

The Mediating Role of Parenting Practices and Personality Traits for The Prediction of Children's Cognitive Control

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Background

Post-Error slowing (PES) refers to the prolongation of reaction time (RT) after an error, compared to the RT after a correct response (Laming, 1979; Rabbitt & Rodgers, 1977). PES is a well-known indicator of the development of the executive attention network and cognitive control (Botvinick et al., 2001; Lavro et al., 2018). It begins manifesting behaviorally in early childhood, continues to develop throughout preschool and kindergarten ages, and increases up to the ages of 7 to 9 years old (de Mooij et al., 2022; Jones et al., 2003). Mothers' personality traits, such as their tendency for perfectionism, cooperativeness and self-directedness can explain their parental practices (Dieleman et al., 2020; Yeshua et al., 2023). In turn, they can improve or diminish different aspects of a child's cognitive control; however, the literature linking mothers' own cognitive control to their child's cognitive control is scarce. The present study aims to elucidate the mediating effect of mothers' personality traits and parenting practices on the development of their child's PES.

Method

Participants

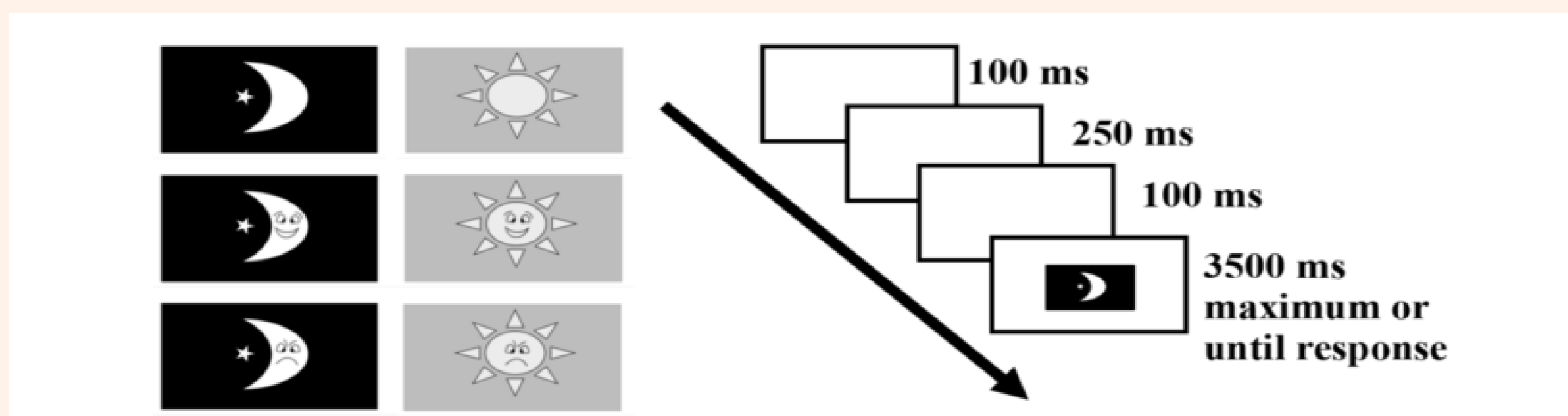
- $N = 156$ mother-child dyads (82 boys; 53%)
- Children's $M_{\text{age}} = 4.7$ (years.months) $\pm .6$ (3.7 – 6.6)
- Mothers' $M_{\text{age}} = 36.7 \pm 4.6$ (28.4 – 51.6)

Instruments

- Post-Error Slowing (Emotional Day-Night Task; EDN).

- Children's version: Four blocks (three congruent and one incongruent) with different face no-go rule.
- Mothers' version: Twelve blocks (six congruent and six incongruent, fully randomized) with different image no-go rule.
- Children's M_{trial} was 53.60 ($SD = 9.83$; 29-70), and mothers' M_{trial} was 288 ($SD = 29$; 173-321)
- PES effect = $\overline{PE} - \overline{NPE}$

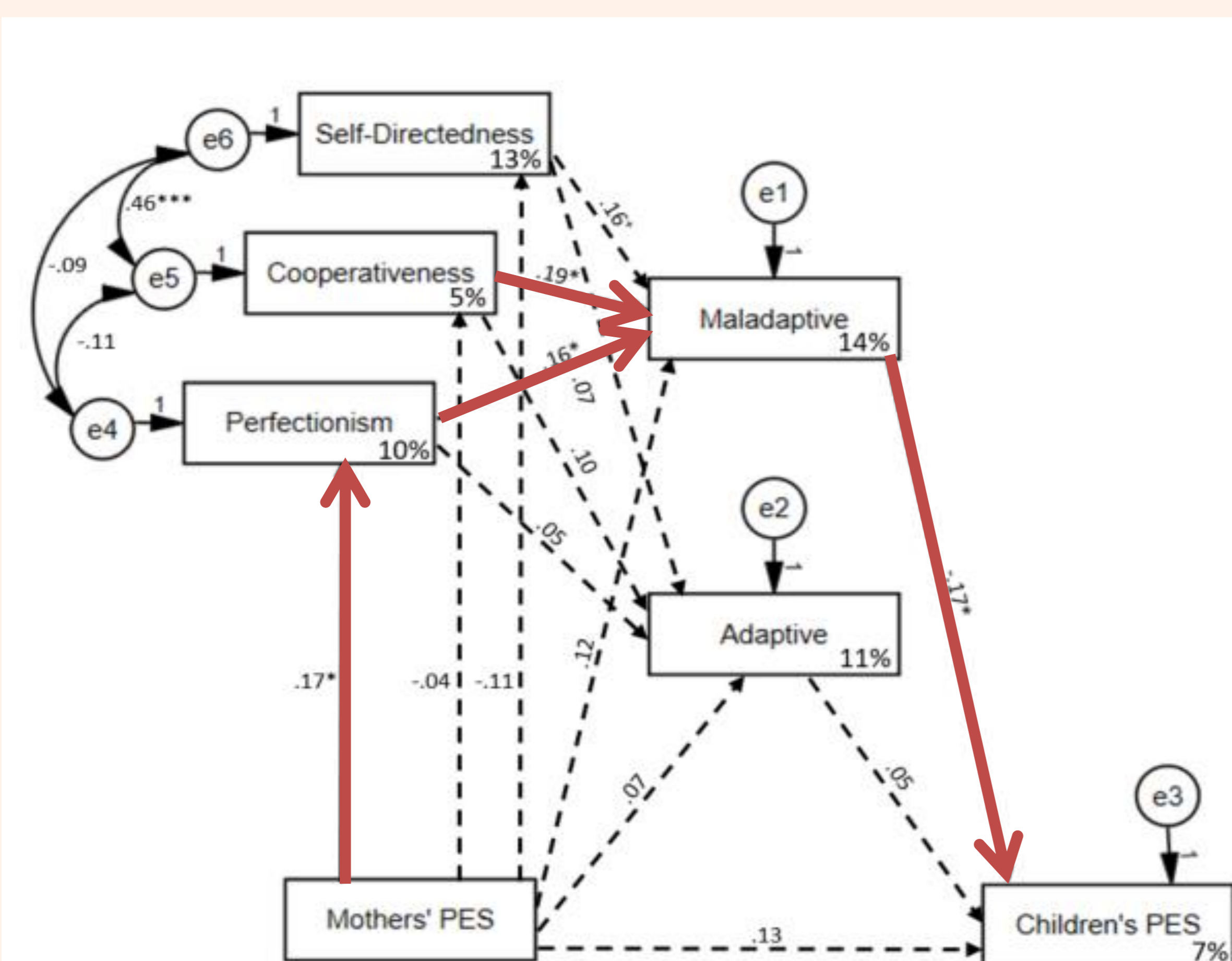
Single Trial Flow



Drawn from Yeshua and Berger (2024). Sun stimuli were colored yellow against a blue background. For mothers, maximum appearance time of a stimulus was 2,000 ms.

Results

Fitted Structural Mediation Model



Note. $N = 156$. For all scales, higher scores are indicative of more extreme responding in the direction of the construct assessed. Path value is beta and the percent within each dependent variable is the R^2 . The model includes the specified controlled variables in the beginning of the Results section. Model fit: CFI = .86, RMSEA = .06.

Discussion

This study explored the mediated mediation of personality and parenting practices on the intergenerational transmission of error processing, as measured behaviorally in the form of PES. The findings indicated that less developed PES of the mothers was related to greater tendency for negative perfectionism. In turn, this trait was associated with greater use of maladaptive parenting practices, but not of adaptive ones. Greater use of maladaptive practices was related to less developed PES of their children. Another finding was that the mothers' cooperativeness explained their maladaptive practices, which in turn explained the less developed PES of their child; however, the mothers' cooperativeness was not explained by their PES. These findings provide additional support and expand the intergenerational transmission of cognitive control and self-regulation via personality traits and parenting practices (Bridgett et al., 2015, 2017, 2018; Yeshua et al., 2023).

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Instruments

- Self-Directedness and Cooperativeness (The Temperament and Character Inventory – Revised; TCI-R; Zohar & Cloninger, 2011)

- Self-directedness Cronbach's alpha = .83
- Cooperativeness Cronbach's alpha = .74
- 20 self-reported items each

- Perfectionism (The Frost Multidimensional Perfectionism Scale – Brief; FMPS-B; Burgess et al., 2016)

- 8 self-reported items; Cronbach's Alpha = .77

- Mothers' Parenting Practices (Etch-A-Sketch task; Stevenson-Hinde & Shouldice, 1995)

- A 7-minute mother-child interaction; four segments of 1 minute and 45 seconds
- Two coders (Cohen's Kappa = .74; ICC = .93) coded the interaction using an adapted version of the Parent Child Interaction System (PARCHISY; Deater-Deckard et al., 1997)

Exploratory Factor Analysis

Variables	Rotated Component Matrix		
	1	2	3
Positive Control	-.53	.48	
Negative Control	.70		
Positive Affect		.67	
Negative Affect	.68		
Responsiveness	-.61	.41	
On task			.70
Verbalizations			.67
Social Acceptance		.56	
Intolerance	.70		
Empathy		.66	
Social Disinterest	.64		
Competitiveness	.62		.56
Variance (%)	26.12%	15.82%	12.50%

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