Secondary Models: Structural Equation Models with Time Varying Mediators

Given evidence for intervention effects, which may occur through changes in parenting behaviors, secondary analyses were conducted examining the mediational roles of the four parenting variables at T2 and their latent change from T1 to T3 on associations between the intervention and T3 child self-regulation and latent change in self-regulation from T1 to T3. In these models, the RET intervention was modeled as an input variable along with maltreatment. Thus, the effects of maltreatment were statistically controlled for in order to isolate and evaluate the effects of the RET intervention and the parenting or socialization processes that might be explaining its effects. In the following results, only statistically significant pathways are reported; full results are available from the first author upon request.

Modeling procedures. First, consistent with the procedures outlined in the primary analyses, four latent growth models examining the patterns of change in the longitudinal data of each mediator were run in R 3.4.0 (R Core Team, 2017) using the lavaan package (Rosseel, 2012). Subsequent full structural equation models including all variables were run in Mplus (Mplus Version 8; Muthén & Muthén, 2017). As we wished to examine mediator levels at T2 and latent change in the mediators from T1 to T3, the slope loadings T1 and T2 were set to -2/6 and 0, respectively. If a linear trend was appropriate for the mediator data, the slope loading at T3 was set to 4/6 to reflect a linear rate of change. If a linear model was not appropriate, the T3 slope loading was freely estimated to correspond to the actual trends in the data.

Modeling procedures for the four mediators. For positive parenting, the linear growth curve model was a good fit, $x^2(3) = 4.74$, *n.s.*, *CFI* = .99, *RMSEA* = .05. For positive expressiveness, the linear growth curve model was not a good fit, $x^2(3) = 32.59$, $p < .001$, *CFI* = .86, *RMSEA* = .20. Thus, a latent basis coefficient model was run freely estimating the final

loading of the slope factor, and the model fit improved significantly, $x^2(2) = .52$, *n.s.*, *CFI* = 1.00, *RMSEA* = .00. For negative expressiveness, the linear growth curve model was a good fit, $x^2(3) = 1.29$, *n.s.*, *CFI* = 1.00, *RMSEA* = .00. Finally, for sensitive guidance, the linear growth curve model was not a good fit, $x^2(3) = 17.88$, $p < .001$, *CFI* = .85, *RMSEA* = .14. A latent basis coefficient model was run and the model fit improved significantly, $x^2(2) = .94$, *n.s.*, *CFI* = 1.00, *RMSEA* = .00. Thus, the final full models were fit using linear growth curve models for positive parenting and negative expressiveness, and latent basis coefficient models freely estimating the T3 loading for positive expressiveness and sensitive guidance.

Adaptive emotion regulation full model modeling procedure. In the full model, the residual variance estimates for the slopes of emotion regulation and negative expressiveness were negative. Negative variance estimate for the slope parameters may indicate that the variance is zero in reality (Verbeke & Molenberghs, 2009) so they were fixed at 0.0. The model fit of the final full structural equation model was satisfactory, $x^2(89) = 120.33$, $p = .02$, *CFI* = .97, *RMSEA* = .04. For positive expressiveness and sensitive guidance, the T3 factor loadings were freely estimated to be .03 and -.02, respectively, suggesting a steep change in these variables from T1 to T2, and a tapering off at T3.

Lability/Negativity full model modeling procedure. As the original model indicated a good fit of latent basis coefficient for the lability/negativity component, the full model was fit again as such. In the full model, the residual variance estimate for the slope of negative family expressiveness was negative so it was set to 0.0. The model fit of the final full structural equation model was satisfactory, $x^2(86) = 126.64$, $p < .01$, *CFI* = .97, *RMSEA* = .05. The latent basis coefficient models supported similar patterns of change to those estimated in the emotion regulation model; the T3 loadings were estimated to be .03 and -.04 for positive expressiveness

and maternal sensitive guidance, respectively.

Adaptive Emotion Regulation Model with Time Varying Mediators (Figure 3). Maternal sensitive guidance at T2 was positively correlated with positive expressiveness at T2 (b^* = .30, *SE* = .10, p = .001). Positive parenting was positively correlated with positive expressiveness at T2 (b^* = .51, *SE* = .07, $p < .001$) and negatively associated with negative family expressiveness at T2 (b^* = -.31, *SE* = .08, $p < .001$). Positive family expressiveness at T2 was negatively associated with negative expressiveness at T2 (b^* = -.26, *SE* = .10, $p < .01$). Positive change in positive parenting from T1 and T3 was positively associated with more positive change in positive expressiveness from T1 to T3 (b^* = .59, *SE* = .29, $p < .05$).

The RET intervention predicted higher sensitive guidance at T2 (b^* = .46, *SE* = 0.09, $p < .001$), and more positive change in sensitive guidance from T1 to T3 (b^* = .57, *SE* = 0.21, $p <$ .01). Maltreatment predicted lower sensitive guidance at T2 (b^* = -.25, *SE* = 0.08, $p < .01$) and higher negative expressiveness at T2 (b^* = .18, *SE* = 0.09, $p < .05$). According to the 95% bootstrap confidence interval estimates, there were significant indirect effects of the intervention on child emotion regulation at T3 and change in child emotion regulation through change in sensitive guidance from T1 to T3 (95% CI: -2.760, -0.086; 95% CI: -2.428, -0.048, respectively).

Lability/Negativity Model with Time Varying Mediators (Figure 4). Intercorrelations between the four latent process variables at T2 and their latent change from T1 to T3 mirror those results presented above in the adaptive emotion regulation model results with the exception that in the lability/negativity model, more positive change in positive parenting from T1 to T3 was associated with higher positive expressiveness at T2 (b^* = .41, *SE* = .19, $p < .05$).

Statistically significant associations between the intervention, maltreatment and the time varying mediators mirrored results enumerated in the adaptive emotion regulation model above.

Regarding relations between the time varying mediators and child lability/negativity, higher positive parenting at T2 predicted lower lability/negativity at T3 (b^* = -.28, *SE* = 0.14, $p < .05$). More positive change in positive parenting from T1 to T3 predicted lower child lability/ negativity at T3 (b^* = -.73, *SE* = 0.24, $p < .01$) and less increase in lability/negativity from T1 to T3 (b^* = -1.21, *SE* = 0.57, $p < .05$). Higher positive expressiveness at T2 predicted higher child lability/negativity at T3 (b^* = .45, *SE* = 0.18, $p = .01$) and steeper increases in child lability/ negativity from T1 to T3 (b^* = .81, *SE* = 0.37, $p < .05$). More positive change in positive expressiveness predicted higher child lability/negativity at T3 (b^* = .48, *SE* = 0.19, $p = .01$). Higher negative expressiveness at T2 predicted heightened child lability/negativity at T3 (b^* = .48, *SE* = 0.10, $p < .001$). Finally, higher sensitive guidance at T2 predicted lower child lability/negativity at T3 (b^* = -.42, *SE* = 0.13, $p = .001$).

According to the 95% bootstrap confidence interval estimates, there were statistically significant indirect effects of the intervention on child lability/negativity at T3 through maternal sensitive guidance at T2 (95% CI: -0.422, -0.093), positive parenting at T2 (95% CI: -0.109, -0.002), positive expressiveness at T2 (95% CI: 0.025, 0.165), and change in positive expressiveness from T1 to T3 (95% CI: 0.016, 0.219). Additionally, there was a significant indirect effect of the intervention on change in child lability negativity from T1 to T3 through positive family expressiveness at T2 (95% CI: 0.032, 0.272). Regarding maltreatment, there was a significant indirect effect of maltreatment on lability/negativity at T3 through sensitive guidance at T2 (95% CI: 0.036, 0.238) and positive expressiveness at T2 (95% CI: -0.121, -0.020). Finally, there was a significant indirect effect of maltreatment on change in child lability/negativity from T1 to T3 through positive expressiveness at T2 (95% CI: -0.273, -0.032).

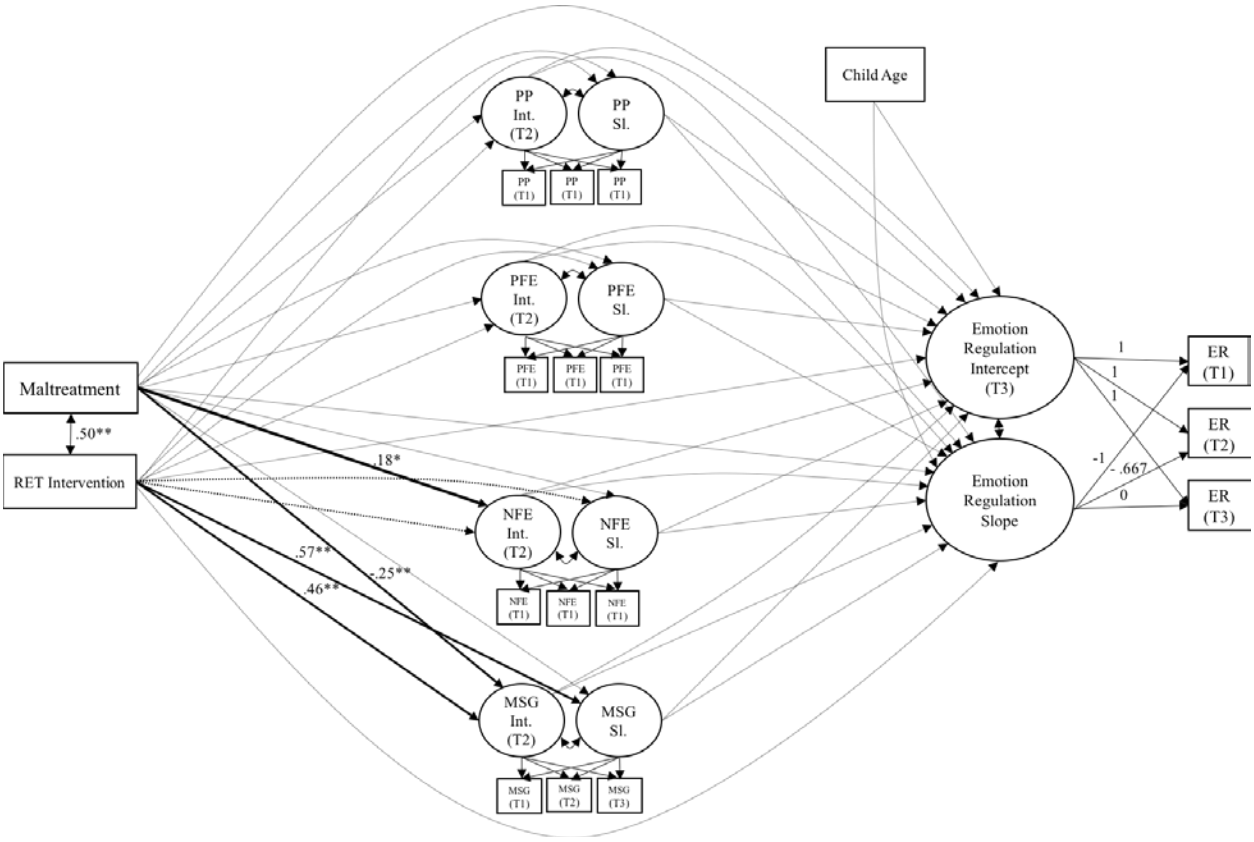

Figure S1. Adaptive emotion regulation model with time varying mediators. Structural equation model depicting the mediational roles of positive parenting, positive and negative expressiveness, and maternal sensitive guidance at T2 and their latent change from T1 and T3 on relations between maltreatment and child adaptive emotion regulation at T3 and latent change in adaptive emotion regulation from T1 to T3. Nonsignificant pathways are indicated by thin dashed lines and statistically significant pathways are indicated by solid lines. Loadings for the latent growth components for each of the four mediators are enumerated in the supplementary material text. Covariances between the mediators were modeled but are not included in the figure for ease of presentation. PP = Positive Parenting, PFE = Positive Family Expressiveness, NFE = Negative Family Expressiveness, MSG = Maternal Sensitive Guidance, ER = Emotion Regulation.
* $p < .05$, ** $p < .01$

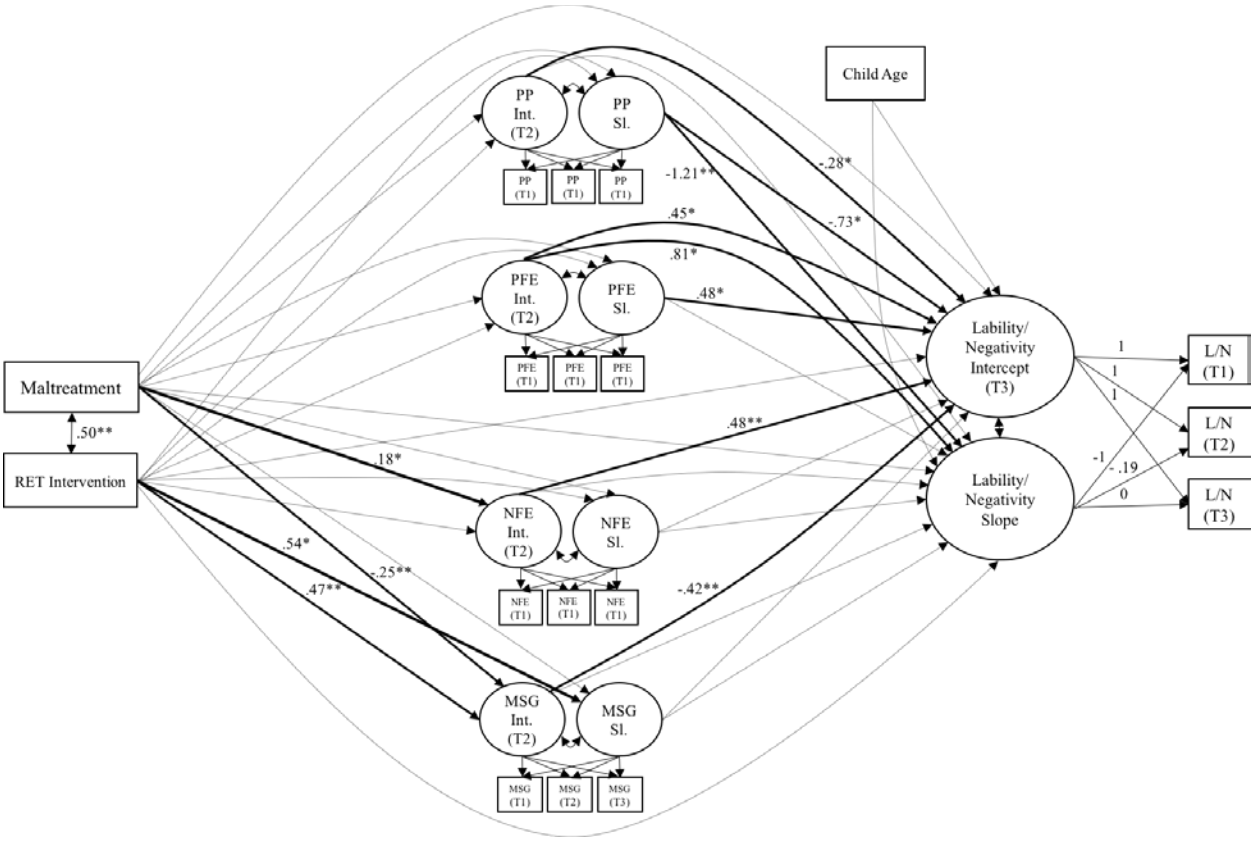

Figure S2. Lability/negativity model with time varying mediators. Structural equation model depicting the mediational roles of positive parenting, positive and negative expressiveness, and maternal sensitive guidance at T2 and their latent change from T1 and T3 on relations between maltreatment and child lability/negativity at T3 and latent change in lability/negativity from T1 to T3. Nonsignificant pathways are indicated by thin dashed lines and statistically significant pathways are indicated by solid lines. Loadings for the latent growth components for each of the four mediators are enumerated in the supplementary material text. Covariances between the mediators were modeled but are not included in the figure for ease of presentation. PP = Positive Parenting, PFE = Positive Family Expressiveness, NFE = Negative Family Expressiveness, MSG = Maternal Sensitive Guidance, L/N = Lability/Negativity.
* $p < .05$, ** $p < .01$