C., Heyn, S., & Herringa, R. J. (2022). The impact of childhood maltreatment on adaptive emotion regulation strategies. *Child Abuse & Neglect*, *125*, 105494. https://doi.org/10.1016/j.chiabu.2022.105494