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The Role of Child Negative Emotionality in Parenting and Child Adjustment: Gene-Environment Interplay

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Abstract

Background: Evocative gene-environment correlation (*r*GE) describes a process through which children's heritable characteristics influence their rearing environments. The current study examined if heritable influences on parenting and children's behavioral outcomes operate through child negative emotionality.

Method: Using data from the Early Growth and Development Study, we examined associations among adoptive parent reports of child anger and sadness at 4.5 years, adoptive parents' hostile and warm parenting at 6 years, and child behavioral problems and social competence at age 7. Birth parent temperament was included to test whether child effects on parents reflects evocative gene-environment correlation (*r*GE).

Results: Child anger at 4.5 years evoked hostile parenting from adoptive parents at 6 years, which was subsequently related to child problem behaviors at 7 years. Evocative *r*GE effects were identified for adoptive parents' hostile parenting.

Conclusions: By employing a genetically informed design, we found that birth parent temperament was related to child negative emotionality. Adoptive parents were sensitive to child negative emotionality and this sensitivity was linked to the child's later adjustment.

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Keywords

Evocative gene-environment correlation; parenting; child emotionality; child behavior problems

Both inherited and environmental factors influence parenting (e.g., Horwitz & Neiderhiser, 2015). However, few have considered how inherited influences on children's negative emotions impact their parents' interactions with their children, and in turn, children's outcomes. Even fewer have considered different types of child negative emotionality (e.g., sadness, anger), despite evidence that parents respond to sadness and anger differently (Cassano, Zeman, & Sanders, 2014; Snyder, Stoolmiller, Wilson, & Yamamoto, 2003). We examined if child anger and sadness were differentially related to parental hostility and warmth and whether these associations were explained by child heritable characteristics. To demonstrate the developmental significance of links between child emotionality and parenting, we included children's subsequent problem behaviors and social competence as distal outcomes.

Previous research on child behavior and parenting has focused on families with parents rearing their biological child(ren). However, parents and children share genes and environments; therefore, associations between children's behaviors and parenting could reflect environmental mechanisms or heritable processes (Scarr & McCartney, 1983; Shewark & Neiderhiser, 2019). Accordingly, research designs that separate heritable from environmental processes are crucial for advancing our understanding of the mechanisms through which children shape and are shaped by their rearing environments. We employed a parent-offspring adoption design in which adoptive parents, genetically unrelated to their children, provide the rearing environment only; and birth parents, genetically related to the child, do not provide the rearing environment (although birth mothers provide the prenatal environment). This design removes the confound of shared genes and affords the opportunity to assess the presence of evocative gene-environment correlation (*r*GE). Evocative *r*GE describes the process that children's heritable characteristics affect how their environments respond to them (Plomin, Loehlin, & DeFries, 1977; Scarr & McCartney, 1983). In a parent-offspring adoption design, birth parents' characteristics are used as indices of heritable predispositions, and *r*GE is present if birth parents' characteristics and adoptive parents' parenting are associated. Furthermore, we can examine the extent to which such associations are mediated by the adopted child's characteristics to understand the process of *r*GE.

Differential Relations Between Parenting and Children's Anger and Sadness

Much of the research examining associations between children's negative emotionality and parenting combine indices of child sadness and anger, even though they are often considered to be distinct dimensions of negative emotionality (Dougherty, 2006). There is also evidence that sadness and anger are differentially associated with child adjustment. Both sadness and anger during preschool have been related to poor social competence outcomes at kindergarten (Denham et al., 2003). However, whereas anger during early childhood is

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associated with externalizing problems during middle childhood (e.g., Chaplin, Cole, & Zahn-Waxler, 2005), and internalizing problems by age 10 (Suveg & Zeman, 2004), sadness during early to middle childhood is only associated with internalizing problems during early to mid-adolescence (Wang, Eisenberg, Valiente, & Spinrad, 2016).

Furthermore, children's anger and sadness elicit different responses from parents. During early to middle childhood, parents respond to sadness with more supportive strategies (Cassano et al., 2014) and to anger with more unsupportive behaviors (e.g., frustration, anger; Oliver, 2015; Snyder et al., 2003). Why might parents respond to sadness and anger differently? Anger and sadness serve distinct communicative functions in families. For instance, sadness signals to others the need for care, whereas anger could signal to others to stay away (e.g., Lench, Bench, Darbor, & Moore, 2014). Thus, we examined the unique contributions of child emotion and hypothesized that child sadness would evoke more warmth from parents, whereas anger would evoke more hostility from parents.

Current Study

The current study examines the role of evocative *r*GE processes in associations between child characteristics and parenting. Such processes are frequently overlooked (Scarr & McCartey, 1983; Wakschlag et al., 2018). Research finds that children's heritable characteristics can affect parenting behaviors (e.g., Avinun & Knafo, 2014; Hajal et al., 2015). This study seeks to understand the process through which this occurs, and the implications for subsequent child outcomes. To accomplish these objectives, we tested a model that examined: (a) associations between children's heritable predispositions and children sadness and anger; (b) if children's anger and sadness proneness would mediate associations between children's heritable predispositions and parenting (evocative *r*GE); and (c) the degree to which early childhood anger and sadness, and parenting were related to later child outcomes.

In our conceptual model (Figure 1), birth parent (BP) emotion dysregulation and behavioral activation were used as indices of children's heritable tendencies towards negative emotionality. Emotion dysregulation, defined as a tendency to express heightened frustration and fear vs. emotion regulation, is moderately to highly heritable (Tackett et al., 2013). Consequently, we hypothesized that BP emotion dysregulation would be positively associated with child anger and sadness. Behavioral activation, which reflects sensitivity to external rewards, is also moderately heritable (Ankohin, Golosheykin, Grant, & Heath, 2009). During adulthood, heightened behavioral activation sensitivity is associated with more anger (Harmon-Jones, 2003), whereas lower levels are associated with higher incidences of sadness (Carver & Scheier, 2013). Therefore, we hypothesized that BP behavioral activation would be inversely associated with child sadness, and positively associated with child anger.

Last, numerous studies suggest the development of children's externalizing (e.g., Hicks et al., 2004; Wakschlag et al., 2018) and internalizing (Kendler, Myers, Maes, & Keyes, 2011) problems and social competency (Van Ryzin et al., 2015) is, in part, due to heritable mechanisms. These findings point to the importance of considering the contributions

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of environmental and heritable factors. Yet, without examining key predictors, such as children's negative emotions and parents' harsh and warm responses, it is difficult to tease apart the mechanisms by which children's later problem behaviors develop. Thus, we hypothesized that child anger and sadness would be associated with long term outcomes (social competence and problem behaviors) via their effects on both mothers' and fathers' hostile and warm parenting, independent of heritable effects.

Method

Participants

The Early Growth and Development Study (EGDS; Leve et al., 2019) includes 561 adopted children from two cohorts and their linked adoptive parents (APs; 549 adoptive fathers (AF) and 565 adoptive mothers (AM); including 41 same-sex parent families), birth mothers (BM; $n = 556$), and birth fathers (BF; $n = 210$) followed from infancy to early adolescence. Adoptive parent 1 was most often adoptive mother (96.6%) and adoptive parent 2 was most often adoptive father (95.8%), therefore we use adoptive mother and father terms throughout the manuscript to refer to these groups. About half of the children (57.2% male) were Caucasian (55.3%) with 19.6% multi-racial, 13.2% African American, 10.9% Latino, and the remaining 1% included Asian, American Indian, Pacific Islander, or did not report. The mean age of the child at placement in the adoptive home was 5.58 days ($SD = 11.32$; range = 0 – 91 days). APs were generally Caucasian (Mothers = 91.8%; Fathers = 90.4%), were well-educated (Mothers = 79.1% earned a four year degree; Fathers = 73.6 % earned a four year degree), had a median income of $100,000 or more, and were in their mid to late thirties at the time of birth (Mothers: $M = 37.42$ years, $SD = 5.59$ years; Fathers: $M = 38.30$ years, $SD = 5.83$ years). Birth parents (BPs) were also mainly Caucasian (Mothers = 70.1%; Fathers = 69.9%), but completed less education (Mothers: 46.8% earned a high school degree and 38.9% continued their education; Fathers: 59.1% earned a high school degree and 28.3% continued their education), had a median income between $25,001 and $40,000, and were younger than the APs (Mothers: $M = 24.35$ years, $SD = 6.03$ years; Fathers: $M = 26.10$ years, $SD = 7.78$ years). Informed consent was obtained from all participants, and assent was obtained from children at age 7. The institutional review boards at all participating universities responsible for recruitment and assessment approved this study.

Measures

Child Emotionality.—Child anger and sadness were assessed at age 4.5 years via the CBQ Standard Form (Rothbart, Ahadi, Hershey, & Fisher, 2001) for Cohort I, and the CBQ-Very Short Form (CBQ-VSF; Putnam & Rothbart, 2006) for Cohort II. To create an equivalent assessment for both cohorts, we identified 5 items shared by both versions of the CBQ: 2 from the anger scale and 3 from the sadness scale. The resulting anger and sadness subscales demonstrated adequate internal reliability across cohorts (anger: $\alpha = .62$; sadness: $\alpha = .58$). For Cohort I, the reduced subscales were correlated with the full subscales from the Standard Form (anger: $r = .80$; sadness: $r = .77$), supporting their validity. Adoptive mothers' and fathers' reports were correlated (anger: $r = .36$; sadness: $r = .33$), so we used

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their averaged ratings in analyses. The items included in these composites are listed in Table S1 of the online Supporting Information.

Child Behavior Problems.—We used the Child Behavior Checklist raw scores (CBCL; Achenbach, 1978) to assess children's externalizing and internalizing problems at 7 years old. APs completed 99 items on a scale ranging from 0 (*not true)* to 2 (*very true or often true).* AMs' (internalizing: α = .80; externalizing: α = .89) and AFs' (internalizing: α = .82; externalizing: α = .88) reports on internalizing (r = .48) and externalizing (r = .61) problems were correlated, and averaged to create composites.

Child Social Competence.—Children's social competence was assessed using the Peer Involvement and Social Skills questionnaire (Walker, Mcconnell, & Lewis, 1991) at 7 years. AMs (α = .92) and AFs (α = .94) completed this 17-item questionnaire on a 5-point Likert scale ranging from 1 (*never*) to 5 (*frequently*). Parents' reports were correlated (r = .53) and averaged to create a single composite.

AP Parenting.—AP hostility and warmth were assessed using the Iowa Family Interaction Rating Scales at 6 years (IFIRS; Melby & Conger, 2001; Melby et al., 1990). This questionnaire was designed to measure behavioral and emotional characteristics using a 7-point scale ranging from 1 (*never*) to 7 (*always*). The hostility subscale (AM: α = .76; AF α =.72) consisted of 5 items and the warmth scale (AM: α = .87; AF α =.87) consisted of 6 items.

BP Temperament.—We developed latent temperament factors for BMs and BFs to estimate heritable influences on children's emotionality. The measures, percentage of missingness, missing data strategies, and results of the factor analyses are detailed in the Supporting Information (see Tables S2–S5 and Figure S1). We used the emotion dysregulation and behavioral activation factors. For emotion dysregulation, higher scores were associated with higher levels of frustration and fear and lower scores indicated higher levels of activation and attentional control. Higher scores on the behavioral activation factor were indicative of higher reward responsiveness, higher levels of fun seeking behaviors, and drive. The factor solution was constrained to be equal across BMs and BFs to test for invariance. The fit was acceptable (χ^2 (276) = 446.89, CFI = .90, RMSEA = .03, SRMR = .08), demonstrating the temperament constructs were the same across BMs and BFs. In the subsequent analyses, BM and BF factor scores were used and paths were constrained to be equal to provide a single estimate for each BP temperament factor.

Statistical Analysis Approach

We used structural equation modeling (SEM) using Mplus 7 (Muthén & Muthén, 1998–2012) to test our hypotheses. This approach can test relations between observed and latent constructs simultaneously, while accounting for covariate associations (Kline, 2011). Along with direct effects, we specified a mediation model, using the MODEL INDIRECT command, to test the indirect effects of BP temperament through child negative emotionality on AP parenting and later problem behaviors. Mplus calculates indirect effects by multiplying the direct effects. For instance, if we test the effect of X on Z via Y, Mplus

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multiples X's direct effect on Y and Y's direct effect on Z. To evaluate model fit, we examined the following fit indices and their recommended cutoffs (Kline, 2011; West, Taylor, & Wu, 2012): χ^2 (p>.05), RMSEA (<.07), CFI (>.90), and SRMR (<.08).

Results

Descriptive and correlational results using raw data are presented in Tables 1 and 2. The estimated model exhibited excellent fit with the data (χ^2 (18) = 17.73 p = .474, RMSEA = .00, CFI =1.00, SRMR = .02) with results presented in Figure 2.

Covariates

The following covariates were tested on all child constructs: openness of the adoption, child sex, child ethnicity, and obstetric complications (Leve et al., 2019). For AP constructs, the child covariates as well as AP education, income, ethnicity, and age at assessment were tested. For BPs, we tested ethnicity, income, openness of the adoption, and obstetric complications. Significantly related covariates were regressed out of the study constructs and standardized z-scores were used. Please see pages 1 and 2 of the Supporting Information (Appendix S1) for additional information regarding the covariates.

Missing data

Missing data percentages are presented in Table 1. BPs missing data percentages are presented in the Supporting Information (see Tables S2 and S3). Because of the wide range of missingness and estimation of several indirect effects, we used FIML with auxiliary variables to estimate missing data (Lang & Little, 2018). Please see pages 1 and 2 of the Supporting Information (Appendix S1) for additional information regarding missing data.

Evocative *r*GE on APs' Hostility and Warmth

Results showed that BPs' higher levels of emotion dysregulation were related to lower child sadness at age 4.5 years and AF hostility at 6 years, but not to child anger at 4.5 years, AM hostility, or AP warmth at age 6 years. Higher levels of BP behavioral activation were related to higher levels of child sadness and anger at 4.5 years, but not to AP hostility and warmth.

Child anger was positively associated with AM and AF hostility, but not warmth. To clarify if this was an evocative *r*GE effect, we examined if child anger mediated associations between BP behavioral activation and AP hostility. We found that higher BP behavioral activation was associated with higher child anger, and this anger elicited hostile responses from children's AMs (indirect effect β = .02, SE =.01, p = .034) and AFs (indirect effect β = .02, SE =.01, p = .016). However, child sadness was not associated with APs' hostility or warmth. Last, there was a positive path from BP emotion dysregulation to AF hostility, indicating evocative *r*GE.

Children's Behavioral and Social Outcomes

Higher levels of child anger were associated with externalizing problems at 7 years; however, child anger was not associated with social competence or internalizing problems.

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Higher levels of child sadness were associated with child internalizing problems, but not with social competence or externalizing problems. Whereas higher levels of AF hostility were associated with higher child externalizing and internalizing problems and less social competence, higher levels of AM hostility were only associated with higher child externalizing problems. Only AM warmth was associated with social competence, and neither AM or AF warmth was associated with child externalizing or internalizing problems. Last, BP emotion dysregulation was negatively associated with children's social competence.

There were significant indirect effects from child anger to externalizing problems via AM and AF hostility (AM: indirect effect $\beta = .07$, SE = .02, $p = .005$; AF: indirect effect $\beta = .06$, SE = .02, $p = .005$), such that higher child anger was associated with hostile responses from AMs and AFs, which in turn, were related to more externalizing problems a year later. There were additional indirect effects of anger on child outcomes via AF hostility: higher child anger was associated with AF hostility, which in turn was linked to less social competence (indirect effect: $\beta = -0.05$, $SE = 0.02$, $p = .011$) a year later. When considering potential evocative *r*GE effects on child outcomes, we found effects of higher BP behavioral activation being related to higher child anger, which in turn evoked hostility from parents and was related to higher externalizing behaviors (AMs: $\beta = .01$, SE = .00, $p = .047$; AFs: $\beta = .01$, SE=.00, $p = .047$). In addition, there was a significant indirect effect from BP emotion dysregulation to child externalizing problems (indirect effect $\beta = .02$, SE = .01, $p = .035$), and an effect of BP emotion dysregulation on social competence (indirect effect $\beta = -.02$, SE = .01, $p = .048$) through AF hostility. Last, the indirect effect from BP behavioral activation on externalizing problems via child anger was significant (indirect effect: $\beta = .02$, SE = .01, $p = .021$).

Discussion

We sought to examine the unique effects of anger and sadness on parental hostility and warmth, and whether observed associations are explained by evocative *r*GE. In addition, to demonstrate the developmental significance of links between child emotionality and parenting and *r*GE, we included children's problem behaviors and social competencies as distal outcomes.

Our hypothesis that BP temperament would be associated with child anger and sadness was partially supported. This is consistent with prior work (Tackett et al., 2013). First, child sadness was negatively associated with BPs' emotion dysregulation. Though this was not the hypothesized direction, we speculate that children who have higher self-control and lower frustration and fear may be overly inhibited, leading to more internalized sadness (Block & Block, 1980; Huey & Weisz, 1997; Robins, John, Caspi, Moffitt, & Stouthamer-Loeber, 1996). Second, BP behavioral activation was positively related to child anger and sadness, suggesting the heritable predisposition may be expressed as greater anger and sadness during early childhood. Though this was not the hypothesized direction for sadness, it could be that children with a predisposition for high behavioral activation experience more sadness when anticipated goals were blocked (Leventhal, 2008).

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Our results support child-driven effects on AP hostility; higher levels of child anger were associated with higher levels of AP hostility. This is consistent with previous work (Snyder et al., 2003; Oliver, 2015) and further evidence of the coercive cycle in the parent-child dyad in early to middle childhood (Patterson, 2016). We found that this child-driven effect was partially explained by evocative *r*GE, consistent with previous work (e.g., Hajal et al., 2015; Ganiban, Ulbricht, Saudino, Reiss, & Neiderhiser, 2011). BP behavioral activation was related to AM and AF hostility, via child anger, in addition, BP emotion dysregulation was positively related to AF hostility. These findings highlight children's genetically influenced characteristics as an important consideration when attempting to understand parents' hostile responses.

In contrast, neither child anger nor sadness were significantly associated with AP warmth. There are mixed findings in the literature for evocative *r*GE effects on positive parenting (Avinun & Knafo, 2014; Klahr, Thomas, Hopwood, Klump, & Burt, 2013), which might indicate a subset of positive parenting behaviors are sensitive to children's heritable characteristics. For example, evocative effects may be present for specific positive parenting behaviors such as comforting or scaffolding in response to children's anger or sadness, but not for overall parental warmth.

In addition, we investigated the potential role of AP perceptions of their child's sadness and anger in evoking parent hostility and warmth by fitting separate post hoc exploratory mother-report and father-report models. These additional analyses, presented and discussed in the Supporting Information (Figures S2 and S3), showed minimal differences (confirmed with an invariance test) in AM and AF hostility in response to parent specific reporting of children's negative emotions. The differences centered around child effects on AM and AF warmth.

The current study supports previous work by demonstrating that not only is parenting important for child adjustment outcomes, but that evocative *r*GE mechanisms are one potential pathway through which parenting impacts child adjustment outcomes. Specifically, we found that AM and AF hostility at age 6 were uniquely positively associated with child externalizing behavior at age 7 years. Moreover, we found evocative *r*GE effects on AP hostility, such that AM and AF hostility partially mediated the influences of child anger and BP behavioral activation on externalizing behavior. In addition, AF hostility mediated the association between BP emotion dysregulation and child externalizing behaviors and social competence. These findings highlight the importance of *both* evocative *r*GE and parenting for the development of externalizing behaviors during middle childhood. AM warmth at age 6 was positively associated with social competence at age 7, whereas AF hostility was negatively related to social competence and positively related to internalizing behavior. In these instances, there was limited evidence of *r*GE. However, they re-affirm the impact of parenting on children's socioemotional outcomes.

Finally, children's characteristics were associated with outcomes independent of parenting. Specifically, child anger was directly related to externalizing behavior, whereas child sadness was directly related to internalizing behavior. Also, higher BP emotion dysregulation was associated with lower levels of child social competence. These findings

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indicate the importance of considering children's own characteristics when assessing their outcomes, in this way, we are better able to understand the impacts of their environment and the potential mechanisms by which the environment impacts children's adjustment outcomes.

Limitations and Conclusions

This study had some limitations. First, our AP sample is majority Caucasian and middle class or higher SES, which could influence the generalizability of these results. Second, there is the potential for a shared method bias as APs reported both on their own parenting and on children's negative emotionality and adjustment outcomes. However, we attempted to account for this by averaging AP reports for child negative emotionality and adjustment outcomes. Third, our sample was low on externalizing and internalizing problems, although we did have a range of problem behaviors (Table 1). Last, heritable characteristics are estimated using the phenotypes of the biological parents within the adoption design. Because the birth parent phenotypes are likely influenced by genetic and environmental factors, they are not "pure" indicators of heritable risk. The lack of a "pure" indicator of heritable risk in this adoption design could lead to an underestimation of genetic effects on children's temperament and reporting of modest effects (Maccoby, 2000).

In conclusion, our study shows parents play an important role in precursors to externalizing problems, and that father's hostility was additionally related to internalizing problems and social competence. Furthermore, this study demonstrates the roles that children's heritable characteristics and anger play in their parents' hostile responses and underscores how these responses in turn may increase risk for poor adjustment outcomes. Future research should examine these findings in higher risk families, where there might be more negative emotions expressed and more stressors on parenting that could contribute to parents' hostile responses. In addition, future examinations investigating the bidirectional associations between parents' parenting and their children's negative emotions in a genetically informed design could be informative about the role of child heritable characteristics in their interactions with their parents. Lastly, future research should consider the role of parental perceptions of children's emotions when testing for evocative *r*GE. In the current examination, we explored these differences in the Supporting Information (Figures S3 and S4), but did not have the power to quantitively compare perception differences within the reported model. Overall, assessing both paternal- and maternal-child behavior is useful when examining mechanisms by which children might influence their parents, and associations with later adjustment outcomes.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. The authors have declared that they have no competing or potential conflicts of interest.

Abbreviations:

AP	Adoptive Parent
AM	Adoptive Mother
AF	Adoptive Father
BP	Birth Parent
BM	Birth Mother
BF	Birth Father
EGDS	Early Growth and Development Study

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Key points

- Structural equation modeling results showed child anger at 4.5 years evoked hostile parenting from both adoptive parents at child age 6 years and was subsequently related to child problem behaviors at 7 years.
- Evocative *r*GE effects were identified for adoptive parents' hostile parenting via child anger.
- The results highlight the importance of a longitudinal approach in understanding how heritable characteristics, child emotionality, and parents, impact children's later problem behaviors and social competencies.
- These findings are useful to help prevention and intervention efforts target the precursors to poor adjustment outcomes during middle childhood.

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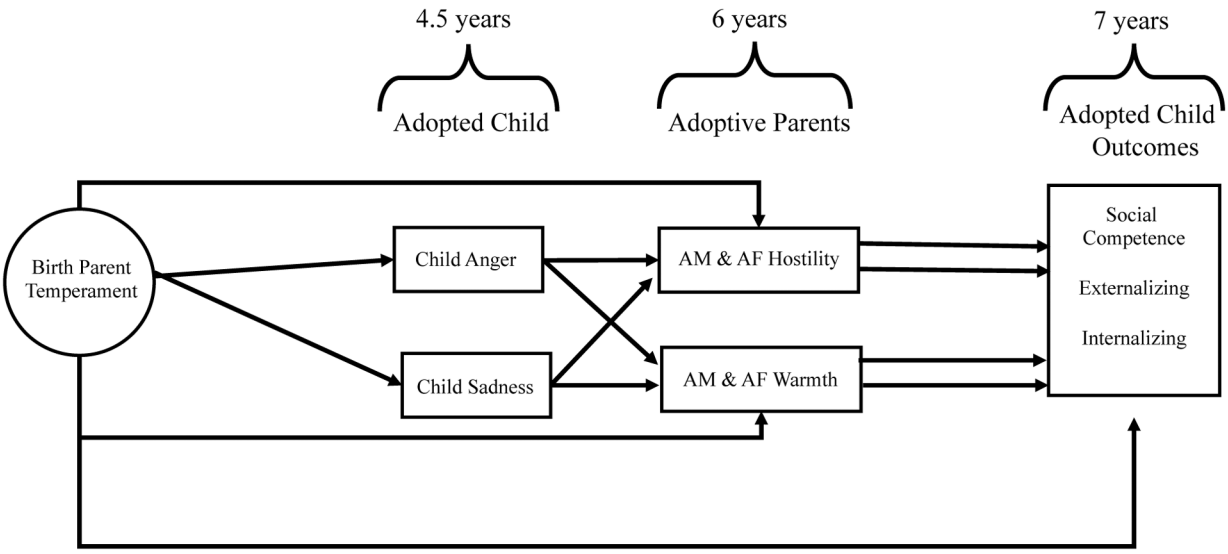

Figure 1.
Full model
Note. Within time correlations are not presented in this conceptual figure but are included in the statistical model. AM = adoptive mother, AF = adoptive father.

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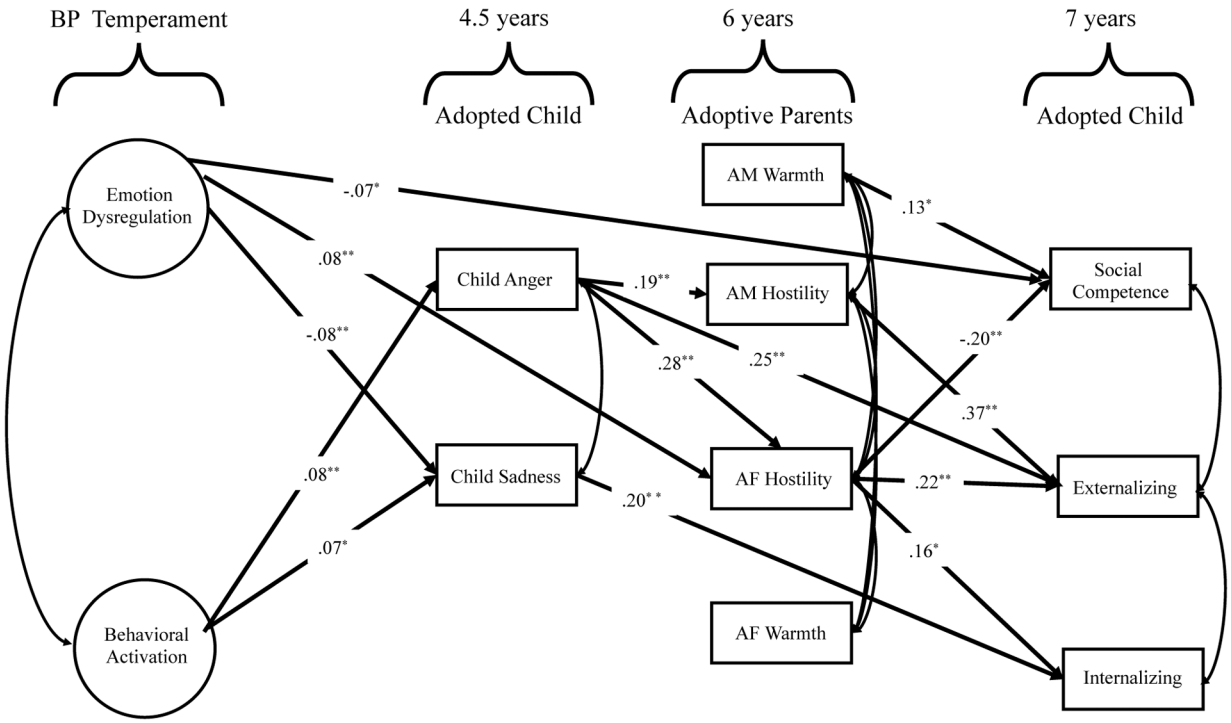

Figure 2.

Child evocative effects results

Note. Standardized values are presented. Non-significant paths are not included to assist with readability but were included in the statistical model. AM = adoptive mother, AF = adoptive father, BP = birth parent. * $p < .050$. ** $p < .010$. Number of same sex couples: Female/Female = 23; Male/Male = 18.

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Table 1.

Descriptive information

Construct	Mean	Std	Range	N	Missing Data
BM Emotion Dysregulation Factor Score	.01	.82	−2.47 −2.65	561	--
BF Emotion Dysregulation Factor Score	−.00	.52	−2.20 – 1.81	561	--
BM Behavioral Activation Factor Score	−.00	.81	−2.01 −2.23	561	--
BF Behavioral Activation Factor Score	−.00	.57	−1.92–2.51	561	--
AM Hostility	10.92	3.02	5 – 21	393	29.9%
AF Hostility	10.71	3.18	5 – 23	355	36.7%
AM Warmth	38.84	3.34	24 – 42	393	29.9%
AF Warmth	37.77	3.73	21 – 42	355	36.7%
Child Anger	4.78	.93	1.75 – 6.75	457	18.5%
Child Sadness	4.07	.88	1.50 – 6.17	457	18.5%
Child Internalizing	4.27	3.87	0 – 24	413	26.4%
Child Externalizing	7.07	5.65	0– 36.50	413	26.4%
Child Social Competence	71.69	9.24	35.32 – 85.00	320	43.0%

Note. AM = adoptive mother, AF = adoptive father, BM = birth mother, BF = birth father. Factor scores for BM and BF are standardized estimates and therefore have means close to zero. Missing data on factor scores is not provided because FIML was used in their creation. See Supporting Information for more information on birth parent measures.

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Table. 2

Correlations

Construct	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. AM Hostility	1												
2. AF Hostility	.23**	1											
3. AM Warmth	−.28**	−.13*	1										
4. AF Warmth	−.08	−.31**	.30**	1									
5. Child Anger	.16**	.30**	−.13*	−.10	1								
6. Child Sadness	.11*	.17**	−.15**	−.07	.44**	1							
7. Child Internalizing	.18**	.28**	−.12*	−.15*	.23**	.23**	1						
8. Child Externalizing	.39**	.41**	−.25**	−.25**	.35**	.18**	.53**	1					
9. Child Social Competence	−.15*	−.31**	.16**	.24**	−.15**	−.04	−.32**	−.33**	1				
10. BM Emotion Dysregulation	−.02	.13*	.09	−.00	.02	−.08	.12*	.17**	−.08	1			
11. BM Behavioral Activation	.05	.06	.01	−.07	.14**	.10*	.06	−.01	−.01	−.09*	1		
12. BF Emotion Dysregulation	−.02	.10	.02	−.04	.01	−.07	−.02	.01	−.11	.33**	.19**	1	
13. BF Behavioral Activation	.03	.02	.02	−.04	.08	.06	.02	.02	.03	.27**	.35**	.20**	1

Note. AM = adoptive mother, AF = adoptive father, BM = birth mother, BF = birth father.

* $p < .05$.

** $p < .01$.