Maternal Emotion Dysregulation and its Association with Child Internalizing and Externalizing Behaviors and Heart Rate Variability

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Abstract

Maternal emotion dysregulation, a transdiagnostic feature of psychopathology, may be a potential risk factor for the emergence of psychopathology in children. However, there is less known about child characteristics that might serve as protective factors against this risk. One such characteristic is heart rate variability (HRV) reactivity, where greater decreases in HRV from baseline to a stressor task indicate increased emotion regulation. This study examined whether increased child HRV reactivity served as a protective factor mitigating the transmission of psychopathology from emotionally dysregulated mothers to behavior problems in preschool age children.

Mother-preschooler dyads (N=66) were oversampled for maternal emotion dysregulation, measured using maternal self-report on the Difficulties in Emotion Regulation Scale. Mothers reported on child internalizing and externalizing behaviors using the Child Behavioral Checklist. Child baseline HRV was collected, where the child sat quietly for 2 minutes while a book was read to them. Child HRV was also measured during a stressor task, where dyads had 7 minutes to build a complex Lego figure. HRV reactivity was calculated by subtracting child baseline HRV from child HRV during the stressor task.

Two hierarchical regression models were conducted, entering maternal emotion dysregulation, child HRV reactivity, and the interaction term of these variables predicting either child internalizing or child externalizing problems (see Table 1). Across these two models, maternal emotion dysregulation, but not child HRV reactivity, significantly predicted child's internalizing and externalizing behaviors. Maternal emotion dysregulation significantly interacted with child HRV reactivity to predict child internalizing behaviors, such that maternal emotion dysregulation had a greater impact on child internalizing behaviors if the child exhibited a greater decrease in HRV from baseline to the stressor task (i.e. exhibited increased self-regulation). There was no significant interaction predicting child externalizing behaviors.

These findings suggest that maternal emotion dysregulation more strongly predicts child behavior problems in physiologically regulated children. Interventions that target maternal emotion dysregulation may therefore improve child behavior outcomes even in physiologically regulated children.

Keywords: emotion regulation, parenting, child outcomes

Word count: X

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Introduction

Emotion dysregulation, a transdiagnostic feature of psychopathology, has been shown to be a significant mediator of mental health symptoms and symptom severity in adults (Kring & Sloan, 2009). A parent's own mental health has been known to predict child mental health symptoms and behavioral problems (McLaughlin et al., 2012). These two facts together, therefore, may mean a parent's emotion regulation, particularly emotion regulation difficulties, may be an important risk factor for the emergence of psychopathology in children. Investigating the role of parental emotion regulation on childhood health and mental health problems is therefore an important clinical question in need of further investigation.

While risk factors are one important area to investigate in the prevention of child mental health symptoms, it is also important to examine protective factors that may help make a child more resilient to developing these symptoms later on. However, there is less known about child characteristics that might serve as protective factors against risk. One such characteristic that has been identified in the literature is heart rate variability (HRV) reactivity, where greater decreases in HRV from baseline to a stressor task indicate increased emotion regulation (Appelhans & Luecken, 2006).

This study examined whether increased child HRV reactivity served as a protective factor mitigating the transmission of psychopathology from emotionally dysregulated mothers to behavior problems in preschool age children. The aims of this research is to investigate the relationship between maternal emotion dysregulation and child behaviors in a sample of women with BPD symptoms and there preschool aged children. A second aim is to examine the effects of maternal emotion dysregulation on child HRV reactivity. The final aim is to examine the interaction of maternal emotion dysregulation and child

reactivity on child behaviors.

Methods

Participants

Sixty-eight mothers and their preschool aged children (M = 48, SD = 7.6 months, 46% girls) were recruited from various sources including a developmental database maintained by the university psychology department, craigslist, and community mental health centers. Mothers were recruited based on the presence or absence of borderline personality disorder (BPD) symptoms, a disorder marked by extreme emotion dysregulation, as measured by the McLean screener (Zanarini et al., 2003). Mothers with elevated BPD symptoms were oversampled in order to ensure a range of emotion regulatory capabilities.

Procedure

Families participated in a 2.5-hour assessment in offices on a university campus. Prior to participation, both mother consent and child assent were obtained, per Institutional Review Board approval. While mothers completed questionnaires, children completed assessments in an adjacent room, although child assessment data is not presented here. Mother and children were then reunited for parent-child interaction tasks in which baseline and stressor task HRV was collected on both mothers and children. Only child HRV data is presented here.

Materials

Maternal emotion dysregulation. Maternal emotion dysregulation was measured using the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). The DERS is a 36-item self-report questionnaire designed to assess multiple facets of emotional

dysregulation, with scores ranging from 36-180 (M=70.10, SD=22.33). Higher scores suggest greater emotion dysregulation.

Heart rate variability. Child baseline HRV was collected, where the child sat quietly for 2 minutes while a book was read to them. Child HRV was also measured during a stressor task, where dyads had 7 minutes to build a complex Lego figure. HRV reactivity was calculated by subtracting child baseline HRV from child HRV during the stressor task (M=-1.10, SD=0.65)..

Child behavior problems. Child behavior problems were assessed using maternal report on the Child Behavior Checklist (CBCL) for both internalizing (i.e., anxious, depressive, and overcontrolled) and externalizing (i.e., aggressive, hyperactive, noncompliant, and undercontrolled) behaviors. Mean scores are presented in Table 2.

Data analysis

We used R (Version 3.5.1; R Core Team, 2018) and the R-packages *bindrcpp* (Version 0.2.2; Müller, 2018), *dplyr* (Version 0.7.7; Wickham, François, Henry, & Müller, 2018), *forcats* (Version 0.3.0; Wickham, 2018a), *ggplot2* (Version 3.0.0; Wickham, 2016), *here* (Version 0.1; Müller, 2017), *jtools* (Version 1.1.1; Long, 2018), *kableExtra* (Version 0.9.0; Zhu, 2018), *knitr* (Version 1.20; Xie, 2015), *papaja* (Version 0.1.0.9842; Aust & Barth, 2018), *purrr* (Version 0.2.5; Henry & Wickham, 2018), *readr* (Version 1.1.1; Wickham, Hester, & Francois, 2017), *rio* (Version 0.5.10; C.-h. Chan, Chan, Leeper, & Becker, 2018), *stringr* (Version 1.3.1; Wickham, 2018b), *tibble* (Version 1.4.2; Müller & Wickham, 2018), *tidyr* (Version 0.8.1; Wickham & Henry, 2018), and *tidyverse* (Version 1.2.1; Wickham, 2017) for all our analyses.

We used linear regressions to test the predictive effects of maternal emotion dysregulation and child reactivity on child behaviors.

Results

Means and standard deviations for variables are presented in Table 1 and Table 2. Two hierarchical regression models were conducted, entering maternal emotion dysregulation, child HRV reactivity, and the interaction term of these variables predicting either child internalizing or child externalizing problems (see Tables 3 & 4.). Across these two models, maternal emotion dysregulation, but not child HRV reactivity, significantly predicted child's internalizing (β =0.17, t(45)=3.99, p<0.00) and externalizing behaviors (β =0.16, t(45)=2.84, p<0.01). Figure 1 illustrates the relationship between maternal emotion dysregulation and child behavior. Maternal emotion dysregulation significantly interacted with child HRV reactivity to predict child internalizing behaviors, such that maternal emotion dysregulation had a greater impact on child internalizing behaviors if the child exhibited a greater decrease in HRV from baseline to the stressor task (i.e. exhibited increased self-regulation), (β =-0.18, t(45)=-2.27, p<0.03) (see Figure 3). There was no significant interaction predicting child externalizing behaviors (β =-0.03, t(45)=-0.30, p<0.76).

Discussion

In this study we found that there was a maternal emotion dysregulation significantly predicted child behaviors (Aim 1), indicating that emotion dysregulation is a potential risk factor for the development of child mental health symptoms in the future. We did not find a significant association between child reactivity and child behaviors however (Aim 2), indicating that high emotion regulation reactivity alone may not be enough to protect children from the development of future mental health problems or behavioral problems. Lastly, we found that maternal emotion dysregulation more strongly predicts child behavior problems in physiologically regulated children (Aim 3), meaning that maternal emotion dysregulation is such a strong predictor of risk it may override any potential

protective impact of physiological regulation. This finding bears clinical impact in that it suggests that interventions that target maternal emotion dysregulation are critical, and may be able to improve child behavior outcomes even in physiologically regulated children. More research is needed on this important topic, particularly intervention studies that examine the effects of treatment for maternal emotion dysregulation on child outcomes.

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Table 1

Means and SDs for Maternal Emotion Dysregulation (DERS) and Child Reactivity

DERS_mean	DERS_SD	Reactivity_mean	Reactivity_SD
70.10	22.33	-1.10	0.65

Table 2

Means and SDs for Child Internalizing and Externalizing Behavior

cbcl_subtype	cbcl_mean	cbcl_SD
ext	16.28	9.49
int	11.17	7.54

Table 3

Results of Linear Regression Predicting Child Internalizing Behavior

Predictor	*b*	95% CI	*t*(45)	*p*
Intercept	11.00	[9.04, 12.97]	11.27	$< .001$
Ders c	0.17	[0.08, 0.25]	3.98	$< .001$
Reactivity c	-1.19	[−4.30, 1.91]	-0.77	.443
Ders c × Reactivity c	-0.18	[−0.34, −0.02]	-2.27	.028

Table 4

Results of Linear Regression Predicting Child Externalizing Behavior

Predictor	*b*	95% CI	*t*(45)	*p*
Intercept	16.02	[13.34, 18.69]	12.06	$< .001$
Ders c	0.16	[0.05, 0.27]	2.84	.007
Reactivity c	1.72	[−2.50, 5.94]	0.82	.415
Ders c × Reactivity c	-0.03	[−0.25, 0.19]	-0.30	.764

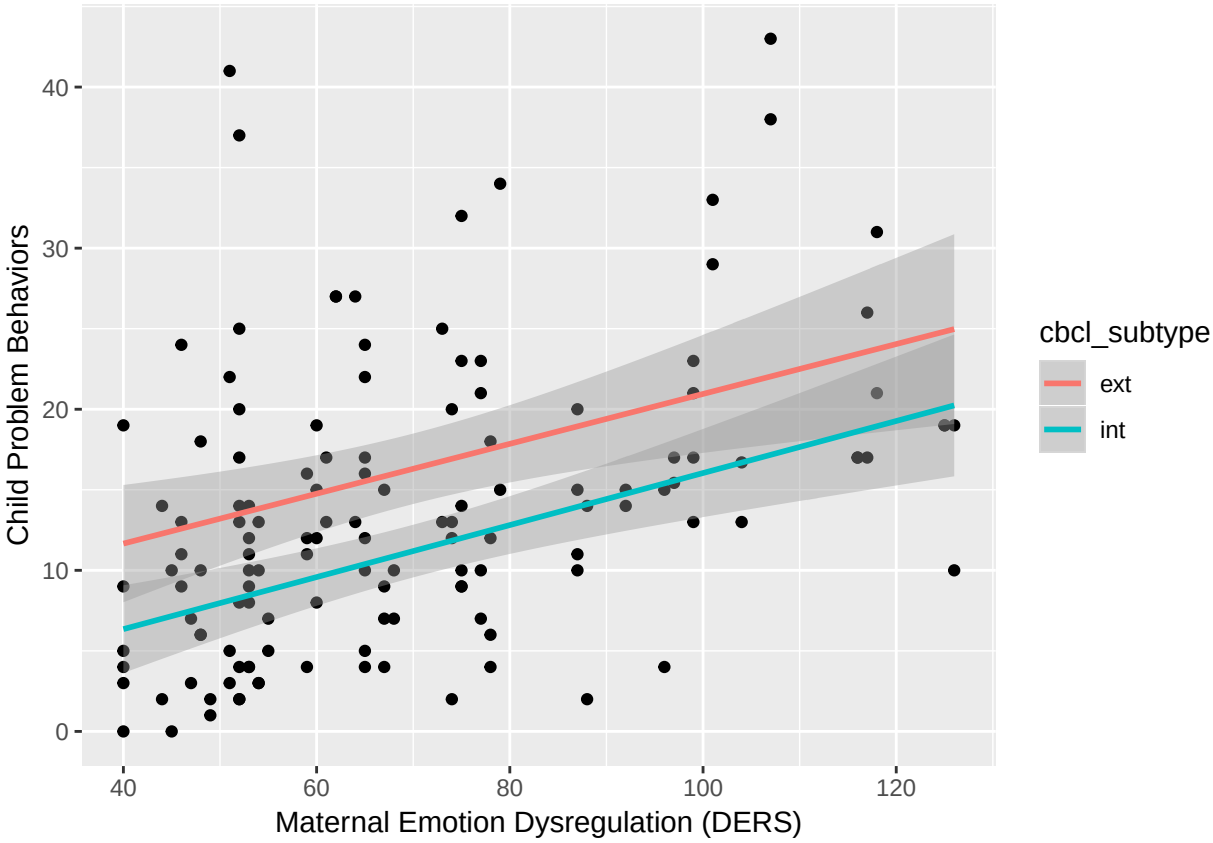

Figure 1. Maternal Emotion Dysregulation and Child Behaviors

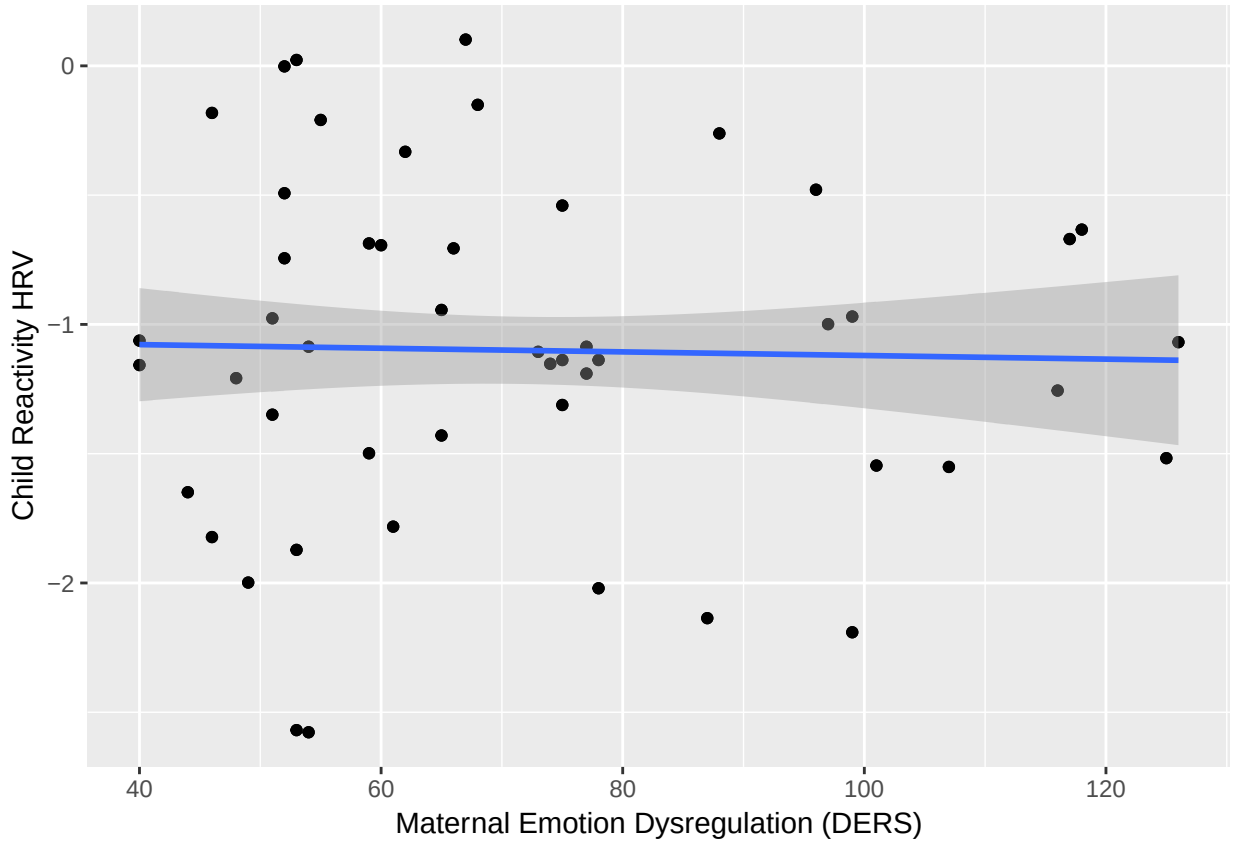

Figure 2. Maternal Emotion Dysregulation and Child HRV Reactivity

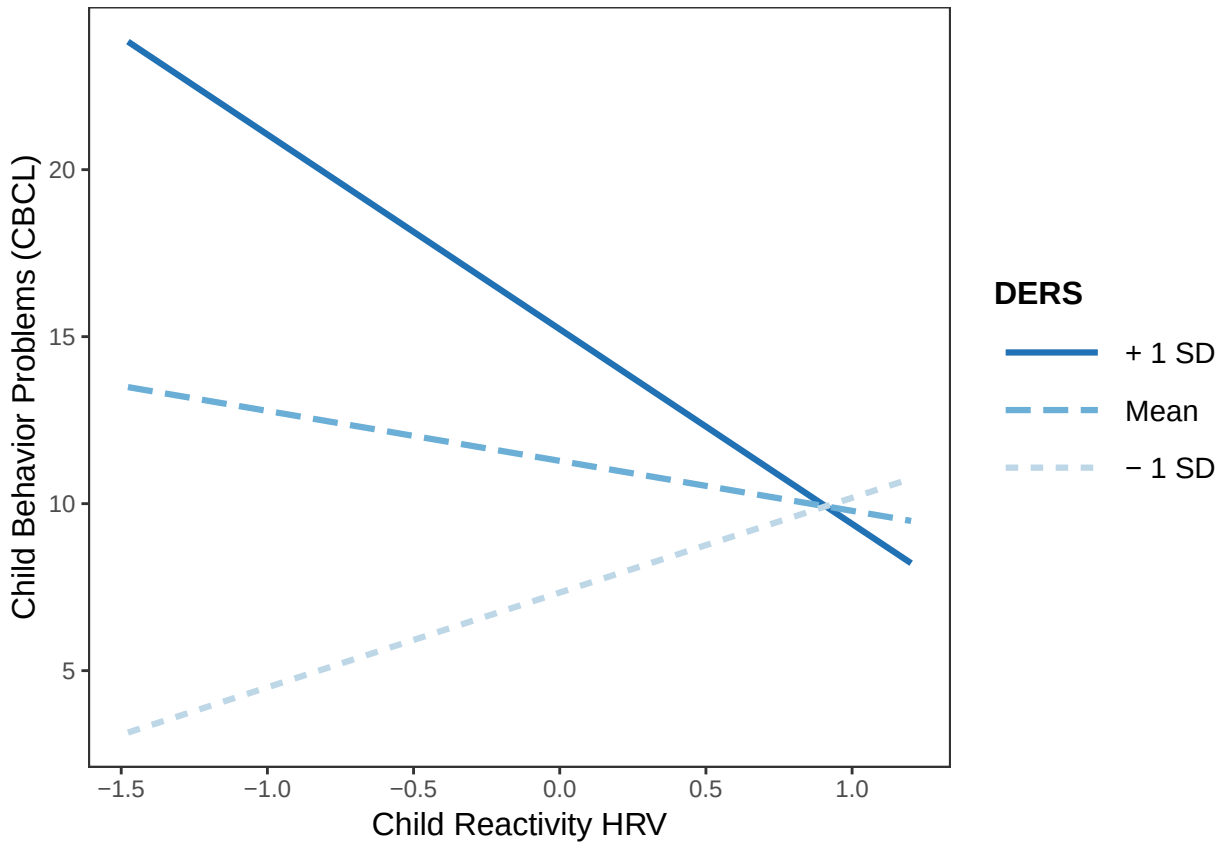

Figure 3. Child Reactivity Predicting Child Behavior Problems at Three Different Levels of Maternal Emotion Dysregulation