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Birth and adoptive parent antisocial behavior and parenting: A study of evocative gene-environment correlation

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Abstract

Negative parenting is shaped by the genetically-influenced characteristics of children (via evocative rGE) and by parental antisocial behavior, however, it is unclear how these factors jointly impact parenting. The current study examined the effects of birth parent and adoptive parent antisocial behavior on negative parenting. Participants included 546 families within a prospective adoption study. Adoptive parent antisocial behavior emerged as a small but significant predictor of negative parenting at 18 months and of change in parenting from 18 to 27 months. Birth parent antisocial behavior predicted change in adoptive father's (but not mother's) parenting over time. These findings highlight the role of parent characteristics and suggest that evocative rGE effects on parenting may be small in magnitude in early childhood.

Keywords

Adoption study; Parenting; Antisocial behavior; Evocative rGE; Gene-environment correlation

Negative parenting, which includes verbal criticism, rejection, and harsh discipline, is strongly linked with externalizing problems in children and youth (Deater-Deckard & Dodge, 1997; Dishion, Patterson, Stoolmiller, & Skinner, 1991; Hovee et al., 2009; Kerr, Lopez, Olson, & Sameroff, 2004; Patterson & Fisher, 2002), beginning in early childhood (Campbell, Pierce, Moore, Marakovitz, & Newby, 1996; Shaw et al., 1998; Shaw, Gilliom, Ingoldsby, & Nagin, 2003; Shaw, Keenan, & Vondra, 1994). For example, toddler and preschool-aged boys who exhibit high levels of early hyperactivity and aggression and who experience high levels of negative parenting are most likely to demonstrate behavior problems at school entry (Campbell, Shaw, & Gilliom, 2000). Negative parenting in early childhood is therefore an important target for prevention and intervention efforts aimed at

improving child mental health outcomes. However, the etiology of negative parenting in early childhood is not fully understood.

Negative parenting is a complex process that is influenced by individual characteristics of parents along with contextual factors (Belsky & Jaffee, 2006; Belsky, 1984). Prior research has also highlighted the role of child-driven effects on parenting (Bell, 1968) and of bi-directional effects between parents and children (Hipwell et al., 2008; Larsson, Viding, Rijdsdijk, & Plomin, 2008; Pardini, Fite, & Burke, 2008). Child-driven effects on parenting may function via evocative *r*GE (i.e., children evoke reactions from others that are consistent with their genetic predispositions; Plomin, DeFries, & Loehlin, 1977; Scarr & McCartney, 1983). Summarizing the genetically-informed work on parenting, a recent meta-analysis found that child-driven genetic influences account for a moderate proportion of the variance (approximately 40%) in negative parenting, with shared and non-shared environmental influences accounting for 27% and 32% of the variance, respectively (Klahr & Burt, 2014). The meta-analysis also revealed sex-differences, such that mothers were more influenced by evocative *r*GE while fathers were more influenced by the shared environment (which includes the role of parent characteristics). However, most studies included in the meta-analysis focused on middle childhood and adolescence, with a smaller number examining parenting in early childhood.

Two twin studies in smaller samples have found that parenting in early childhood is primarily influenced by the shared environment, with no evidence for evocative *r*GE effects (Cohen, Dibble, & Grawe, 1977, $N = 366$, parent-reports of parenting; Roisman & Fraley, 2008, $N = 312$, observer ratings of parenting). However, two larger studies have identified evocative effects. In the Quebec Twin Newborn study ($N = 475$), evocative genetic effects accounted for 31% of the variance in maternal hostility at 5 months of age (with shared environment accounting for 53% and non-shared environment accounting for 16% of the variance, using parent-reports of parenting; Boivin et al., 2005). Knafo and Plomin also found evidence for evocative *r*GE effects on negative parenting (in both mothers and fathers) in a large sample of 3 and 4 year old children (58% and 53% of the variance for 3 and 4 year old children, respectively, $N = 4,680$, parent-reports of parenting; Knafo & Plomin, 2006).

Adoption studies are a useful tool for identifying evocative *r*GE effects on parenting. In a landmark study, Ge and colleagues found that psychiatric disorders in the biological parents of adopted youth were associated with adoptive parents' negative behaviors toward their adolescent children (Ge et al., 1996). Other work replicated these results in a sample of 7–12 year old adopted children (O'Connor, Deater-Deckard, Fulker, Rutter, & Plomin, 1998). In a recent study using the current sample, birth mother personality was associated with harsh parenting when children were 9 months of age, but only for adoptive fathers and not adoptive mothers (Hajal et al., 2015). Finally, another recent study in the current sample found that birth mother externalizing problems were associated with negative reactions from adoptive mothers during infancy, but only when the adoptive parents reported having marital problems (Fearon et al., 2014). In sum, although there is compelling evidence of evocative *r*GE effects on negative parenting in middle childhood and adolescence, fewer studies have examined these effects in early childhood and results have been somewhat mixed across studies, with differences for mothers vs. fathers and evidence for moderation effects.

In addition to child-driven effects, parent characteristics such as personality and psychopathology also have been linked to negative parenting (Belsky, 1984; Lovejoy, Graczyk, O'Hare, & Neuman, 2000; Prinzie, Stams, Dekovi, Reijntjes, & Belsky, 2009), including parental antisocial behavior. For instance, in a large nationally representative study, Kim-Cohen and colleagues found that mothers with a history of antisocial behavior exhibited higher levels of hostility toward their school-aged children and were more likely to physically maltreat them (Kim-Cohen, Caspi, Rutter, Tomás, & Moffitt, 2006). The effects of parental antisocial behavior on parenting also have been found in early childhood. For example, a prospective longitudinal study found that mothers and fathers with significant conduct problems during adolescence were more likely to use harsh, coercive discipline on their 4 year old children, even after controlling for intelligence, social background, and education (Byford, Abbott, Maughan, Kuh, & Richards, 2014). Similarly, mothers who report past or current antisocial behavior are more likely to behave in a hostile manner toward their infants (Bosquet & Egeland, 2000) and to demonstrate higher levels of harsh discipline toward preschool-aged children (Jaffee, Belsky, Harrington, Caspi, & Moffitt, 2006). Prior research in the current sample also found a link between adoptive parent antisocial personality traits, marital hostility, and hostile parenting during early childhood (Stover et al., 2012). Taken together, these studies provide strong support for the role of parental antisocial behavior in negative parenting during early childhood.

Critically, however, most existing research examining the relationship between parental antisocial behavior and parenting has relied upon biological family members, typically failing to control for the fact that biological parents not only parent their children but also share genes with them. These shared genes may be correlated with both parenting and child outcomes (i.e., passive *rGE*; see Harold et al., 2013 for further discussion of testing passive *rGE* effects in the current sample). It is thus unclear whether the aforementioned associations between parental antisocial behavior and parenting reflect direct associations or whether they are mediated by children's genetic risk for those same behaviors (i.e., parents may be primarily responding to their children's genetically-influenced antisocial behaviors). The possible role of children's genetic risk is particularly important to consider based on the aforementioned evidence for evocative *rGE* effects on negative parenting. In addition, it is unclear how parent characteristics and child genetic risk for antisocial behavior might *interactively* impact parenting. Evocative *rGE* effects on parenting may be accentuated or suppressed depending on the characteristics of the parent. For example, parents with high levels of antisocial behavior may be more reactive to their child's genetically-influenced disruptive behaviors than parents with low levels of antisocial behavior. Such effects would be considered an example of moderated *rGE* (Ganiban, Ulbricht, Saudino, Reiss, & Neiderhiser, 2011; Ulbricht et al., 2013).

An adoption study provides the ideal framework from which to examine the joint effects of parental antisocial behavior and evocative *rGE* on parenting behavior. Because adopted children are genetically unrelated to their adoptive parents, it is possible to examine the unique contributions of evocative *rGE* and adoptive parent antisocial behavior as well as their interaction. Despite this advantage, few studies to date have examined the effects of parental antisocial behavior on parenting while simultaneously considering genetic confounds of this association. Although previous studies within this sample have examined

evocative rGE effects on parenting in early childhood (Hajal et al., 2015, Fearon et al., 2014), this is the first study to examine the joint roles of birth parent antisocial behavior and adoptive parent antisocial behavior in the etiology of negative parenting behavior during toddlerhood. Because the etiology of negative parenting differs across mothers and fathers (Klahr & Burt, 2014) and early childhood work suggests differences for mothers vs. fathers in evocative rGE effects (Hajal et al., 2015), we also examined potential sex differences. We expected to find an association between adoptive parent antisocial behavior and negative parenting (Byford et al., 2014; Kim-Cohen et al., 2006). However, given the mixed findings in early childhood (Knafo & Plomin, 2006; Roisman & Fraley, 2008), we had few a priori expectations about evocative rGE effects on parenting or about the potential moderation of evocative rGE effects by adoptive parent antisocial behavior.

Method

Participants

Participants included 561 linked triads of participants (adoptive parents, adopted child, and birth parent[s]) who participated in the Early Growth and Development Study (EGDS), an on-going, longitudinal, multisite study ($N = 546$ for the current study, due to missing data). EGDS consists of two cohorts, both of which were included in the current study. Families were recruited from 45 adoption agencies in 15 states between 2003 and 2010. Recruitment sites were located in the Mid-Atlantic, West/Southwest, Mid-West, and Pacific Northwest regions of the United States and adoption agencies included public, private, religious, and secular agencies along with agencies favoring open and closed adoptions. All children in the study were placed by 3 months postpartum ($M = 6.2$ days, $SD = 12.45$; range = 0–91 days) within a non-relative family. There is no evidence for systemic placement biases in the sample (Leve et al., 2013). No children had known major medical conditions or extensive medical surgeries. Birth parents were assessed in-person at approximately 4 months and 18 months postpartum. The current study includes adoptive family assessments from when the children were 18 months and 27 months old and birth parent assessments at 4 months. 42.8% of the children were female. 55.6% of the adopted children were Caucasian, 13% were African American, 10.9% were Hispanic or Latino, and 19.3% were more than one race. Adoptive parents (Age at child's birth: Mothers: $M = 37.76$, $SD = 5.49$; Fathers: $M = 38.41$, $SD = 5.85$) were primarily Caucasian (91.8% and 90.4% for mothers and fathers, respectively), upper-middle class (Median household income = \$119k), college educated, and married (91.1%). Data were available for 541 birth mothers and 204 birth fathers (Age at child's birth: Mothers: $M = 24.17$, $SD = 5.90$; Fathers: $M = 25.65$, $SD = 7.27$; Mean educational level = completed trade school, Median annual income = \$14k for mothers and \$21k for fathers). The EGDS sample includes 49 families in which the adoptive parents are of the same sex (2-mother families $n = 18$; 2-father families $n = 31$). These families were retained for all analyses. Additional information about study recruitment, sample, and assessment measures is presented elsewhere (Leve et al., 2013).

Measures

Birth Parent Antisocial Behavior—To estimate the children's genetic risk for antisocial behavior, we used birth parent self-reports of delinquency and DSM-IV symptom counts of

conduct disorder (CD) and antisocial personality disorder (ASPD) to create a composite risk score. Birth parent delinquency was measured using the Index of Minor Offenses scale from the 38-item Elliot Social Behavior Questionnaire (Elliott, Ageton, & Huizinga, 1982), assessed when infants were 18 months old, which assesses respondent's engagement in delinquent behaviors including destruction of property, fire setting, and theft. Items were summed to create a delinquency score (BM: $\alpha = .88$; BF: $\alpha = .91$). Birth parents were also interviewed using the Diagnostic Interview Schedule (L. N. Robins, Helzer, Croughan, & Ratcliff, 1981) to assess DSM-IV symptoms of CD and ASPD when infants were 18 months old.

The three indicators of birth parent antisocial behavior (i.e., delinquency, CD, and ASPD) were significantly correlated for birth mothers and fathers (BM: $r = .19-.22$, $p < .01$; BF: $r = .28-.39$, $p < .01$) and loaded on a one-factor solution (BM: $.68$, $.70$, and $.68$ for CD, ASPD, and delinquency, respectively; BF: $.68$, $.79$, and $.74$). To index overall birth parent antisocial behavior, we created an average of both birth mother and birth father antisocial behavior when data were available from both parents ($r = .16$). If data were available for only one parent, that parent's data were used. Scale scores were standardized prior to averaging. Due to positive skew, the composite was log-transformed prior to analysis.

Adoptive Parent Antisocial Behavior—Adoptive parent antisocial behavior was measured via the 13-item Antisocial Action questionnaire (Levenson, Kiehl, & Fitzpatrick, 1995) at the 18 month assessment, adapted from the SRP-W Antisocial Action subscale. Items were adapted to be more suitable for stay-at-home mothers and included “I gossip”, “I don't pay parking tickets”, and “I tell lies” ($\alpha = .82$).

Negative Parenting—Negative parenting was assessed when the child was 18 and 27 months of age using adoptive parents' reports on the Overreactivity subscale of the Parenting Scale (Arnold, O'Leary, Wolff, & Acker, 1993), a measure of dysfunctional parental discipline (e.g., “When my child misbehaves, I raise my voice or yell”; AM $\alpha = .74$ and $.71$, AF $\alpha = .69$ and $.70$; at each measurement occasion respectively).

Statistical Analyses

The analyses sought to examine the effects of children's genetically-influenced predispositions (as indexed by birth parent antisocial behavior), adoptive parent antisocial behavior, and their interaction on negative parenting behavior at 18 months and change in negative parenting from 18 to 27 months using a series of interrelated Structural Equation Models (see Figure 1). We also examined whether the associations between birth parent antisocial behavior, adoptive parent antisocial behavior, or the interaction term and parenting could be constrained between adoptive mothers and adoptive fathers. Lower AIC values indicate the better-fitting model.

To accommodate missing data, we made use of Full-Information Maximum-Likelihood raw data techniques (FIML) for all structural equation models, which produce less biased and more efficient and consistent estimates than other techniques, such as pairwise or listwise deletion, in the face of missing data (Little & Rubin, 1987). AMOS, a structural-equation modeling program (Arbuckle, 2003), was used to estimate the models. Child race/ethnicity,

adoptive parent race/ethnicity, adoptive parent age, adoptive family income, and adoption openness were included as covariates in all models.

Results

Mean levels of birth parent antisocial behavior, adoptive parent antisocial behavior, and negative parenting were calculated (see Table 1). Consistent with prior research (Compton, Conway, Stinson, Colliver, & Grant, 2005), birth fathers reported significantly higher rates of antisocial behavior than did birth mothers (Conduct Disorder: $d = .33$, $p = .01$; ASPD: $d = .43$, $p < .01$; Delinquency: $d = .30$, $p < .01$). 13.5% of birth fathers and 7.3% of birth mothers met full diagnostic criteria for Antisocial Personality Disorder. 51.5% of birth fathers and 36.7% of birth mothers endorsed 3 or more symptoms of Antisocial Personality Disorder but did not have a diagnosis of conduct disorder prior to age 18.

There were no significant differences between adoptive mothers and fathers for antisocial behavior ($d = .08$, $p = .13$) or negative parenting (18 months: $d = .08$, $p = .18$; 27 months: $d = .02$, $p = .90$). 2.5% of adoptive mothers and 4.7% of adoptive fathers reported no antisocial behavior. 13.6% of adoptive mothers and 15.9% of adoptive fathers endorsed 7 or more antisocial behaviors at a low frequency (e.g., "I have done this once or twice") or fewer than 7 antisocial behaviors, but at a higher frequency.

Structural Equation Models

To examine the effects of birth parent antisocial behavior and adoptive parent antisocial behavior on parenting, we fitted a model estimating the effects of birth and adoptive parent antisocial behavior and their interaction on parenting at 18 and 27 months, allowing estimates to differ across adoptive mothers and adoptive fathers (Figure 1; based on the model used in Leve et al., 2010; $X^2 = 241.59$ on 72 df, $p = .01$, AIC = 405.59) and then systematically constraining paths to be equal across mothers and fathers. See Table 2 for path estimates from this model. Two paths could not be constrained without a decrement in fit: birth parent antisocial behavior (Constrained: $X^2 = 245.69$ on 73 df, AIC = 407.69; $X^2 = 4.10$ on 1 df, $p = .04$) and adoptive parent antisocial behavior (Constrained Model: $X^2 = 247.09$ on 73 df, AIC = 409.09; $X^2 = 5.50$ on 1 df, $p = .02$), both predicting change in parenting at 27 months. Estimates suggested that birth parent effects were significant for change in adoptive father's negative parenting from 18 to 27 months, but not for change in adoptive mother's parenting. In addition, child race/ethnicity was associated with change in parenting in fathers but not in mothers, with non-white race/ethnicity associated with increases in negative parenting ($\beta = 0.21$, $p = .01$; Constrained Model: $X^2 = 248.00$ on 73 df, AIC = 410.00; $X^2 = 6.41$ on 1 df, $p = .01$). The final model (allowing birth parent antisocial behavior, adoptive parent antisocial behavior, and child race/ethnicity to differ for mothers and fathers while constraining other estimates) had a root-mean-square error of approximation (RMSEA) of 0.04, indicating good overall fit to the data.

Discussion

The current study sought to examine how birth parent antisocial behavior and adoptive parent antisocial behavior jointly contribute to the development of negative parenting

practices in early childhood. Our results highlighted direct associations between adoptive parent antisocial behavior and parenting- suggesting that adoptive parent antisocial behavior demonstrates an effect on negative parenting that cannot be accounted for by evocative rGE effects (of birth parent antisocial behavior). Our results also provided support for an association between biological parent antisocial behavior on change in negative parenting from 18 to 27 months of age, but only for adoptive fathers. There was no evidence for evocative rGE effects of birth parent antisocial behavior on negative parenting at 18 months.

There are some limitations of the current study. The results of this study highlight the association between adoptive parent antisocial behavior and negative parenting during early childhood, therefore additional research is needed to examine the impact of adoptive parent antisocial behavior on parenting during other developmental periods, while controlling for genetic confounds. Secondly, our analyses rely upon birth parent antisocial behavior during adulthood as a proxy for genetic risk. Although this is a relatively common analytic strategy in adoption studies (Ge et al., 1996; Leve et al., 2009), developmental timing of genetic risk may have impacted the current results. For example, genes that are associated with antisocial behavior in adulthood may not impact behavioral traits during early childhood (i.e., perhaps these effects only manifest later in development, during adolescence). Future research should attempt to assess childhood antisocial behavior in the biological parents for a more direct proxy of genetic risk in childhood, and/or develop more robust adult indicators.

Next, we relied upon self-reports of negative parenting. Although this is a common measurement strategy, particularly when examining parenting in early childhood, self-reports of parenting are subject to various pitfalls, including recency and social desirability effects (De Los Reyes & Kazdin, 2005; Morsbach & Prinz, 2006; Paulhus & Vazire, 2007). Behavioral coding of parent-child observations within the current sample is ongoing and future research within this and other samples should examine associations between antisocial behavior and parenting using observer-ratings. In addition, because adoptive parents reported both on their antisocial behavior and their negative parenting practices, shared informant variance may have inflated the associations between adoptive parent antisocial behavior and negative parenting. Assessments of antisocial behavior also differed between biological and adoptive parents, with a less thorough antisocial behavior assessment in the adoptive parents (one self-report questionnaire vs. questionnaires and a diagnostic interview in the biological parents). Future research using multiple informants of parental antisocial behavior and parenting is needed to further clarify these findings. Lastly, the adoptive parents were generally well educated and with high incomes, consistent with restriction of range in the environment that is common of adoptive families (Stoolmiller, 1999). Prior research suggests that restriction of range in adoptive families may not be problematic for the examination of behavioral outcomes (McGue et al., 2007). However, it remains unclear whether the current findings extend to more disadvantaged rearing families.

Keeping these limitations in mind, the current study has several important implications. First, our analyses highlight the possibility of evocative rGE effects on change in negative parenting from 18 to 27 months, although these effects were only apparent for adoptive fathers. These results are partially consistent with prior research (within the same sample as the current study) that found evocative rGE effects of birth mother reward dependence on

adoptive father harsh parenting at 9 months, but no evocative *rGE* effects on maternal harsh parenting during infancy (Hajal et al., 2015). Taken together, this suggests that evocative *rGE* effects on parenting may be present during early childhood for fathers but not for mothers. This is interesting to note, as meta-analytic data suggests that mothers are more influenced by evocative *rGE* than are fathers when examining parenting across all developmental stages (Klahr & Burt, 2014). Longitudinal research will be important for clarifying the magnitude and developmental timing of evocative *rGE* effects on parenting and potential differences in growth trajectories for mothers vs. fathers.

The lack of evocative *rGE* effects at 18 months in the current study is partially consistent with twin studies suggesting that negative parenting in early childhood is primarily shared environmental in origin (Cohen et al., 1977; Roisman & Fraley, 2008), although other twin studies in early childhood have found evocative effects (Boivin et al., 2005; Knafo & Plomin, 2006). In contrast to the early childhood findings, the presence of evocative effects on negative parenting is well established in middle childhood and adolescence, in both twin (Klahr, Klump, & Burt, 2014; Marceau et al., 2013) and adoption samples (Ge et al., 1996; O'Connor et al., 1998). The current results highlight the need for additional research on the etiological origins of negative parenting in early childhood (Shaw et al., 1998, 2003, 1994).

The current findings highlight a direct association between adoptive parent antisocial behavior and negative parenting that operates regardless of the parent's sex or the child's level of genetic risk. These findings constructively replicate prior work linking parental antisocial behavior to negative parenting (Jaffee et al., 2006), including research carried out during early childhood (Bosquet & Egeland, 2000; Kim-Cohen et al., 2006). These findings further suggest that this association is a direct one (i.e., the association between parental antisocial behavior and parenting cannot be accounted for by child-driven evocative effects specific to birth parent antisocial behavior, and is instead consistent with a parent-driven effect). The influence of antisocial behavior on parenting within this sample is particularly striking because of the low levels of antisocial behavior that characterize adoptive parents in this and other adoption samples (Stoolmiller, 1999) and the high levels of antisocial behavior in the birth parents. Thus, these results suggest that even antisocial behavior within the normative range is pertinent for the development of negative parenting practices, and even for children at high levels of genetic risk, although further research is needed to clarify the magnitude of these associations.

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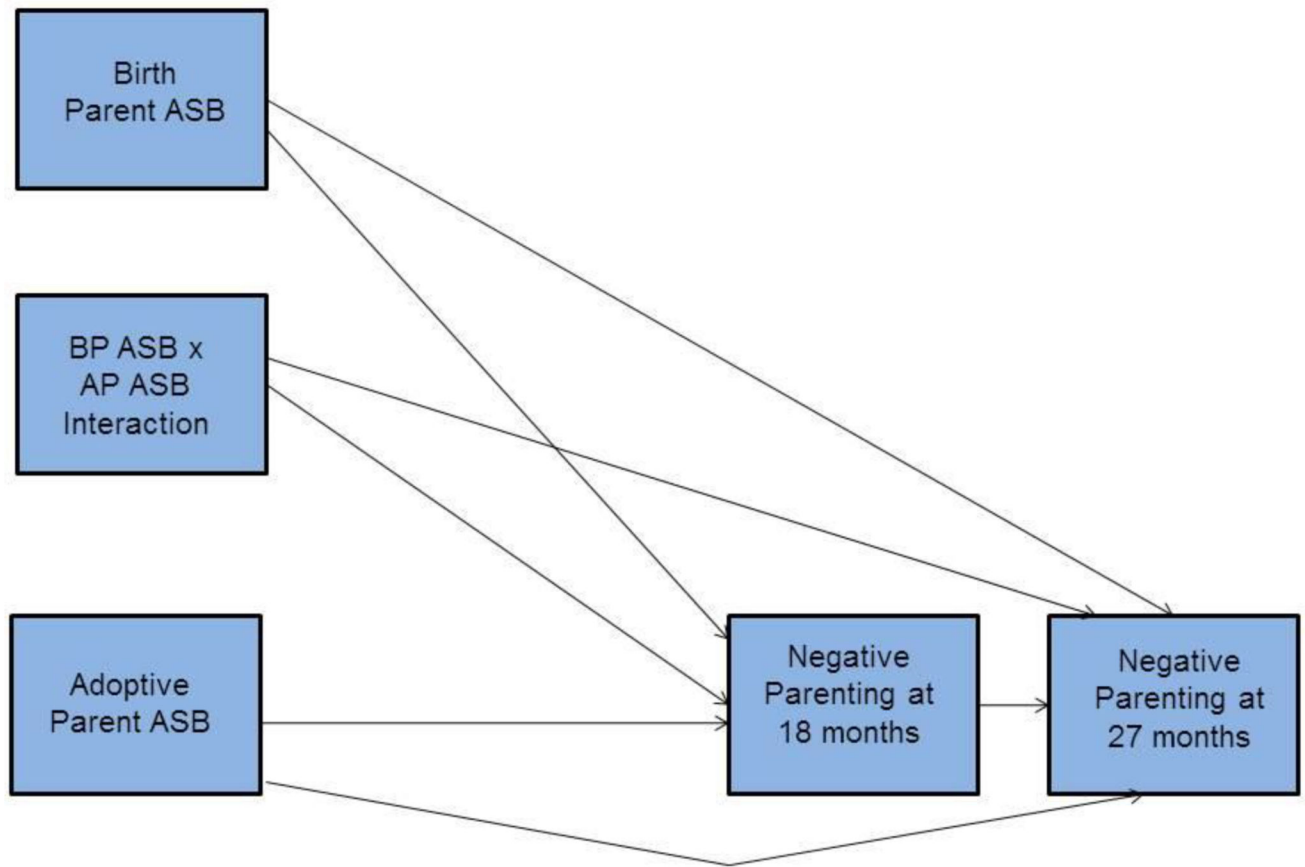


Figure 1. Full Structural Equation Model

Note. BP = birth parent; AP = adoptive parent; ASB = antisocial behavior. Adoptive parent age and race/ethnicity, adoptive family income, adoption openness, child race/ethnicity, and child perinatal/obstetric risk were also included in the model but are not shown here.

Birth Parent Antisocial Behavior, Adoptive Parent Antisocial Behavior, and Negative Parenting

Table 1

Variable	Mean	SD	Min	Max	N
BM Delinquency	31.46	3.81	29	68	488
BM Conduct Disorder	1.52	1.27	1	5	415
BM ASPD	2.39	1.59	1	5	411
BF Delinquency	32.90	5.43	29	65	167
BF Conduct Disorder	1.81	1.60	1	5	136
BF ASPD	3.08	1.57	1	5	134
AM Antisocial Action	16.85	2.44	13	29	513
AF Antisocial Action	17.03	2.57	13	28	490
AM Neg. Parenting-1	1.85	.59	1	4.90	511
AM Neg. Parenting-2	2.06	.61	1	4.30	487
AF Neg. Parenting-1	1.89	.66	1	4.40	487
AF Neg. Parenting-2	2.05	.63	1	4.20	463

Note. BM = birth mother; BF = birth father; AM = adoptive mother; AF = adoptive father; ASPD = antisocial personality disorder; Neg. Parenting-1 = Negative parenting at 18 months; Neg. Parenting-2 = Negative parenting at 27 months; Min = minimum; max = maximum; SD = standard deviation

Table 2

Path Estimates for Adoptive Mothers and Fathers

Group	Pathway	Standardized Estimate (SE)	<i>p</i>
<i>Adoptive Mothers</i>	BP Antisocial Behavior → Parenting B	−0.02 (0.04)	.59
	BP Antisocial Behavior → Parenting C	−0.04 (0.03)**	.29
	AP Antisocial Behavior → Parenting B	0.21 (0.04)	<.01
	AP Antisocial Behavior → Parenting C	0.04 (0.03)**	.19
	Interaction → Parenting B	0.01 (0.04)	.90
	Interaction → Parenting C	−0.02 (0.03)	.57
	Stability of Parenting Over Time	0.71 (0.03)	<.01
<i>Adoptive Fathers</i>	BP Antisocial Behavior → Parenting B	−0.06 (0.05)	.22
	BP Antisocial Behavior → Parenting C	0.07 (0.03)**	.05
	AP Antisocial Behavior → Parenting B	0.19 (0.04)	<.01
	AP Antisocial Behavior → Parenting C	0.16 (0.03)**	<.01
	Interaction → Parenting B	−0.03 (0.05)	.54
	Interaction → Parenting C	0.03 (0.04)	.41
	Stability of Parenting Over Time	0.64 (0.04)	<.01

Note. Significant path estimates are in bold. The percentage of variance that is uniquely accounted for by a given path can be obtained by simply squaring its path coefficient.

SE = Standard Error. BP = birth parent. AP = adoptive parent. Parenting B = negative parenting at 18 months. Parenting C = negative parenting at 27 months.

Adoptive parent age and race/ethnicity, adoptive family income, adoption openness, child race/ethnicity, and child perinatal complications were also included as covariates in the model.

** Estimates are significantly different between mothers and fathers