



## Introduction

**Effortful control:** the capacity to inhibit a dominant response to perform a subdominant response, has been linked with successful developmental outcomes<sup>1,2</sup>

- High effortful control → academic success, social competence<sup>3</sup>
- Low effortful control → negative emotionality, externalizing problems<sup>4</sup>

Parenting (warmth) and child temperament (positive emotionality) have been associated with later effortful control.

Few genetically informed designs have examined these associations in young children<sup>4,5</sup>

## Research Questions

(1) Examine genetic (birth parent reward dependence, genetic index of positive emotionality<sup>6</sup>) and environmental (adoptive parenting warmth<sup>7,8</sup>) contributions to effortful control in young children (4.5 years)

(2) Explore possible evocative rGE of toddler positive emotionality<sup>9,10</sup> on adoptive parental warmth, which then may influence child effortful control (4.5 years)<sup>1</sup>

## Participants

561 families including adopted children, adoptive parents & biological mothers from the Early Growth and Development Study (EGDS<sup>12</sup>). Adopted children: 42.7% girls, 6.20 (12.45) days old when adopted. Adoptive parents mainly Caucasian (91.8% / 90.4%), with a median annual income \$100,000 – \$125,000. Biological mothers mainly Caucasian (70.1%), median annual income \$15,000- \$25,000

## Measures

**Birth Mother Reward Dependence (3-6 m)**

Temperament Character Inventory<sup>13</sup>, Reward dependence subscale  
Assessing e.g. individuals, eagerness to help others and sympathy

**Adopted Child Positive Emotionality (18 m)**

Toddler Behavior Assessment Questionnaire<sup>14</sup>, pleasure scale  
Parent report ( $r=.51, p<.001$ )

**Adoptive Mother & Adoptive Father Parental Warmth (27 m)**

Iowa Family Interaction Rating Scales<sup>15</sup>, expressivity of warmth  
Self- & partner reports (Mothers  $r=.65, p<.001$ ; Father  $r=.66, p<.001$ )

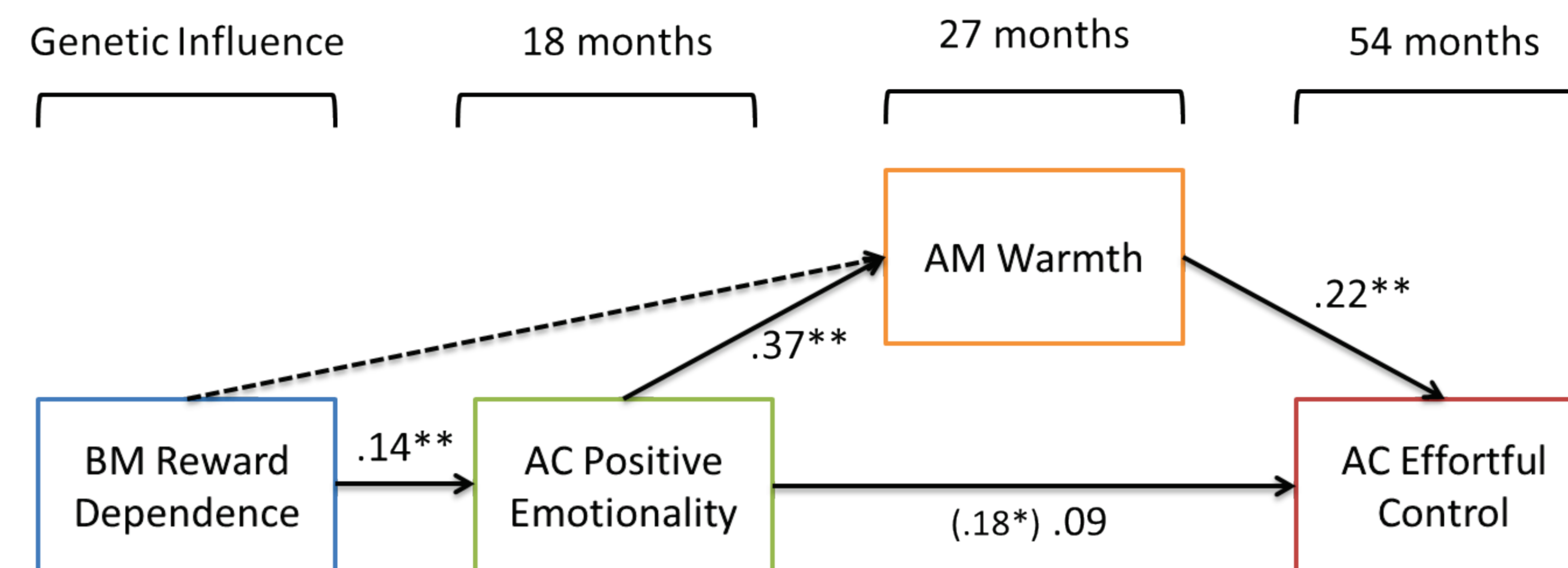
**Adopted Child Effortful Control (54 m)**

Children's Behavior Questionnaire<sup>16</sup>, effortful control  
Parent report ( $r=.52, p<.001$ )

Covariates: adoptive parents' age, adopted child gender, obstetric complications, adoption openness<sup>17,18</sup>

## Results

**Figure 1. Findings for adoptive mothers.**



**Figure 2. Findings for adoptive fathers.**

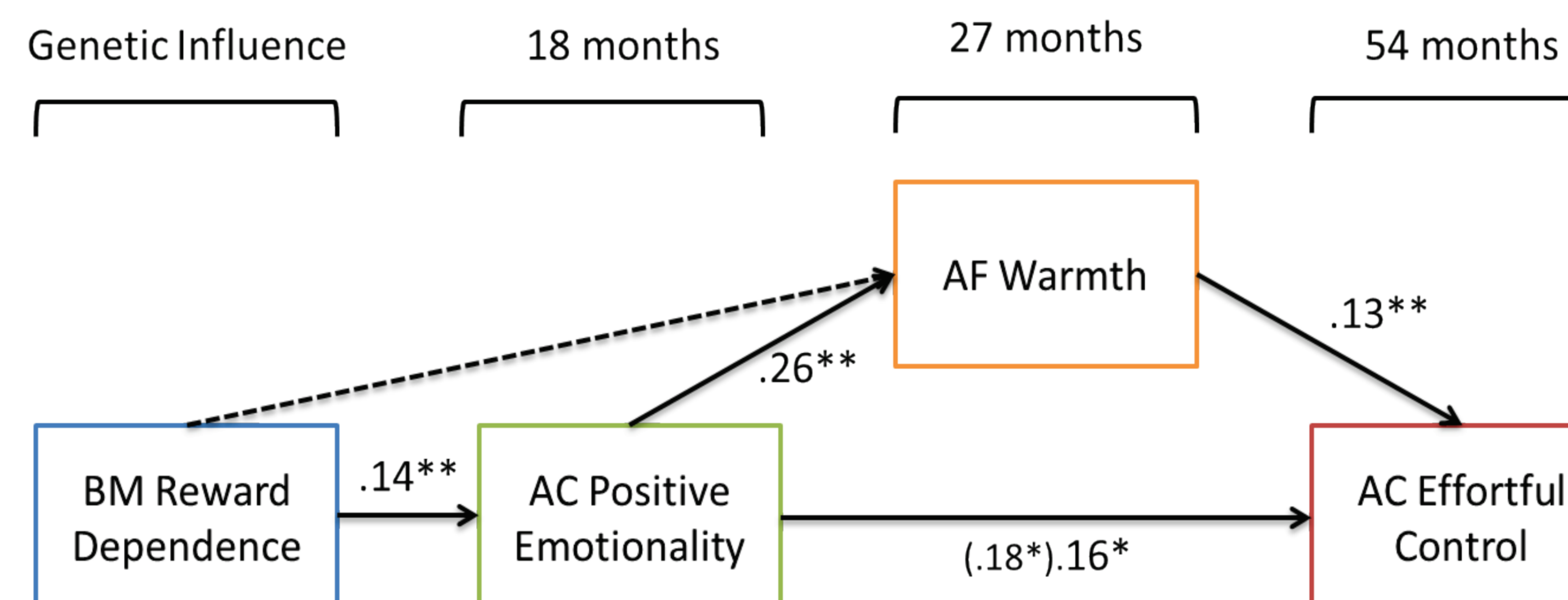


Figure notes: \* $p < .05$ , \*\* $p < .01$ , dashed lines represent non-significant paths. BM= birth mother, AC = adopted child, AM= adoptive mother, AF=adoptive father.



## Analyses

Little's MCAR test was used to test if data were not missing completely at random. MI in SAS was applied for data imputation. Structural Equation Models were conducted using Mplus (7th ed.). Models assessed both direct and indirect effects. Indirect effects were tested using the bootstrapping procedure (e.g., MODEL INDIRECT).

## Indirect Effects & Model Fit

Significant indirect effects of birth mother reward dependence on maternal warmth ( $\beta = .01, p < .05$ ) and paternal warmth ( $\beta = .01, p < .05$ ). Model fit was good for both models ( $\chi^2 p > .05, CFI > .90; SRMR < .1; RMSEA < .05$ ).



## Discussion

(1) Warm parenting of both mothers and fathers is important for effortful control over the course of early childhood.

(2) Evocative rGE was found for both maternal and paternal warmth. Positive emotionality of the child evokes more parental warmth predicting greater subsequent effortful control in early childhood.

## Grant Support

This project was supported by R01 HD042608, NICHD, NIDA, and OBSSR, NIH, U.S. PHS (PI Years 1–5: Reiss; PI Years 6–10: Leve), R01 DA020585 NIDA, NIMH, and OBSSR, NIH, U.S. PHS (PI: Neiderhiser), and R01 MH092118 NIMH, NIH, U.S. PHS (PI Neiderhiser, Leve). Many thanks to the birth and adoptive families who participated in this study. Yayouk conducted her master thesis research at Pennstate.

Yayouk Willems was granted the NWO Research Talent fund 2015, and is currently working as a PhD student at the VU in collaboration with prof. C. Finkenauer & prof. M. Bartels.

