

1 Maternal Emotion Dysregulation and its Association with Child Internalizing and
2 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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```

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

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

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

```

```

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

```

54 Introduction

55 Methods

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

58 Participants

59 Material

60 Procedure

61 Data analysis

62 We used R (Version 3.5.1; R Core Team, 2018) and the R-packages *bindrcpp* (Version
 63 0.2.2; Müller, 2018), *dplyr* (Version 0.7.7; Wickham, François, Henry, & Müller, 2018),
 64 *forcats* (Version 0.3.0; Wickham, 2018a), *ggplot2* (Version 3.0.0; Wickham, 2016), *here*
 65 (Version 0.1; Müller, 2017), *kableExtra* (Version 0.9.0; Zhu, 2018), *papaja* (Version
 66 0.1.0.9842; Aust & Barth, 2018), *purrr* (Version 0.2.5; Henry & Wickham, 2018), *readr*
 67 (Version 1.1.1; Wickham, Hester, & François, 2017), *rio* (Version 0.5.10; C.-h. Chan, Chan,
 68 Leeper, & Becker, 2018), *stringr* (Version 1.3.1; Wickham, 2018b), *tibble* (Version 1.4.2;
 69 Müller & Wickham, 2018), *tidyr* (Version 0.8.1; Wickham & Henry, 2018), and *tidyverse*
 70 (Version 1.2.1; Wickham, 2017) for all our analyses.

Results

```

71
72 ## 'data.frame':  136 obs. of  9 variables:
73 ## $ family_id      : num  1001 1002 1003 1004 1005 ...
74 ## $ ders           : num  54 59 87 75 48 65 55 53 54 48 ...
75 ## $ child_baseline: num  7.04 5.82 NA 5.68 NA ...
76 ## $ child_lego     : num  5.95 5.13 6.67 4.37 5.04 ...
77 ## $ cbcl_subtype   : chr  "int" "int" "int" "int" ...
78 ## $ cbcl_score     : num  10 4 15 9 10 10 5 4 3 6 ...
79 ## $ reactivity     : num  -1.086 -0.687 NA -1.312 NA ...
80 ## $ ders_c         : num  -16.1 -11.1 16.9 4.9 -22.1 ...
81 ## $ reactivity_c   : num  0.014 0.414 NA -0.211 NA ...

82
      DERS_mean DERS_SD Reactivity_mean Reactivity_SD
      70.10294  22.33027      -1.100361    0.6520285

      cbcl_subtype cbcl_mean cbcl_SD
83      ext          16.28333  9.492662
      int          11.17318  7.539277

84 ##
85 ## Call:
86 ## lm(formula = cbcl_score ~ ders_c * reactivity_c, data = subset(tidy_data,
87 ##   cbcl_subtype == "int"))
88 ##
89 ## Residuals:
90 ##   Min     1Q  Median     3Q    Max
91 ## -9.871 -4.287 -1.288  2.292 17.350
92 ##

```

```

93 ## Coefficients:
94 ##               Estimate Std. Error t value Pr(>|t|)
95 ## (Intercept)      11.00475    0.97629  11.272 1.07e-14 ***
96 ## ders_c           0.16504    0.04142   3.985 0.000245 ***
97 ## reactivity_c     -1.19234    1.54053  -0.774 0.442990
98 ## ders_c:reactivity_c -0.18142    0.07985  -2.272 0.027927 *
99 ## ---
100 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
101 ##
102 ## Residual standard error: 6.814 on 45 degrees of freedom
103 ##   (19 observations deleted due to missingness)
104 ## Multiple R-squared:  0.3413, Adjusted R-squared:  0.2974
105 ## F-statistic: 7.772 on 3 and 45 DF,  p-value: 0.0002752
106 ##
107 ## Call:
108 ## lm(formula = cbcl_score ~ ders_c * reactivity_c, data = subset(tidy_data,
109 ##   cbcl_subtype == "ext"))
110 ##
111 ## Residuals:
112 ##      Min       1Q   Median       3Q      Max
113 ## -11.938  -6.341  -2.041   3.818  27.750
114 ##
115 ## Coefficients:
116 ##               Estimate Std. Error t value Pr(>|t|)
117 ## (Intercept)      16.01973    1.32811  12.062 1.07e-15 ***
118 ## ders_c           0.16025    0.05634   2.844  0.00668 **
119 ## reactivity_c     1.72370    2.09567   0.823  0.41513

```

```
120 ## ders_c:reactivity_c -0.03287    0.10863  -0.303  0.76360
121 ## ---
122 ## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
123 ##
124 ## Residual standard error: 9.27 on 45 degrees of freedom
125 ## (19 observations deleted due to missingness)
126 ## Multiple R-squared:  0.1698, Adjusted R-squared:  0.1144
127 ## F-statistic: 3.068 on 3 and 45 DF,  p-value: 0.03733

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

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

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

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

Figure 2. Maternal Emotion Dysregulation and Child HRV Reactivity

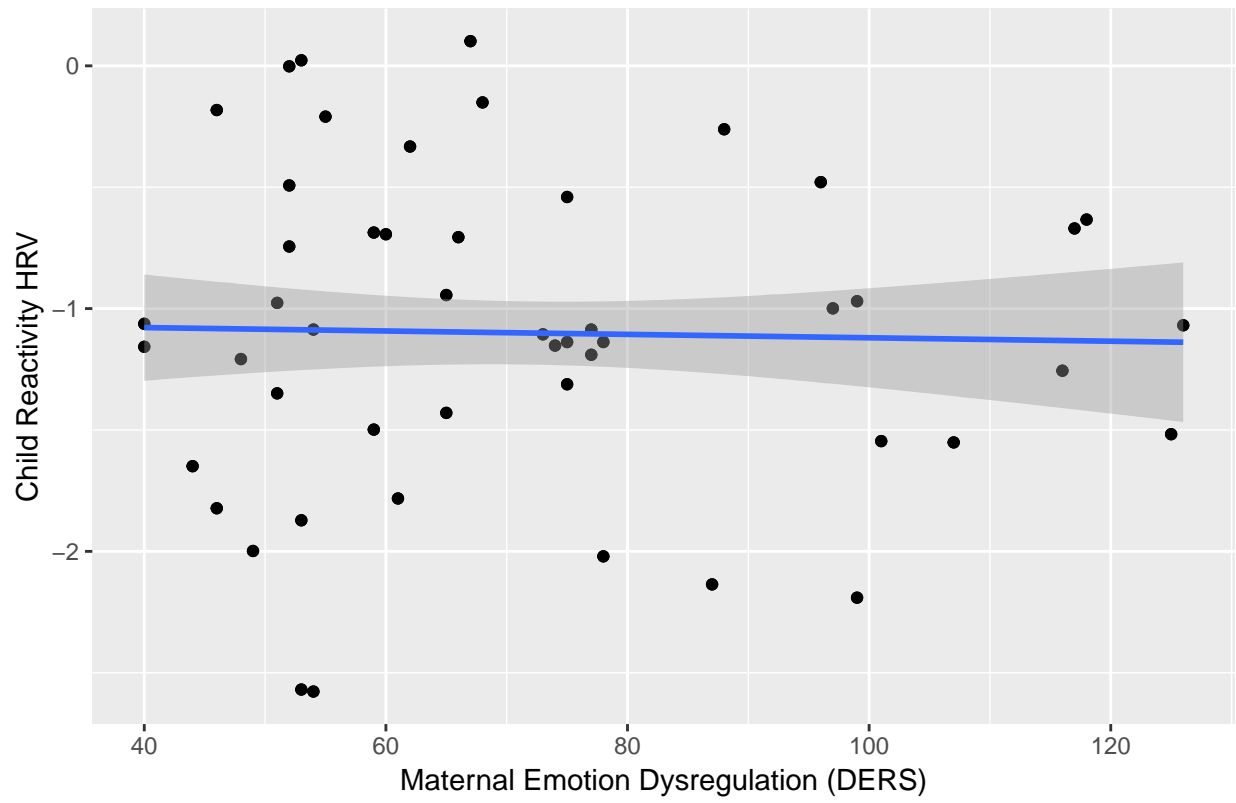
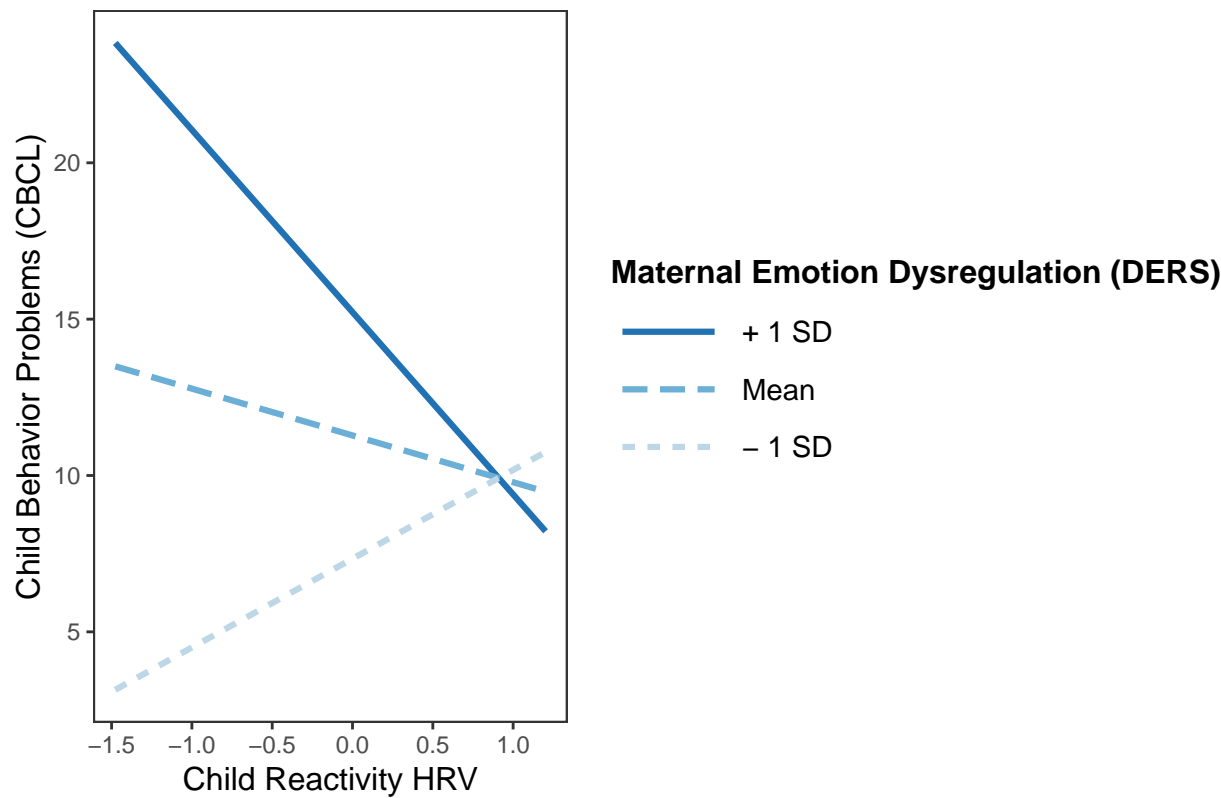


Figure 3. Interaction of Child Reactivity and Maternal Emotion Dy:



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Discussion

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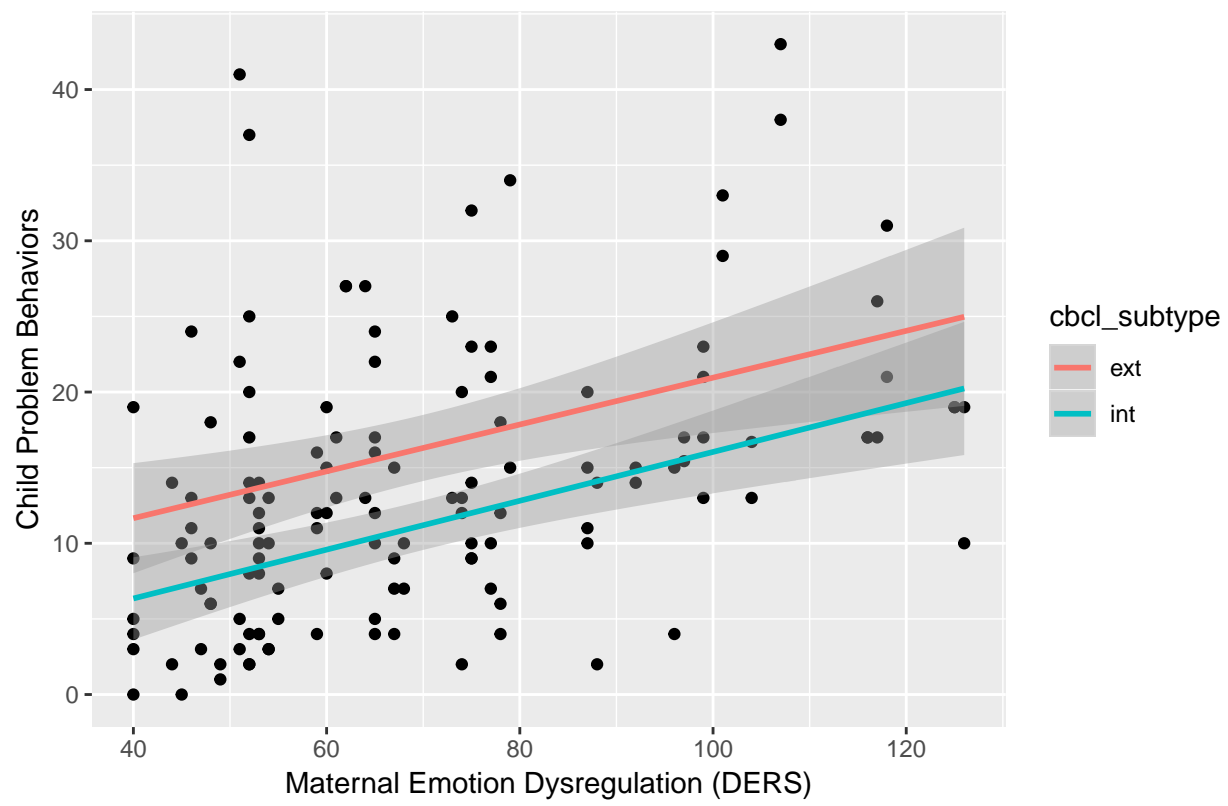
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Figure 1. Maternal Emotion Dysregulation and Child Behaviors

*Figure 1*