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

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Abstract

One or two sentences providing a **basic introduction** to the field, comprehensible to a scientist in any discipline.

Two to three sentences of **more detailed background**, comprehensible to scientists in related disciplines.

One sentence clearly stating the **general problem** being addressed by this particular study.

One sentence summarizing the main result (with the words "**here we show**" or their equivalent).

Two or three sentences explaining what the **main result** reveals in direct comparison to what was thought to be the case previously, or how the main result adds to previous knowledge.

One or two sentences to put the results into a more **general context**.

Two or three sentences to provide a **broader perspective**, readily comprehensible to a scientist in any discipline.

Keywords: emotion regulation, parenting, child outcomes

Word count: X

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```
## Observations: 97
## Variables: 6
## $ family_id      <dbl> 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008,...
## $ cbcl_int       <dbl> 10, 4, 15, 9, 10, 10, 5, 4, 3, 6, 3, 10, 13, 5,...
## $ cbcl_ext       <dbl> 13, 12, 20, 14, 18, 16, 7, 12, 3, 6, 0, 7, 17, ...
## $ ders           <dbl> 54, 59, 87, 75, 48, 65, 55, 53, 54, 48, 40, 68,...
## $ child_baseline <dbl> 7.038787, 5.819146, NA, 5.684124, NA, NA, 6.111...
## $ child_lego     <dbl> 5.952458, 5.132448, 6.669899, 4.372479, 5.04177...

## Observations: 136
## Variables: 6
## $ family_id      <dbl> 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008,...
## $ ders           <dbl> 54, 59, 87, 75, 48, 65, 55, 53, 54, 48, 40, 68,...
## $ child_baseline <dbl> 7.038787, 5.819146, NA, 5.684124, NA, NA, 6.111...
## $ child_lego     <dbl> 5.952458, 5.132448, 6.669899, 4.372479, 5.04177...
## $ cbcl_subtype   <chr> "int", "int", "int", "int", "int", "int", "int"...
## $ cbcl_score     <dbl> 10, 4, 15, 9, 10, 10, 5, 4, 3, 6, 3, 10, 13, 5,...

## Observations: 136
## Variables: 9
## $ family_id      <dbl> 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008,...
## $ ders           <dbl> 54, 59, 87, 75, 48, 65, 55, 53, 54, 48, 40, 68,...
## $ child_baseline <dbl> 7.038787, 5.819146, NA, 5.684124, NA, NA, 6.111...
## $ child_lego     <dbl> 5.952458, 5.132448, 6.669899, 4.372479, 5.04177...
## $ cbcl_subtype   <chr> "int", "int", "int", "int", "int", "int", "int"...
```

```
## $ cbcl_score     <dbl> 10, 4, 15, 9, 10, 10, 5, 4, 3, 6, 3, 10, 13, 5,...
## $ reactivity     <dbl> -1.086328857, -0.686697786, NA, -1.311645429, N...
## $ ders_c         <dbl> -16.102941, -11.102941, 16.897059, 4.897059, -2...
## $ reactivity_c   <dbl> 0.014032141, 0.413663212, NA, -0.211284431, NA,...
```

Introduction

Methods

We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures in the study.

Participants

Material

Procedure

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 0.7.6; 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), *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.

Results

```
## 'data.frame':    136 obs. of  9 variables:
##  $ family_id     : num  1001 1002 1003 1004 1005 ...
##  $ ders          : num  54 59 87 75 48 65 55 53 54 48 ...
##  $ child_baseline: num  7.04 5.82 NA 5.68 NA ...
##  $ child_lego    : num  5.95 5.13 6.67 4.37 5.04 ...
##  $ cbcl_subtype  : chr  "int" "int" "int" "int" ...
##  $ cbcl_score    : num  10 4 15 9 10 10 5 4 3 6 ...
##  $ reactivity    : num  -1.086 -0.687 NA -1.312 NA ...
##  $ ders_c        : num  -16.1 -11.1 16.9 4.9 -22.1 ...
##  $ reactivity_c  : num  0.014 0.414 NA -0.211 NA ...
```

DERS_mean	DERS_SD	Reactivity_mean	Reactivity_SD
70.10294	22.33027	-1.100361	0.6520285

cbcl_subtype	cbcl_mean	cbcl_SD
ext	16.28333	9.492662
int	11.17318	7.539277

```
##
## Call:
## lm(formula = cbcl_score ~ ders_c * reactivity_c, data = subset(tidy_data,
##     cbcl_subtype == "int"))
##
## Residuals:
##    Min     1Q Median     3Q    Max
## -9.871 -4.287 -1.288  2.292 17.350
##
```

```
## Coefficients:
##                     Estimate Std. Error t value Pr(>|t|)
## (Intercept)         11.00475    0.97629  11.272 1.07e-14 ***
## ders_c               0.16504    0.04142   3.985 0.000245 ***
## reactivity_c        -1.19234    1.54053  -0.774 0.442990
## ders_c:reactivity_c -0.18142    0.07985  -2.272 0.027927 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 6.814 on 45 degrees of freedom
##   (19 observations deleted due to missingness)
## Multiple R-squared:  0.3413, Adjusted R-squared:  0.2974
## F-statistic: 7.772 on 3 and 45 DF,  p-value: 0.0002752

##
## Call:
## lm(formula = cbcl_score ~ ders_c * reactivity_c, data = subset(tidy_data,
##     cbcl_subtype == "ext"))
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -11.938  -6.341  -2.041   3.818  27.750
##
## Coefficients:
##                     Estimate Std. Error t value Pr(>|t|)
## (Intercept)         16.01973    1.32811  12.062 1.07e-15 ***
## ders_c               0.16025    0.05634   2.844  0.00668 **
## reactivity_c         1.72370    2.09567   0.823  0.41513
```

```
## ders_c:reactivity_c -0.03287    0.10863  -0.303  0.76360
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 9.27 on 45 degrees of freedom
##   (19 observations deleted due to missingness)
## Multiple R-squared:  0.1698, Adjusted R-squared:  0.1144
## F-statistic: 3.068 on 3 and 45 DF,  p-value: 0.03733
```

```
## Warning: Removed 4 rows containing non-finite values (stat_smooth).
```

```
## Warning: Removed 4 rows containing missing values (geom_point).
```

```
## Warning: Removed 36 rows containing non-finite values (stat_smooth).
```

```
## Warning: Removed 36 rows containing missing values (geom_point).
```

Figure 2. Maternal Emotion Dysregulation and Child HRV Reactivity

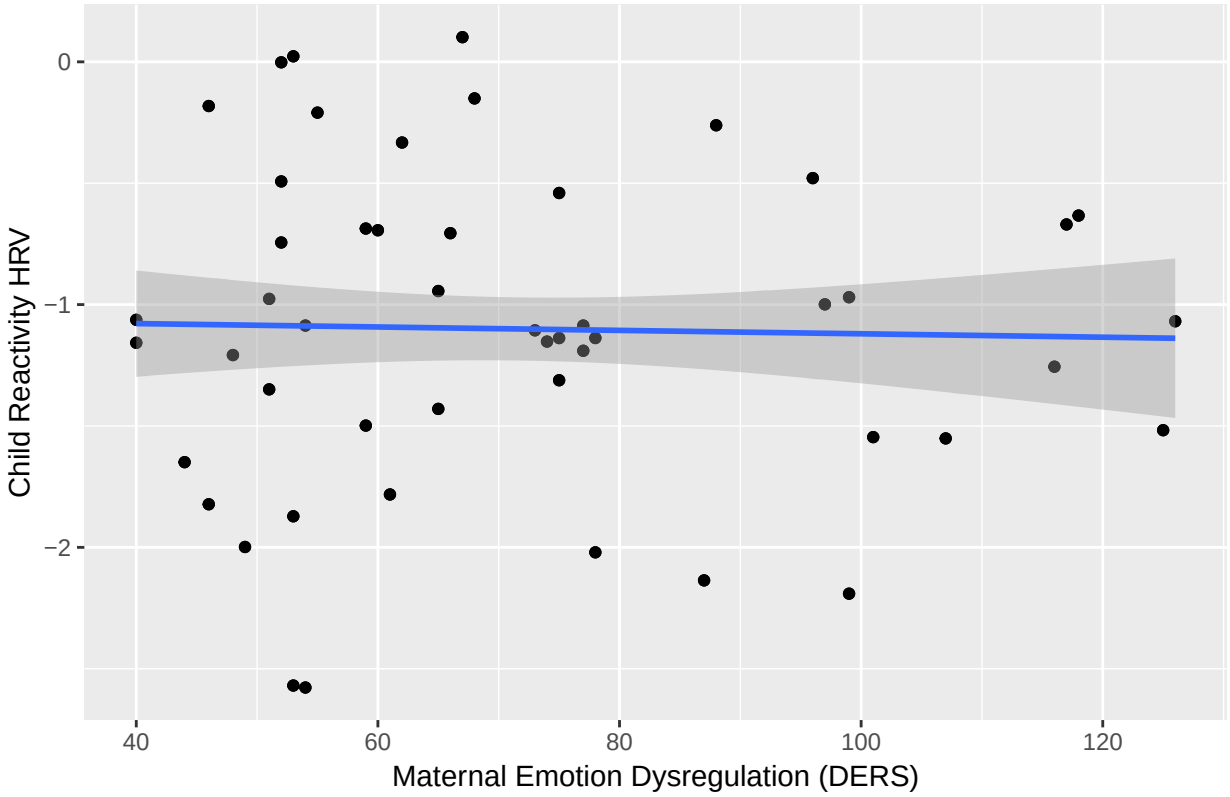
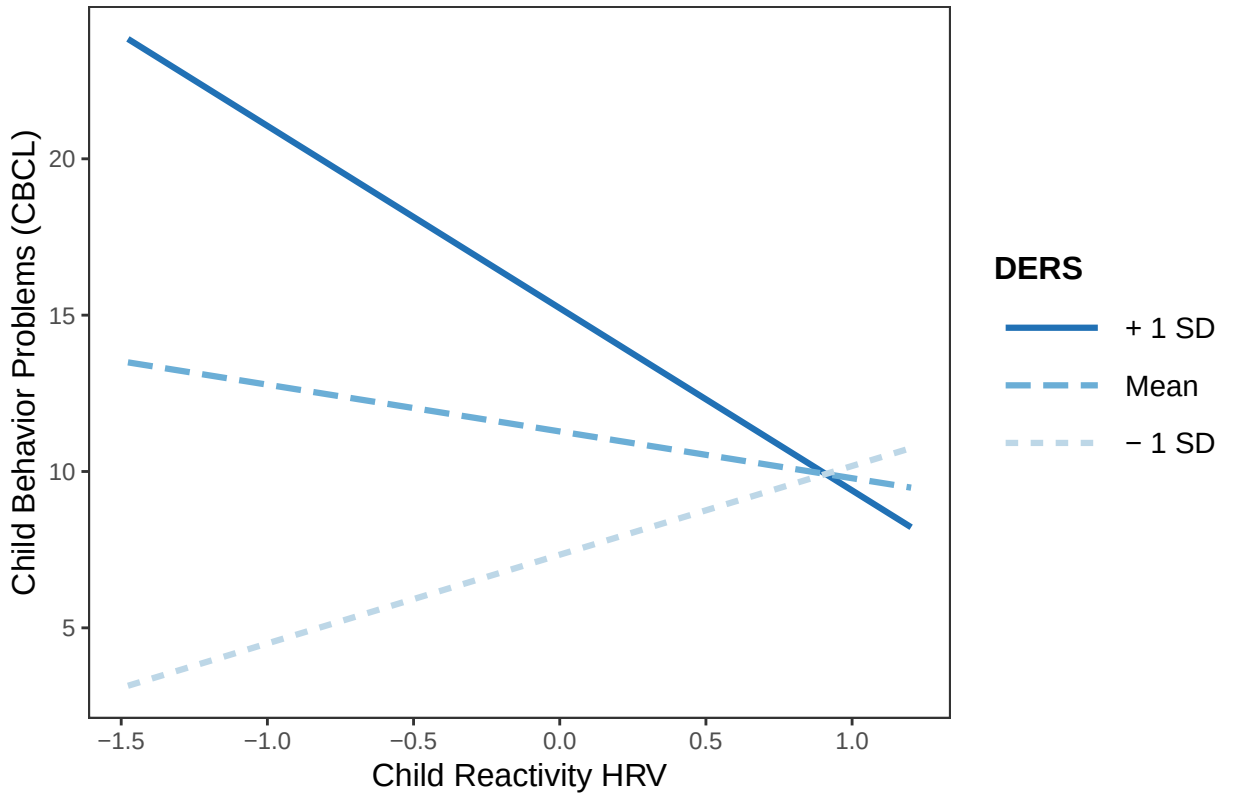


Figure 3. Interaction of Child Reactivity and Maternal Emotion Dy



Discussion

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Figure 1. Maternal Emotion Dysregulation and Child Behaviors

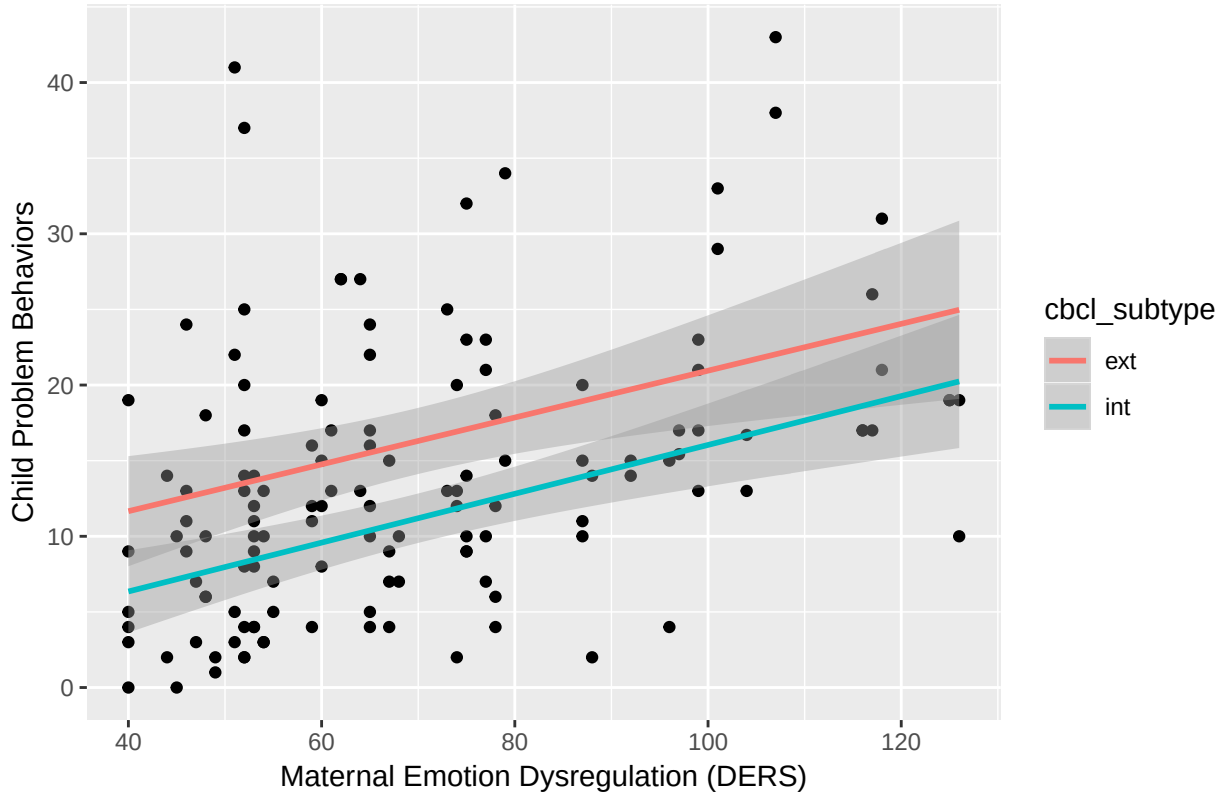

Figure 1