

Children's callous-unemotional traits moderate links between their positive relationships with parents at preschool age and externalizing behavior problems at early school age

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Background: Growing research on children's traits as moderators of links between parenting and developmental outcomes has shown that variations in positivity, warmth, or responsiveness in parent-child relationships are particularly consequential for temperamentally difficult or biologically vulnerable children. But very few studies have addressed the moderating role of children's callous-unemotional (CU) traits, a known serious risk factor for antisocial cascades. We examined children's CU traits as moderators of links between parent-child Mutually Responsive Orientation (MRO) and shared positive affect and future externalizing behavior problems. **Methods:** Participants included 100 two-parent community families of normally developing children, followed longitudinally. MRO and shared positive affect in mother-child and father-child dyads were observed in lengthy, diverse naturalistic contexts when children were 38 and 52 months. Both parents rated children's CU traits at 67 months and their externalizing behavior problems (Oppositional Defiant Disorder and Conduct Disorder) at 67, 80, and 100 months. **Results:** Children's CU traits moderated links between early positive parent-child relationships and children's future externalizing behavior problems, even after controlling for strong continuity of those problems. For children with elevated CU traits, higher mother-child MRO and father-child shared positive affect predicted a decrease in mother-reported future behavior problems. There were no significant associations for children with relatively lower CU scores. **Conclusions:** Positive qualities for early relationships, potentially different for mother-child and father-child dyads, can serve as potent factors that decrease probability of antisocial developmental cascades for children who are at risk due to elevated CU traits. **Keywords:** Callous-unemotional traits, positive parent-child relationships, externalizing behavior problems.

Introduction

There is a general consensus in developmental psychology and psychopathology that characteristics of children's individuality and qualities of parent-child relationships in their interplay determine adaptive or maladaptive outcomes. Rapidly growing research has focused on specific forms of such interactions, with the child's traits most often seen as moderators of associations between qualities of the parent-child relationship and children's outcomes. Increasingly well-documented and replicated interactions have emerged.

Across multiple longitudinal studies, various ages of children, and across community and high-risk samples, we have examined aspects of positive parenting and children's characteristics when investigating such interactions. For example, mother-child security, maternal responsiveness, and shared affective positivity were particularly effective in promoting adaptive developmental outcomes, such as conscience, in fearless children, who otherwise may be at risk for externalizing behavior problems (Kochanska, 1997a; Kochanska, Aksan, & Joy, 2007). For difficult, anger-prone children, maternal respon-

siveness was especially effective in promoting positive developmental outcomes (Kochanska, Aksan, & Carlson, 2005; Kochanska & Kim, 2013).

We have also proposed a construct of Mutually Responsive Orientation (MRO) – a close, warm, and mutually cooperative relationship between the parent and child (Kochanska, 1997b). We have demonstrated that MRO is a unidimensional latent construct, that it can be distinguished from and is not reducible to the two interacting individuals' qualities, and that it has remarkable measurement equivalence across assessments and across both mother-child and father-child relationships (Aksan, Kochanska, & Ortmann, 2006). Furthermore, MRO was especially effective in promoting self-regulation for highly emotionally negative infants (Kim & Kochanska, 2012). Mother-child security, a form of MRO, promoted self-regulation, especially for children who carried a short 5-HTTLPR allele, a known vulnerability factor (Kochanska, Philibert, & Barry, 2009).

Those findings dovetail with extant research. Typically, for children who are difficult, challenging, or vulnerable, variations in positive affective qualities of parenting, such as warmth, security, responsiveness, or acceptance are highly consequential: Positive parent-child relationships offset the risks,

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whereas poor, negative relationships amplify them. For children who are easy or less vulnerable, links between parenting and outcomes are either absent or significantly weaker. (Belsky & Pluess, 2009; Ellis, Boyce, Belsky, Bakermans-Kranenburg, & van IJzendoorn, 2011).

Although that body of research has grown rapidly, very little is known about *children's callous-unemotional (CU) traits* as potential moderators of links between parent-child relationships and developmental outcomes. CU traits – compromised guilt, low empathy, diminished fear, emotional 'coldness', and low concern and disregard for feelings of others – have received increasing attention as a serious risk factor for antisocial, externalizing behavior problems (Barry et al., 2000; Frick, Bodin, & Barry, 2000; Frick & Viding, 2009; Frick & White, 2008; Frick et al., 2003; Wakschlag, Tolan, & Leventhal, 2010).

In a pioneering study, Pasalich, Dadds, Hawes, and Brennan (2011) examined 4–12-year-old children's CU traits as moderators of links between parenting and children's conduct problems. For children with elevated CU traits, mothers' and fathers' warmth related negatively to conduct problems (although, despite a significant interaction effect, the slope for fathers' warmth fell short of significance). There were no such relations for children low on CU traits.

Despite its importance, that study had limitations, acknowledged by the authors. The data were concurrent; the measures of parental warmth were based on 5-min samples of the parent's speech about the child, and not interactions; the findings for fathers' warmth were inconclusive; and all data were collected from clinic-referred conduct-disordered children, and consequently, we do not know if the findings generalize to typically developing children.

The purpose of the current article is to replicate and expand the findings of Pasalich et al., (2011). We extended that study in four ways. One, we employed a longitudinal design, with measures collected over approximately 5 ½ years (from age 3 to 8 ½). Two, measures of the positive qualities of the parent-child relationships were based on behavioral observations of the dyads in lengthy, diverse, naturalistic contexts at age 3 and 4 ½, and aggregated across assessments to produce robust constructs. Three, those measures included two related, but not identical dyadic qualities: MRO and shared positive affect between the parent and child, coded by independent teams. Four, the study involved community families with typically developing children.

Children's CU traits were assessed at age 5 ½. Their externalizing behavior problems were measured at age 5 ½, 6 ½, and 8 ½; the latter two assessments were aggregated into one outcome score, and the earliest score, concurrent to CU traits, served as a covariate. Consequently, we were able to examine children's CU traits as moderators of the

links between the quality of the parent-child relationship and future externalizing behavior problems, while implementing a conservative approach that controlled for very robust continuity of those problems. This allowed us to make inferences about a *decrease* or *increase* in conduct problems after age 5 ½.

Method

Participants

Two-parent families of infants ($N = 102$) volunteered for a longitudinal study in response to advertisements and fliers distributed in the community. A family was accepted if the parents were living together and both wished to participate (and to speak English during sessions), the infant was their biological child, normally developing, and free of major birth complications or health problems, and the family had no plans to move in the next 5 years. The parents ranged in education (25% of mothers and 30% of fathers having no more than high school education, and 21% of mothers and 20% of father having postgraduate education) and annual income (25% made less than \$40,000, and 49% made over \$60,000). Ninety percent of mothers and 84% of fathers were White, 3% and 8% Hispanic, 2% and 3% were African American, 1% and 3% were Asian, 1% of mothers were Pacific Islanders, and 3% and 2% were 'other' non-White. In 20% of families, one or both parents were non-White. The study was approved by University of Iowa IRB; parents completed informed consent, and children (at 100 months) completed assent.

Overview of design and measures

We draw from assessments at 38 months ($N = 100$, 50 girls), 52 months ($N = 99$, 49 girls), 67 months ($N = 92$, 45 girls), 80 months ($N = 90$, 43 girls), and 100 months ($N = 87$, 41 girls). Observational data on MRO and shared positive affect were obtained at 38 months (in one home and one laboratory session, with each parent participating in half of each), and at 52 months (in 2–3-hr laboratory sessions with each parent). Data on children's CU traits were obtained at 67 months, and on their externalizing behavior problems at 67, 80, and 100 months. The sessions, conducted by female staff, were videotaped for future coding. Observations in the laboratory took place in a naturalistic living room and a sparsely furnished play room.

Measures of mother-child and father-child MRO (38, 52 months)

Observed contexts. Each parent-child dyad was observed in multiple naturalistic, carefully scripted contexts that encompassed play, chores, preparation of snacks, snack time, parent busy, a craft

project, etc. There were nine contexts at 38 months (with each parent, total of 77 min), and six contexts at 52 months (with each parent, total of 65 min).

Coding. Coders assigned one overall MRO rating for each observed context, ranging from 1 (very untrue of the dyad) to 5 (very true of the dyad). The coder integrated four dyadic dimensions. Those are described below, along with their lowest and highest descriptors.

Coordinated routines: Dyad has no routines or routines are choppy, rough, and a source of conflict; dyad has easy, comfortable, coordinated routines that reflect shared procedural expectations. **Harmonious communication:** Dyad communicates very little or not at all; dyad communicates smoothly, in a connected, harmonious, back-and-forth way. **Mutual cooperation:** Dyad is unable to cooperate, struggles and conflicts escalate; parent and child adopt an open, willing, receptive stance toward each other, with even subtle cues sufficient for cooperation. **Emotional ambience:** Negative ambience permeates interaction, there are bouts of negative affect; parent and child clearly enjoy each other's company, very positive, warm ambience, with bouts of joy and displays of affection.

The conventions specified how to arrive at the overall score for each context. Reliability, weighted kappas, ranged from .81 to .83.

Data aggregation. At each assessment, the scores across all observed contexts cohered substantially. Cronbach's alphas were (mother-child dyad first, father-child dyad second): at 38 months, .72 and .79, at 52 months, .79 and .75. Consequently, they were averaged across all contexts into one score for each parent at each time. Those scores correlated across both assessments (r s were .58 and .56 for mother- and father-child dyads, respectively, both p s < .001), and they were standardized and aggregated into *one overall MRO score across 38 and 52 months* for each dyad: for mother-child dyads, $M = .00$, $SD = .89$, range $-2.83-1.48$, for father-child dyads, $M = .00$, $SD = .88$, range $-2.99-1.58$.

Measures of mother-child and father-child shared positive affect (38, 52 months)

Observed contexts. Parent-child shared positive affect was coded in the same contexts as MRO (77 min at 38 months and 65 min at 52 months with each parent).

Coding. Coders assigned the following codes to the parent and the child for each 30-sec segment: discrete positive affect ('full-blown' affection or joy), neutral/positive mood (not a 'full-blown' positive emotion, but an upbeat, pleasant, engaged mood), discrete negative affect ('full-blown' distress, cry,

anger, etc.), neutral/negative mood (not a 'full-blown' negative affect, but fatigue, subtle discomfort, disengagement, negatively 'tinged' mood, etc.). More than one discrete affect could be coded in one segment; if no discrete affect was present, neutral (positive or negative) mood was coded. Reliability, kappas, ranged .74-.86 for parents' affect and .74-.88 for children's affect.

Data aggregation. All segments in which both the parent and the child displayed discrete positive affect or neutral/positive mood and neither displayed discrete negative affect or neutral/negative mood were tallied, and those tallies were divided by the number of coded segments to create a score of shared positive affect for each dyad. Those scores correlated across both assessments (r s were .54 and .45 for mother- and father-child dyads, respectively, both p s < .001), and they were standardized and further aggregated into *one overall shared positive affect score across 38 and 52 months*: for mother-child dyads, $M = .00$, $SD = .87$, range $-3.51-1.23$, for father-child dyads, $M = .01$, $SD = .85$, range $-2.99-1.48$.

Measures of children's CU traits (67 months)

Both parents completed the 24-item Inventory of Callous-Unemotional traits (ICU, Frick, 2003) that captures absence of guilt and empathy, and disregard for rules and standards of behavior (e.g., does not care if s/he is in trouble, does not like to put time into doing things well, feelings of others are unimportant). We computed the mean of all items for each parent (0 = not true at all, 1 = somewhat true, 2 = very true, 3 = definitely true); alphas .84 for mothers and .86 for fathers. We standardized both scores, which correlated, $r(88) = .41$, $p < .001$, and averaged into *one score of the CU traits* for the child, $M = .01$, $SD = .85$, range $-1.60-2.59$.

Measures of children's externalizing behavior problems (67, 80, 100 months)

Both parents completed Child Symptom Inventory-4 (CSI-4; Gadow & Sprafkin, 2002; Sprafkin, Gadow, Salisbury, Schneider, & Loney, 2002). Two scores were selected, Oppositional Defiant Disorder and Conduct Disorder, both based on the symptom severity scoring, with each item rated from 0 (never) to 3 (very often). The two scores were added to create an externalizing behavior problem score (one rating for the mother and one for the father at each of the three assessments). Then, for each parent, the scores across 80 and 100 months, which correlated $r(86) = .74$ for mothers and $r(82) = .69$ for fathers, p s < .001, were averaged, mothers, $M = 7.34$, $SD = 4.04$, range = 1-26, fathers, $M = 6.70$, $SD = 3.71$, range = 1-17.50, to represent *the outcome variables of externalizing behavior problems*

from 80 to 100 months. All descriptive data for the variables prior to aggregation are in Table 1.

Results

Preliminary analyses

The intercorrelations among the constructs are in Table 2. MRO and shared positive affect were significantly related to each other and across parents, and both, by and large, negatively to the measures of children's CU traits and externalizing behavior problems (except for mother-child shared positive affect and behavior problems). Consistent with extant research, the report of the child's CU traits correlated moderately with both mothers' and fathers' concurrent and future reports of children's externalizing problems. Mothers' and fathers' reports of children's externalizing problems were intercorrelated.

Three scores served as covariates: child gender, family income, and the externalizing behavior scores at 67 months. Boys were seen as marginally higher on CU traits, boys, $M = .18$, $SD = .95$, girls, $M = -.17$, $SD = .70$, $t(90) = -1.98$, $p = .051$, and as higher on externalizing behavior problems (by mothers only), at 67 months, boys, $M = 9.70$, $SD = 6.40$, girls, $M = 6.86$, $SD = 3.14$, $t(89) = -2.66$, $p < .01$, and at 80–100 months, boys, $M = 8.17$, $SD = 4.62$, girls, $M = 6.39$, $SD = 3.04$, $t(86) = -2.10$, $p < .05$. Family income, scored from 1 to 8 to represent income categories, $M = 5.91$, $SD = 2.07$, significantly related to MRO and shared positive affect for mother- and father-child dyads (r s ranged from .22 to .38, all $ps < .05$). Mother- and father reported externalizing problems at 67 months were very robust predictors of the same problems at 80–100 months (r s within the informant, .74 and .75, $ps < .001$), they positively related to concurrent CU traits (r s .35 and .40, $ps < .001$), and by and large,

negatively to earlier MRO and shared positive affect (significant r s ranged from $-.21$ to $-.32$, $ps < .05$).

Parent-child MRO (38–52 months), children's callous-unemotional traits (67 months), and their interactions as predictors of externalizing problems (80–100 months)

Two hierarchical multiple regressions were conducted: one with the mother-rated and the other with the father-rated child externalizing behavior problems score at 80–100 months as the outcome variable. In Step 1, the covariates were entered: child gender, family income, and, to control for strong longitudinal continuity, the parent's rating of externalizing behavior problems at 67 months. In Step 2, three main effects were entered: the child CU score at 67 months, and the two MRO scores, mother-child and father-child. In Step 3, two interaction terms were entered: mother-child MRO \times child CU score and father-child MRO \times child CU score. The regressions (the final step) are in Table 3.

When predicting mother-rated child externalizing behavior score at 80–100 months, the parallel score at 67 months was, not surprisingly, a very robust predictor. Furthermore, the interaction between mother-child MRO and child CU traits added significant unique variance. This effect was then examined using simple slopes (Aiken & West, 1991). The results are in Figure 1.

Children's CU score at 67 months moderated the effect of mother-child 38–52-month MRO on child externalizing behavior problems at 80–100 months. The simple slope for children with elevated CU traits (1 SD above the mean) was significant, $b = -1.14$, $SE = .54$, $p < .05$, but for those whose CU scores were low (1 SD below the mean), it was not, $b = .72$, $SE = .64$, ns. For children with elevated CU traits, there was an inverse relation between mother-child

Table 1 Descriptive data for all measures (prior to aggregation)

Age of child (months) <i>N</i>	38		52		67		80		100	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Mother-child MRO	2.97	.41	3.08	.50						
Father-child MRO	2.84	.48	2.96	.49						
Mother-child shared										
Positive affect	.85	.13	.77	.12						
Father-child shared										
Positive affect	.80	.14	.71	.16						
Child CU traits (Mother-rated) ^a					.80	.32				
Child CU traits (Father-rated) ^a					.80	.32				
Child externalizing behavior										
Problems (Mother-rated) ^b					8.33	5.26	8.00	4.48	6.67	4.25
Problems (Father-rated) ^b					7.34	4.38	7.23	4.42	6.26	3.68

MRO, mutually responsive orientation. CU, callous-unemotional.

^aAssessed in Inventory of Callous-Unemotional traits, ICU.

^bAssessed in Child Symptom Inventory, CSI-4. MRO and Shared Positive Affect were observed.

Table 2 Correlations among the independent variables (mother-child and father-child MRO and shared positive affect, 38-53), the moderator variable (child callous-unemotional traits, 67 months), and the outcome variable (child externalizing behavior problems, 80-100 months)

	Observed variables				Parent-rated variables		
	MRO		Shared positive affect		C CU traits ^a 67 months M/F	C Externalizing behavior problems ^b 80-100 months	
	38-52 months		38-52 months			M	F
	M-C	F-C	M-C	F-C			
MRO, 38-67 months							
M-C	—	.59***	.56***	.32***	-.39***	-.30**	-.29**
F-C		—	.34***	.68***	-.26*	-.28**	-.27*
Shared positive affect							
M-C			—	.24*	-.24*	-.15	-.09
F-C				—	-.20†	-.30**	-.24*
C CU traits, 67 months ^a							
M/F					—	.38***	.37***
C Externalizing behavior ^b							
Problems, 80-100 months							
M						—	.51***

M, Mother; F, Father; M/F, Average of M and F; C, Child; M-C, Mother-child dyad; F-C, Father-child dyad; MRO, mutually responsive orientation; CU, callous-unemotional.

^aAssessed in Inventory of Callous-Unemotional traits, ICU.

^bAssessed in Child Symptoms Inventory, CSI-4.

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3 Mother-child and father-child MRO, children's callous-unemotional traits (67 months), and their interactions as predictors of children's externalizing problems (80-100 months)

Predictors	Outcome measure: child externalizing behavior problems, 80-100 Mo. ^b			
	Mother-rated		Father-rated	
	Beta	F	Beta	F
Child gender ^a	-.03	<1	-.09	1.26
Family income	.02	<1	.03	<1
Child externalizing behavior problems, 67 Mo. ^b	.65	67.25***	.75	80.04***
Child CU traits, 67 Mo. ^c	.06	<1	.09	1.08
Mother-child MRO, 38-52 Mo	-.05	<1	.04	<1
Father-child MRO, 38-52 Mo.	-.10	<1	-.09	<1
Mother-child MRO, 38-52 Mo. × Child CU traits, 67 Mo.	-.30	5.79*	.22	2.81†
Father-child MRO, 38-52 Mo. × Child CU traits, 67 Mo.	.16	1.72	-.20	2.70
	$R^2 = .59, F(8,77) = 13.98***$		$R^2 = .59, F(8,75) = 13.42***$	

The predictors were entered as follows. Step 1, child gender, family income, and child externalizing behavior problems at 67 months (covariates). Step 2, mother-child MRO and father-child MRO at 38-52 months. Step 3, interaction term of father-child MRO at 38-52 months and child CU traits at 67 months and interaction term of father-child MRO at 38-52 months and child CU traits at 67 months. The results are presented for the final step, with all predictors entered.

^a0 = Girls, 1 = Boys.

^bCSI-4, rating for the same informant as at 80-100 months. Mo. = Months of age.

^cInventory of Callous-Unemotional traits, ICU.

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

MRO and future externalizing problems; for those children, an increase in mother-child MRO significantly predicted a decrease in externalizing behavior scores, even after controlling for those scores' very strong longitudinal continuity. There were no effects for children with low CU scores, and no effects for father-child MRO, regardless of child CU score. There were no significant main or interaction effects for predicting *father-rated child externalizing behavior score at 80-100 months* (or for a rating of externalizing problems averaged across mothers and

fathers), beyond the robust effect of the parallel score at 67 months.

Parent-child shared positive affect (38-52 months), children's callous-unemotional traits (67 months), and their interactions as predictors of externalizing problems (80-100 months)

Again, two hierarchical multiple regressions were conducted: one with the mother-rated and the other with the father-rated child externalizing

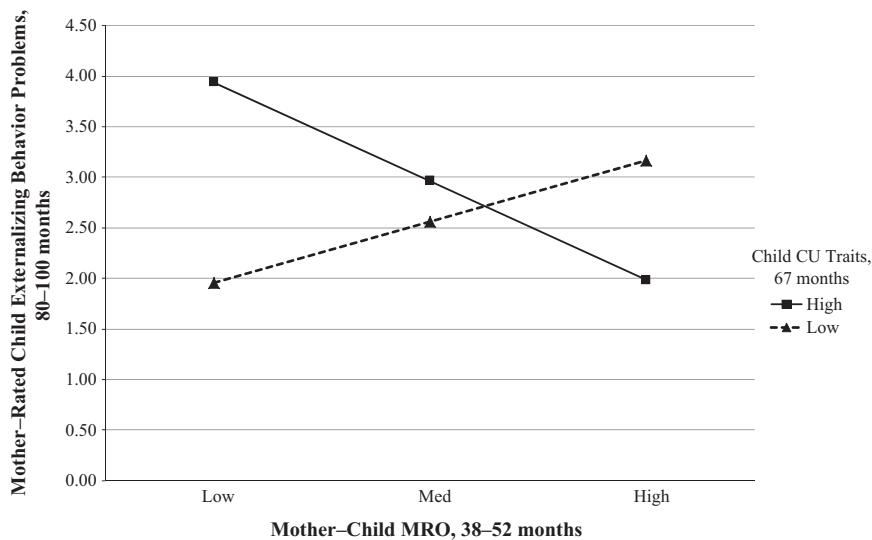


Figure 1 Parent-reported children’s CU traits at 67 months moderate the effect of observed mother–child MRO at 38–52 months on mother-reported children’s externalizing behavior problems (ODD, CD) at 80–100 months. Child gender, family income, and mother–reported children’s externalizing behavior problems at 67 months were the covariates (not depicted). Solid line represents significant simple slope; dashed line represents nonsignificant simple slope

Table 4 Mother–child and father–child shared positive affect (38–52 months), children’s callous-unemotional traits (67 months), and their interactions as predictors of children’s externalizing problems (80–100 months).

Predictors	Outcome measure: child externalizing behavior problems, 80–100 Mo.			
	Mother-rated		Father-rated	
	Beta	F	Beta	F
Child gender ^a	.01	<1	–.13	2.40
Family income	.04	<1	.06	<1
Child externalizing behavior problems, 67 Mo. ^b	.64	65.89***	.74	72.65***
Child CU traits, 67 Mo. ^c	.06	<1	.09	1.01
Mother–child shared positive affect, 38–52 Mo.	–.03	<1	.06	<1
Father–child shared positive affect, 38–52 Mo.	–.16	3.68†	–.10	1.28
Mother–child shared positive affect, 38–52 Mo. × Child CU traits, 67 Mo.	–.11	1.96	.01	<1
Father–child shared positive affect, 38–52 Mo. × Child CU traits, 67 Mo.	–.20	6.96**	.03	<1
	$R^2 = .61, F(8,77) = 15.24***$		$R^2 = .57, F(8,75) = 12.63***$	

The predictors were entered as follows. Step 1, child gender, family income, and child externalizing behavior problems at 67 months (covariates). Step 2, mother–child shared positive affect and father–child shared positive affect at 38–52 months. Step 3, interaction term of father–child shared positive affect at 38–52 months and child CU traits at 67 months and interaction term of father–child shared positive affect at 38–52 months and child CU traits at 67 months. The results are presented for the final step, with all predictors entered.

^a0 = Girls, 1 = Boys.

^bCSI-4, rating for the same informant as at 80–100 months. Mo. = Months of age.

^cInventory of Callous-Unemotional traits, ICU.

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

behavior problems score at 80–100 months as the outcome variable. In Step 1, the covariates, child gender, family income, and the parent’s rating of externalizing behavior problems at 67 months, were entered. In Step 2, three main effects were entered: the child CU score at 67 months, and the two mother–child and father–child shared positive affect scores. In Step 3, two interaction terms were entered, mother–child shared positive affect and child CU score and father–child shared positive affect and child CU score. The regressions (the final step) are in Table 4.

When predicting *mother-rated child externalizing behavior score at 80–100 months*, the parallel score at 67 months was again a very robust predictor. The interaction between father–child shared positive affect and child CU traits added significant unique variance. The results of the simple slopes analysis (Aiken & West, 1991) are in Figure 2.

Children’s CU score at 67 months moderated the effect of father–child shared positive affect at 38–52 months on child externalizing behavior problems at 80–100 months. The simple slope for children with elevated CU traits (1 SD above the mean) was signif-

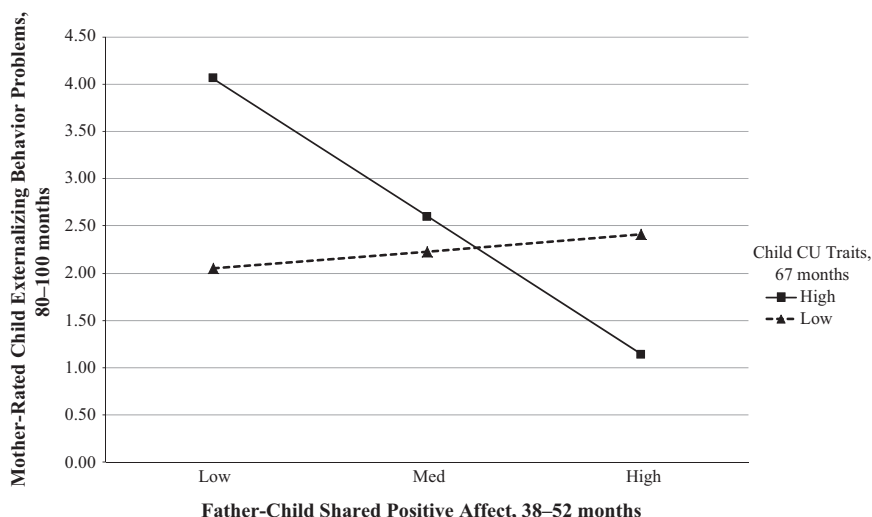


Figure 2 Parent-reported children's CU traits at 67 months moderate the effect of observed father-child shared positive affect at 38-52 months on mother-reported children's externalizing behavior problems (ODD, CD) at 80-100 months. Child gender, family income, and mother-reported children's externalizing behavior problems at 67 months were the covariates (not depicted). Solid line represents significant simple slope; dashed line represents nonsignificant simple slope

icant, $b = -1.89$, $SE = .62$, $p < .005$, but for those whose CU scores were low (1 SD below the mean), it was not, $b = .24$, $SE = .55$, ns. For children with elevated CU traits, an increase in father-child shared positive affect significantly predicted a decrease in externalizing behavior scores, again even after controlling for their very strong longitudinal continuity. There were no effects for children with low CU scores, and no effects for mother-child shared positive affect, regardless of child CU score. There were no significant main or interaction effects for predicting *father-rated child externalizing behavior score at 80-100 months* (or for a rating of externalizing problems averaged across mothers and fathers), again beyond the robust effect of the earlier score at 67 months.

We also conducted an additional comprehensive analysis (not depicted in a table), where the covariates, *both* positive qualities of mother-child and father-child relationships, MRO and shared positive affect, and all four respective interactions with child CU traits were all entered together to predict mother-rated behavior problems at 80-100 months. The same interactions remained significant: mother-child MRO \times child CU traits, Beta = $-.33$, $p < .05$, $B = -1.17$, $SE = .57$, 95% CI [-2.30 , $-.04$], and father-child shared positive affect \times child CU traits, Beta = $-.23$, $p < .01$, $B = -1.47$, $SE = .55$, 95% CI [-2.57 , $-.37$].

Discussion

A growing literature has elucidated how the child's characteristics and qualities of parenting together, in their interplay, predict developmental outcomes (Bates, Schermerhorn, & Petersen, 2012; Kiff, Lengua, & Zalewski, 2011; Rothbart, & Bates, 2006). With regard to children's antisocial behavior, the emphasis had been overly on negative parenting, such as unresponsive, rejecting, or harsh discipline.

Recently, however, perhaps inspired by attachment theory, a new emphasis on positive socialization mechanisms has been strongly ascending. Sensitivity, positive synchrony and mutuality, or joint enjoyable activities have been implicated as potent factors that uniquely prevent externalizing behavior problems in children across a range of ages and socioeconomic backgrounds (Criss, Shaw, & Ingoldsby, 2003; Gardner, Ward, Burton, & Wilson, 2003; Kochanska, Forman, Aksan, & Dunbar, 2005; Kochanska, Forman, & Coy, 1999), and particularly for children at risk for behavior problems (Belsky & Pluess, 2009; Bradley & Corwyn, 2008; Kim & Kochanska, 2012; Kochanska & Kim, 2013). In that literature, children's negative reactivity, difficult temperament, anger proneness, or unmanageability have been most often examined as moderators of effects of parenting on developmental outcomes.

But whether, and how, *children's CU traits* moderate the impact of parenting, particularly with regard to future externalizing psychopathology, is unknown. To test and describe such potential effects is quite important, given that CU traits – a combination of fearlessness, deficient guilt and empathy, emotional 'coldness', and disregard for rules and feelings of others – represent a particularly high risk for a path to serious antisocial disorders. Children with elevated CU traits are especially difficult to socialize (Blair, Peschardt, Budhani, Mitchell, & Pine, 2006); consequently, establishing what specific qualities of the early parent-child relationship have significant implications for such children's development is key for prevention and intervention efforts.

This research replicates and expands the pioneering work by Pasalich and his colleagues (Pasalich et al., 2011), who showed that CU traits moderated links between parental warmth and children's antisocial behavior problems. We examined two aspects of a positive dyadic parent-child relationship: a collabora-

tive, close, responsive mutual orientation and shared positive affect, mutually enjoyed “good times”. Both are powerful mechanisms that lead to adaptive socialization outcomes (Kochanska et al., 1999, 2005).

Indeed, especially for children with elevated CU traits, variations in parent–child positive relationships were linked to future behavior problems, even after controlling for very substantial longitudinal continuity of such problems. Although similar for mother– and father–child relationships, the findings were not identical. Increased levels of *mother-child MRO*, but *father-child shared positive affect* at pre-school age predicted a significant drop in children’s behavior problems at early school age. MRO and shared positive affect, albeit related, are not the same construct. Note that although the two aspects of positive parenting overlap, MRO includes several subtle dimensions of the relationship, such as parent and child being ‘in sync’ with one another, being sensitive to each other’s cues, harmoniously communicating, defusing conflicts, or being mutually responsive. Shared positive affect focuses exclusively on the shared enjoyment.

Those findings dovetail with occasionally reported differences between mothers’ and fathers’ parenting and their implications for development. A more low-key, comforting, responsive style is often adopted by mothers, in contrast to a playful, often boisterous, interactive style typically adopted by fathers (Macoby, 1990; Parke & Buriel, 2006). Lindsey, Cremens, Colwell, and Caldera (2009) found that mother–child mutual compliance and father–child shared positive affect were particularly significant contributors to children’s self-control. The number of studies that involved both parents, however, is very limited. Pasalich et al. (2011) found that mothers’ and fathers’ warmth, assessed from brief speech samples, similarly predicted outcomes in children with high levels of CU traits (although recall that the slope was not significant for fathers). Perhaps differentiating between mutual responsiveness and mutual enjoyment can help address ambiguity in those earlier findings.

In this context, it is also important to point out that whereas for children with elevated CU traits, highly positive parent–child relationships led to a decrease in the risk for antisocial outcomes, the relationships that were poor, unresponsive, and lacked positive affective quality amplified such risks. In that respect, the pattern of findings was consistent with the diathesis-stress model. Given that children with high levels of CU traits pose childrearing challenges, their family relationships likely lack in positivity, which may further exacerbate developmental risks.

This study has several limitations. Perhaps most importantly, the families were typically well functioning and children’s levels of CU traits were low. The unstandardized data in Table 1 indicate that the average CU scores ranged around ‘somewhat true’

(.80 on the scale from 0 to 3). Consequently, in this sample, children with elevated CU scores might be described as not prone to guilt or empathy, not very emotionally expressive, not very socially responsive, and less concerned with feelings of others and standards of behavior than their average peers, but almost certainly not as callous, ‘cold’, emotionally shallow, and indifferent to others as are children in commonly studied clinical samples. Perhaps CU ‘features’ or ‘predispositions’ rather than ‘traits’ are more accurate terms when referring to this and other typically developing samples.

The same was true of children’s externalizing behavior problems; those scores were consistent with data in the normative sample used in the development of CSI-4 (Gadow & Sprafkin, 2002). When we examined separately boys’ and girls’ scores on ODD and CD scales, as reported by mothers and fathers, at 80 and 100 months, across those eight distributions at each age, only between 0 and 2 children had T-scores equal to or higher than 70.

However, given that Pasalich et al. (2011) studied exclusively clinic-referred, conduct-disordered children, our investigation can be seen as a useful complement to that earlier work, extending their model to subclinical developmental processes in typically developing children. Working with a different, low-risk sample, we, too, obtained the significant expected effects, suggesting that the studied developmental processes and mechanisms may be quite robust and may generalize to a range of populations. Thus, the findings add to our understanding of diathesis and pathways of risk for externalizing behavior problems in diverse contexts. Such approach is consistent with the tenets and goals of developmental psychopathology.

It is unclear why our significant findings were only for mother- and not father-rated (or combined across parents) child externalizing behavior problems. Typically, combining parents’ reports of children’s problems is beneficial (see review in Lengua, Bush, Long, Kovacs & Trancik, 2008), and we did combine mothers’ and fathers’ ratings of child CU traits into one robust score, as did Pasalich et al. (2011). In contrast to the latter study, however, we did not obtain significant findings when the outcome measures were combined across parents.

The findings may have implications for prevention and intervention for parents of children with CU traits. For those parents, learning how to capitalize on positive forms of parenting – for example, following children’s lead in play, praising and complimenting children, engaging in shared fun activities, playing, using humor, being affectionate, warm, and responsive to children’s cues – may be especially important. Moreover, if replicated, our data suggest that different forms of positive parenting may be effective for mothers and fathers. Given the burden of antisocial problems for families and societies, further research is indicated.

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Key points

- Children's callous-unemotional (CU) traits (diminished guilt and empathy, disregard for standards of conduct and feelings of others, and emotional 'coldness') are a known risk factor for future externalizing problems.
- Positive parenting may offset such risks. For children with elevated CU traits, higher mother-child mutually positive orientation, and higher father-child shared positive affect predict a decrease in future externalizing behavior problems.
- Although established for the studied group of typically developing and well-functioning children, those findings may have implications for translational research.
- Interventions that emphasize specific aspects of mothers' and fathers' positive parenting may be effective in treatment of children with clinically elevated CU traits.

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