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Low Social Affiliation Predicts Increases in Callous-Unemotional Behaviors in Early Childhood

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Abstract

Background: Callous-unemotional (CU) behaviors predict risk for aggression and rule-breaking. Low social affiliation (i.e., reduced motivation for and enjoyment of social closeness) is hypothesized to be a phenotypic marker for CU behaviors in early childhood. However, studies need to establish observational methods to objectively assess social affiliation, as well as to establish parenting practices that can buffer pathways from low social affiliation to CU behaviors.

Methods: Using data from a longitudinal twin study of 628 children (age 2, 47% females; age 3, 44.9% females), we examined reciprocal associations between observed social affiliation, CU behaviors, and oppositional-defiant behaviors. We tested whether positive parenting moderated associations over time.

Results: We established that an observed measure of social affiliation derived from the Bayley's Behavior Rating Scale and Infant Behavior Record showed high inter-rater reliability and expected convergence with parent-reported temperament measures. Lower social affiliation at age 2 uniquely predicted CU behaviors, but not oppositional-defiant behaviors, at age 3. Finally, low social affiliation at age 2 predicted CU behaviors at age 3 specifically among children who experienced low, but not high, levels of parental positivity.

Conclusions: An objective rating scale that is already widely used in pediatric settings reliably indexes low social affiliation and risk for CU behaviors. The dynamic interplay between parenting and low child social affiliation represents an important future target for novel individual- and dyadic-targeted treatments to reduce risk for CU behaviors.

Keywords

callous–unemotional; conduct problems; social affiliation; parenting; psychopathy

Childhood conduct problems (CP) predict risk for antisocial behavior across the lifespan, as well as poor mental health and socioeconomic outcomes (Rivenbark et al., 2018). Callous-unemotional (CU) behaviors identify a distinct subgroup of children at risk for severe CP, over and above risk associated with other early markers of CP, including oppositional-defiant behaviors (Waller & Hyde, 2018). CU behaviors encapsulate callous, uncaring, and

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remorseless behavior (Waller et al., 2020). Early childhood (ages 2-5) is an important period to study CU behaviors since it is when the developmental foundations for empathy and prosociality are laid (Kochanska, 1997). To improve identification of children at risk for CP and inform novel targets for preventative interventions, we need to establish reliable phenotypic markers of CU behaviors in early childhood (Waller, Wagner, Flom, Ganiban, & Saudino, 2019).

Low social affiliation is theorized to be one phenotypic marker of CU behaviors (Waller & Wagner, 2019). Social affiliation is characterized as the intrinsic motivation for and enjoyment of closeness and social bonding with others, evidenced via social approach, positive vocalizations, social touch, and body gestures that promote interpersonal connection (Depue & Morrone-Strupinsky, 2005). It supports mother-child bonding in infancy (Panksepp, Nelson, & Siviy, 1994) and the development of social communication in early childhood (Hertenstein, Verkamp, Kerestes, & Holmes, 2006). Low social engagement and reduced sensitivity to cues of affiliation hinder attachment formation in infancy (Viding & McCrory, 2019) and social bonding in childhood (Wagner et al., 2016). Thus, an inherited predisposition for low social affiliation may undermine bonding, nurturing relationships, and prosociality, and increase risk for CU behaviors (Viding & McCrory, 2019; Waller & Hyde, 2018; Waller & Wagner, 2019).

A handful of studies have linked low social affiliation to increases in CU behaviors. In prior work, social affiliation has been operationalized differently but, has broadly indexed an overarching motivation for social bonding and positive emotional engagement with others. For example, increases in CU behaviors in early childhood were evidenced downstream of lower observed affection shown by children to parents at 18 months (Waller, Trentacosta, et al., 2016), lower mutually responsive orientation and positive affect between parents and children at age 3 (Kochanska, Kim, Boldt, & Yoon, 2013), and less observed engagement with an experimenter at age 3 (Waller et al., 2019). Together, these studies suggest that between 1 and 3-years of age, there is meaningful variation in the expression of social affiliation and behavioral responsivity to cues of affiliation that signal risk for CU behaviors (Waller & Wagner, 2019). This conclusion signals an important avenue for research since parent-report measures of CU behaviors show reliability and predictive validity only from age 3, whereas at age 2, appear no more prognostic than parent-reported measures of CP (Waller, Dishion, et al., 2016). Thus, if we can establish observed metrics of risk markers for CU behaviors prior to age 3, we can better identify at risk children and target interventions to reduce CU behaviors.

There are several limitations of research examining social affiliation in relation to CU behaviors. First, no studies have explored temporal directionality. That is, while low social affiliation is hypothesized to be a developmental precursor to CU behaviors, high CU behaviors could undermine social affiliative processes during early childhood, contributing to reductions in affiliation over time. In support of this premise, a study of 731 mother-child dyads demonstrated that CU behaviors at age 2 predicted decreases in parental warmth by age 3, over and above CP (Waller et al., 2014). Importantly, however, no studies have assessed reciprocal, longitudinal pathways between child social affiliation and CU behaviors in early childhood to test unidirectionality or bidirectionality between these constructs.

Second, studies need to assess social affiliation using established objective methods, including via measures that are not confounded by social affiliative processes that occur solely within the parent-child dyad (Kochanska et al., 2013; Waller, Trentacosta, et al., 2016) and that generalize to multiple settings. Finally, studies are needed that use observational measures with coding by trained, independent raters, who have a broad basis from which to make comparisons when rating a child's behavior. Indeed, the majority of prior studies are limited through use of observational coding schemes that rate child behavior from a single, brief (i.e., 1-2 minutes) laboratory paradigm. In sum, studies are needed that establish the utility of using standardized observations to assess social affiliation in young children based on different behavioral situations, thus maximizing the potential for generalizability and reliability, as well as prognostic utility, in predicting risk for CU behaviors.

The most widely-used standardized observational measure for children aged 1 and older is the Bayley Scales of Infant Development (BSID-II), which assesses various behaviors directed towards an experimenter, and represents the gold standard assessment for identifying neurodevelopmental delays in early childhood (Bayley, 1969). The Bayley's Behavior Rating Scale (BRS) (Bayley, 1993) is used to rate behavior following administration of the BSID-II. It has also been employed to assess temperament, with research linking BRS ratings to many psychosocial outcomes, including self-regulation (Raikes, Robinson, Bradley, Raikes, & Ayoub, 2007) and social engagement/affiliation (Edelson & Saudino, 2009). However, no prior studies have assessed whether social affiliation, derived from BRS rating scales, predicts risk for CU behaviors. Addressing this knowledge gap represents a critical advancement to identify risk for CU behaviors given the widespread use of the BSID-II in clinical research, as well as child psychiatry and pediatric settings (Bayley, 1993).

Beyond child phenotypic risk, pathways from temperament to behavior in early childhood are modified by context, particularly parenting (Kochanska, 1997). Positive parenting strategies promote children's ability to internalize parental messages of socialization, understand rules, and develop empathy (Kochanska et al., 2013). In particular, parental warmth has been linked to reductions in CU behaviors from 2 to 3-year olds (Waller et al., 2014) and to lower CP in 4 to 12-year-olds with high CU behaviors (Pasalich, Dadds, Hawes, & Brennan, 2011). Moreover, in a monozygotic twin differences study of 6- to 11-year-old children, the twin that experienced lower levels of parental warmth showed higher levels of CU behaviors, establishing parental warmth as a true "non-heritable" influence on CU behaviors (Waller, Hyde, Klump, & Burt, 2018). In contrast, harsh parenting (e.g., punitive discipline) may desensitize children to cues of threat or negative reinforcement, exacerbating risk for aggression and CU behaviors among children with low fearful arousal (Chang, Schwartz, Dodge, & McBride-Chang, 2003; Patrick, Fowles, & Krueger, 2009; Waller et al., 2019). That is, harsh parenting and parental negativity may play a greater role in the risky pathways between a fearless temperament and CU behaviors, while positive parenting may specifically modulate the relationship between low social affiliation and CU behaviors (Waller et al., 2018). However, few studies have investigated the specific interplay between positive versus harsh parenting and child social affiliation in relation to risk for CU behaviors. In particular, studies need to establish whether, in the context of low child social affiliation, the absence of rewarding affiliative interactions with a parent further exacerbates

risk for CU behaviors. Conversely, high parental positivity and warmth could promote empathy, guilt, and prosociality, even among children showing low social affiliation, thus buffering risk for CU behaviors (Waller & Hyde, 2018).

In the current study, we addressed several gaps in knowledge about developmental pathways to CU behaviors. First, we tested whether observer ratings of child behavior following administration of the BSID-II and other laboratory behavioral situations could be used to derive an objective index of observed social affiliation at ages 2 and 3. We tested the fit of a longitudinal measurement model of social affiliation and established the construct and discriminant validity of the derived social affiliation factor relative to several widely-used temperament measures. We hypothesized that social affiliation would be uniquely related to more sociability and less shyness, but unrelated to emotionality, activity, and attention. Second, using a cross-lagged path model, we tested whether observed social affiliation was uniquely and reciprocally related to CU behaviors between ages 2 and 3, hypothesizing bidirectionality in the relationship, such that low social affiliation would predict increases in CU behaviors over time, while CU behaviors would simultaneously predict decrease in social affiliation over time. We included reciprocal pathways between CU behaviors, social affiliation, and oppositional-defiant behaviors to provide a stringent test of the specificity in the associations between social affiliation and CU behaviors. Finally, we explored whether parenting moderated pathways between low social affiliation and later CU behaviors, hypothesizing that reciprocal pathways between low observed social affiliation and CU behaviors between ages 2 and 3 would be exacerbated specifically in the context of low parental positivity, but not negativity.

Methods

Participants

Participants were from the Boston University Twin Project and were recruited from birth records supplied by the Massachusetts Registry of Vital Records. We excluded twins with low birth weight (<1750g), gestational age, (<34 weeks), or developmental disorders (Saudino & Asherson, 2013). We assessed 628 children within two weeks of their second birthday (M_{age}=2.07, SD=.05, 47% females) with 608 children reassessed one year later (M_{age}=3.05, SD=.05, 45% female; 96.8% retention). Race and ethnicity were representative of the Massachusetts population (85.7% Caucasian, 3.2% Black, 4.8% Hispanic/Latino/a, 1.9% Asian, 7.3% mixed, 1.6% other). Socioeconomic status ranged from low to upper middle class according to the Hollingshead Four Factor Index (range=14.50-66.00; M=51.04, SD= 10.67; Hollingshead, 1975).

Procedures

At both ages, the procedure consisted of two 1-hour laboratory visits, 48-hours apart. On day 1, one twin was assessed within the BSID-II standardized test situation while the other twin within a laboratory play situation. On day 2, the situations were reversed. The order of situations was counterbalanced across first and second-born twins. The play situation included tasks from the Laboratory Temperament Assessment Battery-Preschool Version (Goldsmith, Reilly, Lemery, & Prescott, 1995) (LAB-TAB) and three experimenter-modeled

elicited imitation tasks (Fenstermacher & Saudino, 2007). Each twin was assessed by the same tester for the play and test situations, but different testers assessed twins within twin pairs. After each visit, testers completed the BRS and Bayley's Infant Behavior Record (IRB; Bayley, 1969) (i.e., the precursor to the BRS prior to the BSID-II). Written informed consent was obtained from parents. All procedures were approved by the Boston University Institutional Review Board.

Measures

Observed Social Affiliation (ages 2 and 3).—We derived an observed social affiliation measure using BRS (Bayley, 1993) and IBR ratings. While the IBR is no longer part of the standard BSID-II procedure, it was included to generate temperament dimensions consistent with prior research (Saudino & Cherny, 2001). To asses social affiliation, we used the 9-item orientation/engagement subscale of the BRS, which indexes social engagement, positive affect, enthusiasm, interest in the surroundings and tasks, and energy. We used separate BRS ratings from the test (age 2 α=.88; age 3 α=.92) and play (age 2 α=.92; age 3 α=.93) situations. The IBR includes the 5-item affective/extraversion subscale, which assesses social responsiveness, cooperativeness, and emotional tone, providing an index of the degree to which the children are positive and socially involved(Saudino & Cherny, 2001). We used separate IBR ratings from the test (age 2 α=.90; age 3 α=.92) and play (age 2 α=.93; age 3 α=.93) situations. A second observer rated 20% of videotapes with moderate-to-high inter-rater agreement (age 2, range, r=.67-.74, p<.01; age 3, range, r=.71-.85, p<.01). BRS and IBR scores were moderately-to-highly correlated (range, r=.54-.90, p<.001). We estimated a social affiliation factor derived from ratings at each age (i.e., BRS test, BRS play, IBR test, IBR play). We also computed a mean of z-scored ratings (i.e., composite observed score) to generate descriptive statistics and bivariate correlations. Additional details are provided in Supplemental Methods and Table S1.

CU and Oppositional-Defiant Behaviors (ages 2 and 3).—We used six items to assess oppositional-defiant behaviors (e.g., defiant, disobedient) and five items to assess CU behaviors (e.g., no guilt after misbehavior), which were from the parent-reported Achenbach System of Empirically Based Assessment, Preschool Forms (Achenbach & Rescorla, 2000) (see Table S2). Internal consistency for the oppositional-defiant (age 2 α=.79; age 3 α=.81) and CU (age 2 α=.55; age 3 α=.61) behavior scales were consistent with other studies from similar ages (Waller & Hyde, 2018). Moreover, although the internal consistency for the CU behaviors measure is lower than is typically considered to be acceptable, prior studies have established its construct validity in relation to other purpose-developed measures of CU behaviors (Colins, Veen, Veenstra, Frogner, & Andershed, 2016; Waller, Dishion, et al., 2016).

Child Temperament (ages 2 and 3).—The Colorado Child Temperament Inventory (Rowe & Plomin, 1977) (CCTI) is a 30-item parent-report questionnaire with items rated on a 5-point Likert scale (1=not at all like the child; 5=a lot like the child). Items form six subscales: emotionality, activity, sociability, shyness, attention/persistence, and soothability (Rowe & Plomin, 1977). Internal consistencies were good for the emotionality (age 2, α=.82; age 3, α=.81), activity (age 2, α= .72; age 3, α=.74), attention/persistence (age 2,

α=.73; age 3, α=.77), soothability (age 2, α=.74; age 3, α=.74) and shyness (age 2, α=.83; age 3, α=.86) subscales, but were below the adequate threshold for sociability (age 2, α=.56; age 3, α=.65).

Parental Positivity and Negativity (ages 2 and 3).—Parents completed the Parent Feelings Questionnaire (Deater-Deckard et al., 2009) (PFQ), which includes an 11-item positivity scale that indexes parental positive feelings about their child (e.g., 'When I think about my child, it usually gives me warm feelings') and an 11-item negativity scale (e.g., 'I fight or argue more than I would like to'), with each item rated on a 5-point scale (1=definitely untrue; 5=definitely true). Additional items assess the frequency that parents experience positive (5 items) and negative (5 items) emotions about their child (e.g., happy, angry), with items rated on a 10-point scale (1=never; 10=always). Consistent with prior literature (Deater-Deckard et al., 2009), we created a composite score combining the feelings and emotions scales for parental positivity and negativity. Internal consistency for the parental positivity (age 2 α=.75; age 3 α=.78) and negativity scales (age 2 α=.78; age 3 α=.93) were acceptable moderately stable over time (positivity, r=.55, p<.001; negativity, r=.62, p<.001). To explore the overall parenting environment across early childhood, we created composite parental positivity and negativity variables combining scores at ages 2 and 3.

Covariates (age 2).—Covariates were parent reports of child gender, age, and socioeconomic status (SES) using the Hollingshead Four Factor Index (Hollingshead, 1975).

Analytic Plan

All analyses were conducted in Mplus version 8 (Muthén & Muthén, 1998), using full information maximum likelihood procedures. Model fit was evaluated using standard criteria for chi-square, Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and the Root Mean Square Error of Approximation (RMSEA) (Hu & Bentler, 1999). We used the TYPE=COMPLEX and CLUSTER commands in Mplus to implement corrections to the standard errors in each model and account for non-independence of observations due to the nested structure of twin data (i.e., twins nested in families). To test our first aim, we examined the fit of a longitudinal measurement model for observed social affiliation at ages 2 and 3. Using confirmatory factor analysis, we specified the BRS orientation/engagement and IRB affect/extraversion subscales from both the test and play situations to load onto a social affiliation factor at each age, allowing for covariances between ratings from the same rating scale and situation within and across time. To establish construct validity, we explored pathways within a single correlated dependent variable model simultaneously regressing all six child temperament scales onto the social affiliation factor at each age. To test our second aim, we explored reciprocal associations between observed social affiliation, CU behaviors, and oppositional-defiant behaviors over time by testing a cross-lagged model that included the latent observed affiliation factor at ages 2 and 3. For our third aim, we used multi-group modeling to establish whether pathways between observed social affiliation and CU behaviors differed between children who experienced low versus high parental positivity across ages 2 and 3. We grouped children using a mean split into low (n=240) versus high (n=348) parental positivity groups. We compared the fit of a model where all pathways were

freed for both groups to a model where all pathways were fixed. To isolate the pathway of interest, we also compared the fit of a fully freed model to one where only the pathway from observed social affiliation at age 2 to CU behaviors at age 3 was fixed. We used the Satorra-Bentler scaled chi-square test statistic to compare fit between models (Satorra & Bentler, 1988). To establish specificity in moderation by positive parenting, we also used a multi-group approach to test whether pathways between observed social affiliation and CU behaviors differed between children who experienced low (n=345) versus high (n=243) parental negativity.

Results

Table S3 presents descriptive statistics for study variables. Table S4 presents bivariate correlations between study variables.

Aim 1. Construct Validity of the Observed Social Affiliation Measure

The longitudinal measurement model for observed social affiliation at ages 2 and 3 showed acceptable fit (CFI=.97; TLI=.93; RMSEA=.13; Figure 1). Scale-factor loadings were high at both ages 2 (*range,* β=.73-.80, p<.001) and 3 (*range,* β=.81-.86, p<.001), and the latent correlation between observed social affiliation at both ages indicated moderate-to-high stability (r=.53, p<.001). In terms of construct validity, observed social affiliation at age 2 was related to higher sociability (β=.12, p<.05) and lower shyness (β=−.38, p<.001), but unrelated to activity, emotionality, attention, and soothability (Table S5; Figure S1). Similarly, observed social affiliation at age 3 was marginally related to sociability (β=.10, p=.06) and significantly and negatively related to shyness (β=−.35, p<.001), but unrelated to activity, emotionality, attention, or soothability (Table S6; Figure S1).

Aim 2. Unique associations between social affiliation and CU behaviors

The cross-lagged path model established significant within-construct pathways over time indicative of stability in our core constructs (*range,* β=.40-.51, p<.001). In addition, low observed social affiliation at age 2 predicted higher CU (β=−.11, p<.05), but not oppositional defiant (β=−.01, p=.89) behaviors at age 3 (Figure 2, Table S7). CU behaviors at age 2 did not predict observed social affiliation at age 3 (β=.001, p=.98). The magnitude of estimates and significance patterns remained unchanged using a latent social affiliation factor derived only from BRS ratings (Figure S2, Table S8).

Aim 3. Parental positivity buffering risk

There was no significant difference in the fit of a fully fixed versus fully freed model ($\Delta\chi^2$=41.36, p=.41). However, a fully freed model fit the data significantly better than a model where the cross-lagged pathway of interest from observed social affiliation at age 2 to CU behaviors at age 3 was fixed across levels of parent positivity ($\Delta\chi^2$=3.83, p<.05). Moreover, a model where only the pathway from observed social affiliation at age 2 to CU behaviors at age 3 was freed fit significantly better than a model where all other pathways were fixed ($\Delta\chi^2$=3.93, p<.05). Together, these model comparisons suggest that the relationship between observed social affiliation and later CU behaviors, but not the other pathways, differed between groups (see Table S10 for model comparisons for all

pathways). Overall, lower observed social affiliation at age 2 significantly predicted CU behaviors at age 3 for children who experienced low parental positivity (β=−.23, p<.01), but not for children who experienced high parental positivity (β=−.08, p=.25) (Table S11). Similar estimates were obtained using a median, rather than mean, split for the parenting variable where lower observed social affiliation predicted later CU behaviors only among children who experienced low (β=−.34, p<.001) but not high (β=−.08, p=.31) parental positivity (Table S12). Consistent with hypotheses, parental negativity did not moderate the relationship between low observed social affiliation at age 2 and CU behaviors at age 3 (see Supplemental Results).

Discussion

We established that low social affiliation is an important developmental precursor to CU behaviors in early childhood. Our findings are consistent with a broader literature that places social affiliation at the center of attachment and interpersonal relationship formation (Viding & McCrory, 2019; Wagner et al., 2016), social communication (Hertenstein et al., 2006), and empathy development (Tompkins, Benigno, Lee, & Wright, 2018), processes that are disrupted among children with CU behaviors. We showed a unidirectional longitudinal relationship between observed social affiliation and increases in CU behaviors during early childhood. This pathway was specific to CU behaviors, with no relationship between social affiliation and oppositional-defiant behaviors. Finally, we confirmed the importance of positive parenting for buffering risk between low social affiliation and CU behaviors in early childhood.

There is an emerging consensus that low social affiliation represents a core risk marker for CU behaviors (Waller & Wagner, 2019). It undermines a child's ability to experience social bonding and nurturing relationships, which confer cascading failures in developing empathy, reduced enjoyment in maintaining social closeness, and lack of caring behaviors (Kochanska, 1997; Viding & McCrory, 2019; Waller & Hyde, 2018; Waller & Wagner, 2019). The specificity with which low social affiliation predicted later CU behaviors, but not oppositional behaviors, is consistent with evidence that CU behaviors characterize a qualitatively distinct subgroup of children at risk for CP (Waller & Hyde, 2018). Evidence for the unidirectionality of the relationship supports the need for mechanistically-targeted preventative interventions that specifically target social affiliation processes at 1 and 2 years of age to reduce risk for CU behaviors.

Our findings further establish the utility of using objective behavioral assessments of early child temperament to determine risk for psychopathology. We demonstrated that commonly-used observational rating scales assessed prior to age 3, signal risk for later CU behaviors. The first three years of life are critical for brain maturation and optimizing child development to prevent later neurodevelopmental disorders (Regalado & Halfon, 2001). Thus, professionals, parents, and policymakers focus on this period to improve pediatric care by incorporating targeted and early developmental assessments (Regalado & Halfon, 2001). The current findings suggest that the IBR and BRS could be adapted to assess risk for CU behaviors, which could transform future efforts to identify children at risk for psychopathology, in the form of CP, and target preventative interventions more effectively.

However, this research is in its early stage and large population-based studies are needed that establish precise cut-offs that are indicative of clinically-significant “low social affiliation” and that might constitute risk for future CU behaviors or CP, thus precipitating potential intervention.

Consistent with prior research, parental positivity, but not parental negativity, buffered risk for CU behaviors (Waller et al., 2018). Specifically, parental positivity moderated the relationship between low social affiliation and later CU behaviors, such that early social affiliation predicted later CU behaviors only among children who experienced low parental positivity across ages 2 and 3. Our findings support the assertion that parental positivity can promote affiliative behavior and emotion understanding, thus laying the foundation for empathy and conscience development (Kochanska, 1997). However, while affective/relational aspects of positive parenting may be particularly important in reducing CU behaviors (Waller et al., 2014; Waller & Wagner, 2019), behavioral aspects of positive parenting may be less effective (Falk, Stiles, Krein, & Lee, 2021). Thus, future research is needed to tease apart the relative importance of different aspects of positive parenting that buffer risk for CU behaviors. In particular, randomized controlled trials of parenting interventions with modules that target child socioaffiliative processes, dyadic affiliation, and parental positive reinforcement can better disentangle the interplay of parent/child characteristics and mechanisms of change to reduce CU behaviors (Kimonis et al., 2019).

The current study is characterized by several strengths, including a prospective longitudinal design and observational methods. Nevertheless, the findings should be considered alongside key limitations. First, although we leveraged a twin sample, the modest magnitude of the bivariate association between CU behaviors and observed social affiliation meant that we could not decompose genetic versus environmental sources of covariance. Future twin studies leveraging larger sample sizes are needed to explore genetic versus environmental sources of covariance between CU behaviors and low social affiliation. Second, twin studies may not be representative of non-twin population. However the means and standard deviations of our CU traits measure are similar to those reported in non-twin samples of the same age (Satlof-Bedrick, Waller, & Olson, 2019). Third, the BRS and IBR coding schemes included a single item that assessed for social fearfulness, which runs counter to theoretical models that propose low social affiliation and fearlessness as independent and unique risk factors for CU behaviors (Waller & Wagner, 2019). Future research is needed to develop behavioral coding schemes that separate these two constructs. Fourth, although we tested specificity in the prediction of CU behaviors versus oppositional-defiant behavior, current theoretical models conceptualize low social affiliation as a transdiagnostic construct that could presage risk for many different dimensions of psychopathology, including social anxiety (Weisman, Aderka, Marom, Hermesh, & Gilboa-Schechtman, 2011), schizoid personality (Livesley, Jackson, & Schroeder, 1992), and psychopathy (Viding & McCrory, 2019). Future studies are needed to establish how low social affiliation, along with other temperament or environmental risk factors, gives rise to these different forms of psychopathology across the lifespan (Waller & Wagner, 2019). Finally, our sample included majority white, middle-class families. Thus, the findings may not generalize to more diverse samples or clinic-referred children.

In sum, we provide evidence that low social affiliation is an important developmental precursor to CU behaviors, exacerbated in the context of low parental positivity. We add to the literature on the synergistic relationship between parenting and child temperament and their interactive role in differentiating specific subtypes of childhood CP. Critically, we establish the use of objective and widely-used observational measurers of child temperament and behavior, such as the IBR and BRS, as important tools to assess early risk for CU behaviors. Finally, the findings speak to the need for preventive interventions that target deficits in affiliative processing and promote positive parenting. Specifically, treatment modules could teach parents skills for scaffolding cooperative and affectionate child behaviors and promote child-parent affiliation and bonding (Kimonis et al., 2019).

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Key Points

- Callous-unemotional (CU) behaviors predict risk for conduct problems (CP)
- Low social affiliation may represent an early phenotypic marker for CU behaviors.
- This study established the validity and reliability of an observed measure of social affiliation
- Lower social affiliation at age 2 predicted increases in CU behaviors at age 3, particularly for children who experienced low parental positivity.
- The dynamic interplay between parental positivity and low child social affiliation has implications for treating CU behaviors and CP.

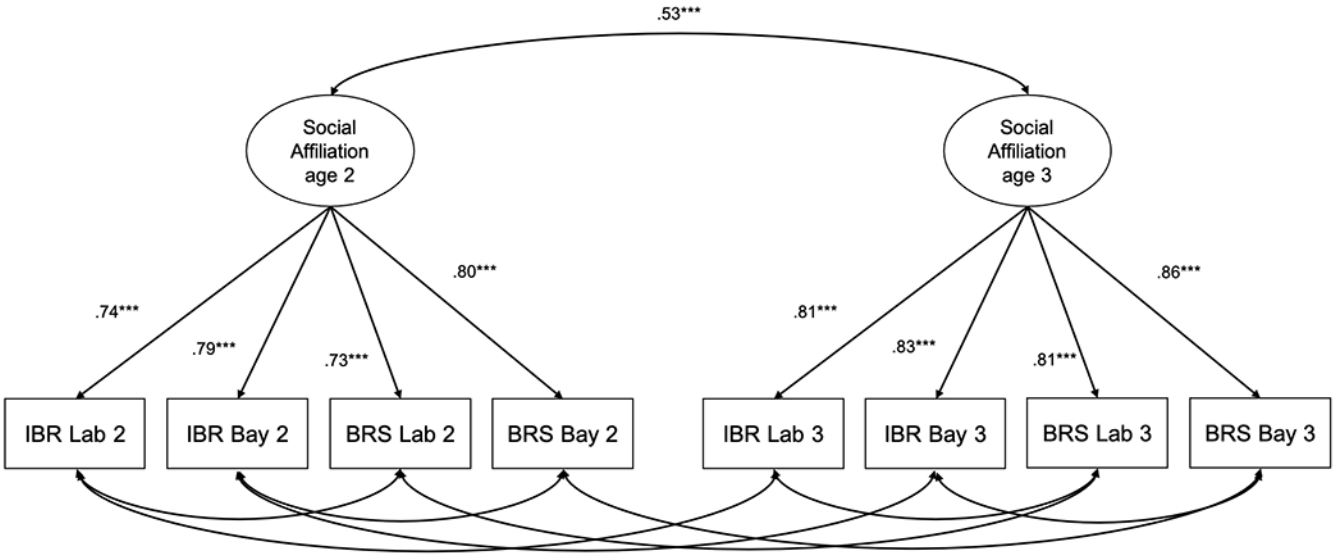

Figure 1.

Measurement model of observed social affiliation at ages 2 and 3

Note. p<.001***. Model fit was acceptable (χ^2=109.74; CFI=.97; TLI=.93; RMSEA=.13). Figure presents standardized factor loadings. BRS OE= rientation/Engagement subscale of the Behavior Rating Scale. IBR AE=Affect-Extraversion subscale of the Infant Behavior Record.

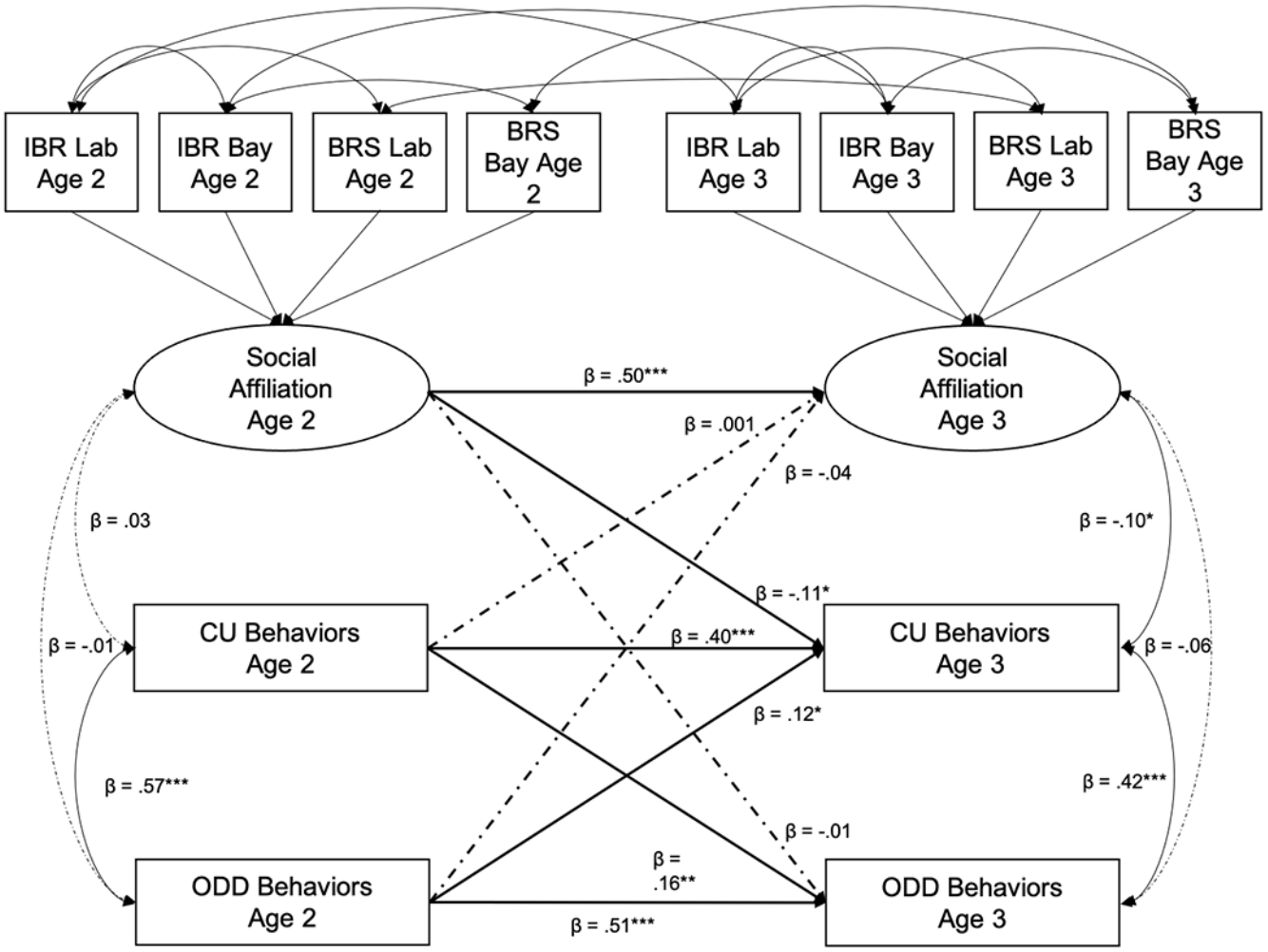

Figure 2.

Cross-Lagged Associations Between CU Behaviors, ODD Behaviors, and Observed Social Affiliation

Note. $p<.05$*; $p<.01$**; $p<.001$***. Model fit was excellent ($\chi^2=96.74$; CFI=.99; TLI=.98; RMSEA=.04). Standardized coefficients are presented. Dashed lines (- - -) indicate non-significant pathways. Model controls for child age, child gender, and SES. Magnitude and direction of estimates and patterns of significance remain unchanged after controlling for gestational age, Mental Development Index verbal score from the Bayley Scales (Verbal IQ) and the Pervasive Developmental Problems subscale (autism-like traits) and Attention-Deficit/Hyperactivity (ADHD) subscale from the Child Behavior Checklist (Table S5).