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Within-Person Bidirectional Associations Over Time between Parenting and Youths' Callousness

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Abstract

Objective.—Callousness has been identified as a key driver of aggressive and violent behavior from childhood into early adulthood. Although previous research has underscored the importance of the parenting environment in contributing to the development of youth callousness, findings have generally been confined to the between-individual level and have not examined bidirectionality. In the current study, we test whether aspects of parenting are associated with callousness from childhood to adolescence both between and within individuals, examine the temporal ordering of associations, and test whether these relations are moderated by gender or developmental stage.

Method.—Data came from a longitudinal study in which parents of 1,421 youth (52% girls; 62% White and 22% Black) from the second, fourth, and ninth grades were interviewed three times, with one year between consecutive interviews.

Results.—Random-intercept cross-lagged panel models indicated that elevated youth callousness predicts subsequent increases in parental rejection and decreases in consistency of discipline. Findings were largely similar for boys and girls, but within-individual associations were generally stronger for 4th graders compared to the 2nd and 9th graders.

Conclusions.—Callousness and parenting practices and attitudes were related both at the between-individual and within-individual level. These results have implications for the etiology and treatment of children and adolescents who exhibit callousness.

Keywords

callousness; parenting; bidirectional; childhood; adolescence

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Youth who exhibit callousness tend to lack empathy, remorse, and emotion, and are more likely to engage in severe and stable patterns of antisocial and violent behavior (Frick, Cornell, et al., 2003). Although callousness was long conceptualized as a largely heritable and stable personality trait (Frick & White, 2008), a robust research literature has identified the importance of the parenting environment in the development of youth callousness (Waller et al., 2013). However, much of this work has examined between-person associations, such that youth exposed to a harsher parenting environment exhibit higher levels of callousness. Because these findings are at the person level, they may be due to reverse causality or confounded by other variables that predict both the parenting environment and youth callousness. Only limited work has examined whether within-person changes in callousness over time are predicted by changes in aspects of parenting, and this work has generally not examined temporal ordering nor bidirectionality (i.e., whether youth callousness predicts later parenting and/or parenting predicts later youth callousness). In addition, research has generally not examined how these associations might differ as a function of gender or developmental stage. In this study, we examine associations between youth callousness and aspects of parenting (rejection and consistent discipline) both between and within individuals using three waves of data from a sample of 1,421 parents of youth in the 2nd, 4th, and 9th grades at baseline.

Etiology of Callousness

Callousness has been measured in children as young as two years old (Hyde et al., 2016; Kimonis et al., 2006) and has been shown to be relatively stable from childhood through adolescence and into adulthood (Frick, Kimonis, et al., 2003). Given these findings, callousness often has been conceptualized as a trait-like personal characteristic, with heritability estimates similar to those of common personality traits (Moore et al., 2019). Indeed, callousness is often referred to as callous-unemotional traits in the literature, cast as a potential developmental precursor to adult psychopathy, and understood as a key component of the broader construct of psychopathic traits that also includes narcissism-grandiosity and impulsivity-conduct problems (Frick, Cornell, et al., 2003). Research on problem behaviors has generally supported these conclusions, as youth with elevated callousness, relative to other youth, appear to engage in problem behaviors that are more heritable (Viding et al., 2008) and less responsive to environmental factors (e.g., parental discipline, intervention; Hawes & Dadds, 2005; Oxford et al., 2003). However, recent research has provided evidence for heterogeneity in the development of callousness (Hawes et al., 2014; Pardini & Loeber, 2008) and the influence of environmental factors, particularly the parenting environment, on the development of youth callousness (Besemer et al., 2016; López-Romero et al., 2015; Waller et al., 2013; Waller et al., 2012; Waller et al., 2014).

Youth Callousness and Parenting

Research has indicated the parenting environment may be a particularly salient environmental influence on the development of callousness. Youth exposed to harsh or inappropriate parenting are generally at greater risk for developing callousness, whereas youth exposed to warm, consistent, and involved parenting tend to have lower levels of callousness (Besemer et al., 2016; Byrd et al., 2018; Dargis & Li, 2020; López-Romero

et al., 2015; Waller et al., 2018; Waller et al., 2013; Waller et al., 2012), though one recent study indicates that the use of positive reinforcement might amplify conduct problems in the presence of high callousness (Falk et al., 2021). Further, theoretical models of environmental influences on callousness have generally implicated the parenting environment. The moral socialization model posits that for youth who may be prone to distress, fearfulness, and emotional reactivity, experiencing harsh, rejecting, or neglectful parenting can elicit emotional numbing and callousness as a coping response, and disrupts the youth's internalization of morals and subsequent conscience development (Craig et al., 2021; Frick & Morris, 2004; Kochanska, 1993). Importantly, this model posits bidirectional influences between children and socialization agents, including parents (Newton et al., 2014; Spinrad & Eisenberg, 2019).

Relatedly, the Sensitivity to Threat and Affiliative Reward (STAR) model of callousness posits that the combination of low affiliative reward and low sensitivity to threat put youth at risk for the development of callousness (Waller & Wagner, 2019). Thus, according to this model, youth who do not derive personal pleasure from interpersonal relationships, including those with parents, because of reduced responsiveness to affiliative inputs, and/or because of low levels of affiliative inputs from the environment, including rejection and inconsistent discipline, are more likely to exhibit callousness, particularly those who exhibit high levels of fearlessness due to neurogenetic or temperamental factors, and/or due to repeated exposure to threatening stimuli which can lead to desensitization and fearlessness. Although this model identifies genetic and physiological factors that contribute to the development of callousness, it also highlights the importance of the parenting environment, as parents who exhibit lower levels of warmth and responsiveness and engage in harsh parenting and rejection contribute to lower affiliative reward and greater fearlessness in children (Waller & Wagner, 2019; Waller et al., 2021). Thus, both the moral socialization model and STAR model of callousness propose that a harsh and inappropriate parenting environment contributes to the development of callousness. Of course, underpinning all theoretical perspectives implicating parenting in the development of callousness is the observation of shared genetic influences between parents and children on the family environment (Takahashi et al., 2021; Viding et al., 2007). Previous research using genetically informed designs, however, has found evidence for parenting influences on callousness above and beyond gene-environment correlations (see Waller & Wagner, 2019).

One specific aspect of parenting that has been implicated in the development of youth callousness is parents' rejection, or negative feelings towards, and dissatisfaction with, their child. In one longitudinal study of children in Great Britain, negative parental feelings and negative parental discipline at age 4 were predictive of higher youth callousness trajectories from ages 7 to 12 (Fontaine et al., 2010). In a longitudinal study of children at ages 2, 3, and 4 in the U.S., observed parental harshness (including parental criticism, rejection, and negative attitudes) at age 2 predicted children's deceitful-callous behavior at ages 3 and 4, and harshness at age 3 predicted deceitful-callous behavior at age 4, even after controlling for children's deceitful-callous behavior at the previous age (Waller et al., 2012). This is in line with previous theory and research which suggests that parental rejection, criticism, and negative feelings towards one's child tend to predict negative outcomes, such as behavior problems, whereas warmth, acceptance, and positive feelings generally predict greater well-

being and psychosocial adjustment (Rohner, 2004; Skinner et al., 2005). Parental rejection also tends to be correlated with adverse parenting practices, including inconsistent discipline and the use of coercion or control (Skinner et al., 2005). Thus, in the current study, we expect parental rejection, which we operationalized as annoyance and dissatisfaction toward the child, to be positively associated with youth callousness.

Although inconsistent discipline has been studied and theorized as an ineffective parenting practice that contributes to the development of problem behavior more broadly (Cheung et al., 2018; Lengua & Kovacs, 2005; Skinner et al., 2005), there has not been as much work linking this construct to youth callousness specifically. Interestingly, one study found that inconsistent discipline mediated the association between mothers' antisocial personality traits and their sons' callousness (Robinson et al., 2016). However, other studies have failed to find that parents' inconsistent discipline predicts youth callousness (Childs et al., 2014; Hawes et al., 2011; Vitacco et al., 2003), although one study did find that youth callousness predicted later inconsistent discipline (Hawes et al., 2011). Identifying whether parents' use of consistent discipline is related to their child's development of callousness can help to inform future prevention and intervention efforts, particularly parent training and support programs, to reduce risk of youth callousness. Thus, in the present study, we sought to explore associations between consistent discipline and youth callousness. Given previous research findings with other youth problem behaviors, we expect consistent discipline to be negatively associated with youth callousness.

Gender and Callousness

Previous studies have consistently found that boys have higher levels of callousness on average compared to girls (Docherty et al., 2017; Essau et al., 2006; Frick, Cornell, et al., 2003; Kimonis et al., 2006; although see Barker et al., 2011 for an exception), and callousness generally predicts problem behaviors for both boys and girls (Barker et al., 2011; Cardinale & Marsh, 2020; Essau et al., 2006). However, findings have been mixed regarding whether associations between parenting and youth callousness differ as a function of youth gender. In a community sample of kindergarten students in the U.S., significant relations between parenting practices (e.g., positive reinforcement, warmth) and callousness were not moderated by gender (Clark & Frick, 2016). In a community sample of school-age children in Cyprus, high parental distress and low parental involvement were associated with higher trajectories of callousness over two years, and this did not differ as a function of youth gender (Fanti et al., 2017). Among children in Great Britain, negative parental feelings, negative parental discipline, and chaos in the home at age 4 were predictive of being in a higher callousness trajectory from ages 7 to 12, and gender did not moderate these associations (Fontaine et al., 2010).

Yet some studies have found significant moderation by gender. In the Avon Longitudinal Study of Parents and Children (ALSPC), parenting behaviors at age 4 were differentially related to callousness at age 13 depending on gender. Warm parenting was associated with lower callousness for girls but was not associated with callousness for boys, whereas harsh parenting was associated with higher callousness for boys but was unrelated to callousness for girls (Barker et al., 2011). In a sample of 1,008 Australian children ages 3 to 10, positive

parenting was associated with lower callousness for girls but not for boys, whereas parental involvement predicted lower callousness for boys but not for girls (Hawes et al., 2011). And although Fontaine and colleagues (2010) did not find evidence for gender moderation of parents' feelings and discipline in their study, they used a twin design and found that the variance in callousness trajectories was more attributable to additive genetic factors for boys and shared environmental factors for girls, especially for the youth on a high stable callousness trajectory. It is unclear whether mixed findings from previous research are due to the differences in study samples (e.g., different countries, different age ranges) or study methodology (e.g., different follow-up periods, parent report vs. youth self-report). Thus, given these mixed findings, more research is needed to understand whether associations of parenting practices and attitudes with callousness from childhood through adolescence differ as a function of gender.

Parenting and Callousness across Development

In addition to gender, it is possible that associations of parenting practices and attitudes with youth callousness may differ as a function of developmental stage. Previous research has indicated that aspects of the parenting environment predict callousness from early childhood through adolescence (Waller et al., 2013), although studies have generally not examined whether the strength of these associations differs across periods of development. One study of Australian children (ages 3 to 10) found that age moderated the prediction of parenting practices from callousness, such that the positive association between callousness and corporal punishment was greater for older children (Hawes et al., 2011). In addition, this study found a three-way interaction between callousness, age, and gender, such that callousness was negatively associated with parental involvement, but only for older boys and younger girls. In the same study, when parenting was used to predict callousness, parental monitoring was negatively associated with callousness, but only among younger children. Though these results point to possible developmental differences in the associations between parenting and callousness in childhood, this sample did not include adolescents, and thus it is unclear whether associations would continue to change as youth get older and their relationships with their parents change (Steinberg, 2001). The present study considers whether associations among aspects of parenting and youth callousness differ across childhood, pre-adolescence, and adolescence.

Limitations of Previous Research

Previous research has identified the parenting environment as a robust predictor of callousness, yet much of this work has relied on cross-sectional observational data or has analyzed longitudinal relations at the between-individual level (Byrd et al., 2018; Dargis & Li, 2020; López-Romero et al., 2015; Waller et al., 2012). Thus, there is generally a lack of research examining *within-individual change* in parenting and callousness over time from childhood to adolescence; even longitudinal studies typically use analyses that cannot disaggregate within-individual change from between-individual differences. This is an important next step in testing theoretical models of bidirectional influences between parenting behaviors and youth callousness, as pre-existing between-individual differences due to other factors may be responsible for associations found in previous research. The

one longitudinal study that did examine within-individual bidirectional associations between interpersonal callousness and parenting behaviors found that interpersonal callousness predicted parents' use of physical punishment, but not other parenting behaviors, and parenting behaviors did not predict changes in interpersonal callousness (Besemer et al., 2016). However, this study was limited by its use of an entirely male sample. Further, previous studies of callousness also generally have failed to identify whether any within-individual associations differ in magnitude or direction as a function of youth gender or developmental stage.

The Current Study

In this study, we examine bidirectional relations between parenting and youth callousness in a longitudinal community sample of 1,421 children (2nd graders), pre-adolescents (4th graders), and adolescents (9th graders) interviewed annually for three years. We use analytical models that are able to separate stable between-individual associations from dynamic within-individual associations among changes in the outcome and predictors. Based on theories implicating the parenting environment for the development of callousness (moral socialization model and STAR model), we hypothesize that parenting and youth callousness will be associated both between and within individuals, such that 1) compared to other individuals, youth with higher levels of parental rejection and lower levels of parental consistent discipline will exhibit higher levels of callousness (between-individual level); 2) during times when youth are exposed to greater parental rejection and less consistent discipline, they will be also be at greater risk for callousness *relative to their own average* (within-individual level); and 3) at the within-individual level, associations between parenting and callousness will be bidirectional (i.e., higher callousness will predict more adverse parenting practices and attitudes at subsequent time points, and adverse parenting practices and attitudes will predict greater callousness at later time points). Finally, we also test moderation by gender and developmental stage to explore whether associations differ for boys and girls and for youth at different ages.

The results of this study will have important implications for theoretical models of callousness by indicating whether associations between parenting practices and attitudes and youth callousness operate on a within-individual level and by establishing temporal ordering among these variables. Thus, to the extent that parenting practices and attitudes precede changes in callousness on a within-individual level, our results will be in support of the STAR model of callousness and moral socialization theory. However, if we find that youth callousness instead drives changes in parenting behaviors, this would still be in line with moral socialization theory, which posits bidirectional influences, but would no longer support the STAR model of callousness[1]. In addition, the results of this study have practical implications for interventions focused on reducing youth callousness; if parenting behaviors precede changes in youth callousness, then targeting these parenting behaviors may be an effective way to improve outcomes for youth. Further, moderation analyses will indicate

[1]We note here that if youth callousness were to predict changes in parenting, this would not be in opposition to the STAR model. It would not be proposed by the STAR model, however, because this theoretical framework specifically addresses etiology of callousness rather than the consequences of callousness or the causal factors that predict parenting attitudes and behaviors.

whether such interventions are more likely to be beneficial depending on a youth's gender or developmental stage.

Methods

Participants and Procedures

Data for this study were drawn from a larger longitudinal project examining environmental risk factors in the development of aggressive and antisocial behavior. Participants spanned three separate grades (2nd, 4th, and 9th grades at baseline) and came from seven different school districts in the Midwest region of the United States (four in Michigan and three in Iowa). Roughly equal proportions of students went to school in urban (35%), suburban (33%), and rural (32%) areas. Of the 1,421 youth in the original study, 447 were in the 2nd grade, 517 were in the 4th grade, and 457 were in the 9th grade. Baseline interviews (T1) were conducted in 2006 and 2007; youth, their parents, and their teachers were interviewed annually for another two years (T2 and T3). In this study, we use data only from parents about their children, as parents completed measures of parenting attitudes and practices and youths' callousness.

Across the three grades, about 45% of participants were girls; 62% were White/Caucasian, 22% were Black/African American, 7% were biracial or multiracial, 2% identified with another racial/ethnic category, and 7% were missing data on race/ethnicity. The interviewed parents (88% of whom were mothers) were, on average, 36 years old (SD = 6.21) at T1 for the 2nd grade students, 38 years old (SD = 6.93) at T1 for the 4th grade students, and 42 years old (SD = 6.88) at T1 for the 9th grade students. Of the interviewed parents, 98% had completed high school, and 39% had completed college. At T1, 53% were working full-time, 23% were working part-time, and 25% were not employed. At T1, 65% were married, 31% were unmarried, and 5% were separated. The median yearly household income category was $41,000 to $50,000 at T1.

Parents were interviewed each year by mail and/or phone. The interviewers were trained staff and graduate students overseen by a masters-level supervisor. Parent retention rate by the T3 interview was 75% and ranged from 73–77% by grade. Parents completed informed consent forms for their own participation at each wave. The parent reporter could vary at each wave; however, in only 93 out of 1,421 cases (6.5%) was this the case.[2] Interviews were largely (~92%) completed by mothers. All study procedures were approved by the Institutional Review Boards at University of Michigan and Iowa State University.

Measures

Callousness.—Parents completed the Inventory of Callous-Unemotional Traits (ICU; Frick, 2004) at each wave for youth in all grades. Mothers rated how well each of 24 items (e.g., "I do not show my emotions to others") applied to the study youth on a 4-point Likert scale from "Not at all true" to "Definitely true." After removing two items found to be unreliable in previous research (Kimonis et al., 2008), we averaged the remaining 22

[2]Variation in parent reporters was not accounted for in analyses; however, results did not change after excluding participants whose parent informant changed across waves. These results are available from the corresponding author upon request.

items, which were internally reliable across all waves and grades (Cronbach's α = .88-.90). Previous research with the ICU has shown that parent reports can be more reliable and valid than reports about the youth by others (Docherty et al., 2017).

Parenting.—We assessed *parental rejection toward their child* with parent report on 10 binary yes/no items (e.g., "Have you been bothered that this child does not follow directions when they run an errand?"; "Have you been satisfied with this child's manners?") from a previous measure that has been used to study parental rejection, although items specifically address parents' disapproval of or dissatisfaction with their child (Eron, 1982; Eron et al., 1991; Eron et al., 1971; Lefkowitz et al., 1977). We averaged items to compute a scale score, such that higher scores indicate more parental rejection (α = .70-.77). To assess *consistent discipline practices*, parents completed a nine-item measure of consistent discipline strategies and parenting efficacy, including four items from the Parenting Practices Inventory (Conduct Problems Prevention Research Group, 1996; e.g., "When you give your child a command to do something, how often do you make sure they do it?"). Responses ranged on a 5-point Likert scale from "Never or almost never" (0) to "Always or almost always" (4). Items were averaged to produce a scale score in which higher scores indicate more consistent use of discipline (α = .79-.81).

Covariates.

Child Aggressive Behavior.: To control for shared variance in callousness and parenting variables that may be explained by child aggression, we included parent report of the youths' aggressive behavior at each wave as a time-varying covariate. Parents completed the Aggression subscale of the Child Behavior Checklist (CBC; Achenbach, 1991) and rated how well each item (e.g., "Physically attacks people") described their child's behavior on a scale from "Not true" to "Very true or often true". The 20 scale items were averaged to produce a score in which higher values reflect greater child aggression (α = .88-.91).

Demographic Characteristics.: We also included youths' gender (boy or girl), race (White/Caucasian or non-White), and type of neighborhood (suburban, urban, or rural) as dummy-coded time-invariant covariates in regression analyses. Youths' age in years at baseline was included as a time-invariant covariate. Parent's education (measured on a 7-point scale from "less than 8th grade" to "finished graduate school") was also included as a time-invariant covariate.

Plan of Analysis

To examine associations between parenting and youth callousness at both the between- and within-individual levels, as well as bidirectional influences, we used a random-intercepts cross-lagged panel model (RI-CLPM; Hamaker et al., 2015) with youth callousness and parenting (rejection and consistent discipline) at each of the three annual waves. RI-CLPMs are able to model between-individual differences by including a random intercept for each variable of interest, which represents person-specific levels that are stable across time. Correlations among random intercepts indicate associations at the *between-individual* level, correlating a participant's standing in the sample's distribution on one variable (e.g., parental rejection) with his or her standing in the sample's distribution on another variable (e.g.,

callousness). In addition, these models include autoregressive and cross-lagged paths among residuals for each variable at each time point to examine *within-individual* associations. Thus, there were autoregressive paths for each construct (e.g., callousness at T1 predicting callousness at T2, and callousness at T2 predicting callousness at T3), as well as cross-lagged paths between callousness and each of the parenting variables (e.g., callousness at T1 predicting rejection at T2, and callousness at T2 predicting rejection at T3, as well as rejection at T1 predicting callousness at T2, and rejection at T2 predicting callousness at T3). These within-individual associations examine whether when an individual is higher (or lower) than his or her own average across the three time points on one variable (e.g., parental rejection), the same individual is higher (or lower) than his or her own average across the three time points on another variable (e.g., callousness) at the subsequent time point. Because we did not hypothesize cross-lagged associations among the parenting variables, we did not estimate those paths in the model (e.g., rejection at T1 predicting consistent discipline at T2), and thus they are constrained to zero.[3] Correlations among variables within each time point are also included, to examine within-individual associations within the same time point. Random intercepts of the parenting and youth callousness variables were regressed on gender, race, age at baseline, type of neighborhood, and parent education as time-invariant covariates, and the parenting and youth callousness variables at each time point were regressed on child aggression as a time-varying covariate. Figure 1 provides a graphical representation of the model.

It should be noted that hypotheses were tested in one RI-CLPM that included callousness, parental rejection, and consistent discipline, rather than in separate models. We first tested a model in which parameters of interest (cross-lagged and autoregressive paths and within-wave covariances) were free to vary across time, and compared this to a model where parameters were constrained to equality across time. Better fit for the freely estimated model would indicate that associations varied in direction or magnitude over time, while comparable or better fit for the constrained model would suggest that associations were largely similar across time. Overall model fit was assessed using chi-squared tests, information criteria (AIC, BIC, and sample size-adjusted BIC (aBIC)), and other widely used model fit indices (CFI, TLI, RMSEA, and SRMR). We used conventions of smaller values for chi-squared tests, AIC and BIC/aBIC, and RMSEA and SRMR to indicate better fit, with conventional cutoffs of .06 and .08 for RMSEA and SRMR respectively, and larger values of CFI and TLI to indicate better fit, with values larger than .95 indicating good fit to the data (West et al., 2012). In addition, because the models were estimated using a maximum likelihood procedure that is robust to non-normality (MLR), we used the Satorra-Bentler chi-squared test to compare nested models (Satorra & Bentler, 2001). A significant Satorra-Bentler chi-squared test indicates that the model with freed parameters provides a significantly better fit to the data, indicating that there are differences in the parameters across time, while a non-significant test indicates that model fit is not worsened by constraining parameters to equality, suggesting that the parameters are similar across

[3]We also tested a model that included the cross-lagged paths between parenting variables. The cross-lagged paths between parenting variables were not significant (p values > .441) and this model fit no better than the model with them constrained to zero according to a Satorra-Bentler chi-squared test ($\chi^2(2) = 0.74$, $p = .691$). In addition, results were generally similar across both models. Results for the model with parenting cross-lagged paths are available from the corresponding author upon request.

time. In the case of a significant Satorra-Bentler chi-squared test, we used Wald tests to compare autoregressive and cross-lagged paths across time (i.e., comparing each path from T1 to T2 to its counterpart from T2 to T3), as well as within-time correlations at each wave, to test the stability of these parameters over time.

To test moderation by gender and developmental stage, we used multiple group models with gender and then grade at baseline as the grouping variable to conduct the same RI-CLPM as described above. First we estimated a model with all parameters (cross-lagged and autoregressive paths and within-wave cross-construct covariances) freely estimated across group and time (models M2a and M3a in Table 1). We then compared the fit of this model to two subsequent models: one in which the parameters were constrained to equality across time but varied across group (models M2b and M3b), and one in which the parameters were constrained to equality across group but unconstrained across time (models M2c and M3c). We then compared the fit of these models to one where parameters were constrained by both group and time (models M2d and M3d). A Satorra-Bentler chi-squared difference test was used to compare the fit of nested models. Once the best-fitting model was selected, if it allowed parameters to vary across groups and/or time, we used Wald tests to determine which individual parameters were significantly different.

Prior to analyses, we tested measurement invariance models by wave and by grade at baseline assuming strict invariance for each of the three key measures (callousness, rejection, and consistency of discipline). These generally provided a good fit to the data, indicating the measures are invariant with respect to age and time and thus mean scores can be compared, with the exception of the models for callousness, presumably because a single-factor model was tested – because we are using the ICU total score – when previous research indicates that the ICU may best be described by a bifactor model (Ray & Frick, 2020). However, fit indices for strict invariance for the ICU, while below standard cutoffs, were still high enough to indicate acceptable levels of invariance (i.e., CFI and TLI >.88, RMSEA < .09, and SRMR <.11). All data organization was done in Stata 16 (StataCorp, 2019), and RI-CLPMs were conducted using Mplus version 8 (Muthén & Muthén, 1998-2017) with an MLR estimator.

Missing Data

Sample retention at T3 was relatively high for parents (76%). According to chi-squared analyses, parent retention at T3 was similar across grades ($p = .501$), but parents of boys were more likely to drop out relative to parents of girls ($p = .035$), and non-White participants were more likely to drop out relative to White participants ($p < .001$). In terms of the major study variables, parents who reported greater rejection ($p < .001$) or more inconsistent discipline ($p = .001$) at T1, or who reported their child had higher levels of callousness at T1 ($p < .001$), were less likely to remain in the study at T3 according to independent samples t-tests. However, in a multivariate logistic regression model predicting T3 attrition from T1 and T2 variables, CU, rejection, and discipline were no longer significantly associated with missingness after accounting for control variables (child's age, gender, and race, T1 and T2 child aggression, parents' education, and neighborhood type). Thus, based on a lack of associations between key study variables and missingness in this

model, we assume that missingness is explained by variables observed in our dataset and thus that our data are missing at random (MAR).

To account for missing data, models use Full Information Maximum Likelihood (FIML), which uses all available information to estimate model parameters in the presence of missing data and is appropriate for data that are MAR. FIML is considered a best practice for handling missing data, and parameters obtained with FIML are more likely to reflect true parameter values than those obtained with other methods for missing data (e.g., imputation, deletion), even when data are not missing at random, and especially when variables associated with missingness are included in the analytical model (Enders, 2001; Enders & Bandalos, 2001). Although multiple imputation is also considered a best practice for handling missing data, we chose to use FIML because 1) FIML is more conveniently implemented with the type of structural equation modeling used in our analyses (Allison, 2003); 2) multiple imputation can create scenarios where the imputation model is inconsistent with the analysis model (Sinharay et al., 2001); 3) although results are generally similar for FIML and imputation, compared to imputation, FIML is asymptotically efficient and produces parameters with less bias (von Hippel, 2016); and 4) there are additional considerations for multiple imputation with longitudinal data (Young & Johnson, 2015).

Results

Descriptive Statistics

Descriptive statistics for observed data on youth callousness, parental rejection, and consistent discipline at each of the three waves, as well as bivariate correlations among study variables at each wave and means for each grade at baseline, are displayed in Supplemental Table S1. Average scores on callousness (from the Inventory of Callous-Unemotional Traits) in the current sample (~0.8) were largely similar to average scores from similarly aged samples (Bansal et al., 2022; Docherty et al., 2017; Kemp et al., 2021; Kimonis et al., 2014; Pihet et al., 2015; Ueno et al., 2021). Parental rejection scores indicated that on average, roughly one-third of parents' responses indicated rejection of their child, which is slightly lower compared to another community sample which used this measure (Huesmann et al., 2002). To our knowledge, the measure of consistent discipline used in this study has not been used before, but the average scores of ~3 indicate that on average parents report "frequent" use of consistent discipline.

Random-Intercept Cross-Lagged Panel Model Results

We initially tested two RI-CLPMs with callousness, parental rejection, and consistency of discipline: one where autoregressive paths, cross-lagged paths, and within-time across-construct covariances were all unconstrained and allowed to freely vary across waves (model M1a in Table 1), and another where these were constrained to equality over time (model M1b in Table 1). Fit indices for these and other models are displayed in Table 1. The constrained model did not fit worse than the unconstrained model, as evidenced by a non-significant Satorra-Bentler chi-squared difference test, $\chi^2(13) = 10.47$, $p = .655$. Indeed, fit indices generally appeared similar but slightly better for the constrained

model compared to the unconstrained model. Thus, associations among variables generally appeared to be stable over time, and we chose to interpret the constrained model because of its better fit and parsimony. The results of this constrained model are displayed in Table 2 and represented graphically in Figure 1. At the between-individual level, the random intercepts were significantly correlated with each other, such that youth with higher overall levels of callousness also experienced higher levels of parental rejection and lower levels of consistent discipline on average (all p values < .001). At the within-individual level, there were significant autoregressive paths for youth callousness (p < .001), consistency of discipline (p = .002), and parental rejection (p = .033) from each time point to the next.

Significant cross-lagged paths were observed from youth callousness at each time point to parental rejection (unstandardized b = 0.08, p = .003) and consistency of discipline (b = −0.18, p = .005) at the subsequent time point. Thus, when youth had higher levels of callousness relative to their own personal average, they were more likely to experience higher levels of parental rejection and lower levels of discipline at the next wave. However, cross-lagged paths from parenting variables at one time point to youth callousness at the next time point were not statistically significant, suggesting that youth callousness precedes parenting behaviors and attitudes rather than vice versa. Correlations among callousness and parenting within each wave were significant at p < .001, suggesting that at times when youth had higher levels of callousness, they also experienced higher levels of parental rejection (r = .33 to .36; differences due to standardization) and lower levels of consistent discipline (r = −.24 to −.28) on average.

Moderation by Gender—We then conducted the same RI-CLPM as above, but in a multiple group model with gender as the grouping variable instead of including gender as a control variable. An initial model with parameters unconstrained by time or gender provided an excellent fit to the data, and Satorra-Bentler chi-squared difference tests comparing model fit indicated that adding constraints for either time or gender, or for both simultaneously, did not result in depreciated model fit (see Table 1). Thus, associations among callousness and parenting variables are similar across time and also similar for boys and girls, such that there is no evidence of gender moderation. Again, the model appeared to provide an excellent fit to the data, although the model chi-squared test was significant. The results of this model were similar to those from the overall model in Table 2.

Moderation by Developmental Stage—We repeated the multiple group RI-CLPM, but with developmental stage (i.e., 2nd, 4th, and 9th grade) as the grouping variable instead of gender. An initial model with parameters unconstrained by time or grade provided an excellent fit to the data, and a Satorra-Bentler chi-squared difference test indicated that adding equality constrained across time did not significantly worsen model fit. However, adding equality constraints across grade groups, while allowing parameters to vary across time, did result in significantly worse fit, suggesting that associations are different across the three grades. Finally, we compared this model to one in which equality constraints were imposed for both grade and time, and found that the additional equality constraints did not decrement model fit. Thus, associations appear to operate differently across developmental stages, but similarly across time within developmental stage. The results of the multiple-

group RI-CLPM with parameters freely estimated for each grade group but constrained to equality across time are displayed in Table 3. Model fit indices generally indicated that this model provides a good fit to the data, although the chi-squared test was significant (see Table 1 for model fit indices and Satorra-Bentler chi-squared test results).

Results for this model are generally similar to the main model presented in Table 2, with some slight differences by grade at baseline. At the between-individual level, correlations among the random intercepts of the parenting and youth callousness variables were significant for youth in all three grades, except for the correlation between youth callousness and consistency of discipline for the 4th graders. According to Wald tests, the correlation between youth's overall level of callousness and parental rejection was stronger for the 9th grade students compared to the 2nd and 4th grade students ($p = .001$); otherwise, the strength of correlations was similar across grades.

At the within-individual level, there were significant autoregressive paths for youth callousness from one time point to the next for all three grades. However, the only significant autoregressive paths for parenting were for rejection and discipline among 9th grade students. The cross-lagged paths from youth callousness at one time point to parenting at the next time point were significant for both rejection and discipline for the 4th grade students, but for neither variable for the 2nd and 9th grade students. The cross-lagged paths from parenting at one time point to callousness at the subsequent time point were only significant for rejection for the 2nd grade students. There were also significant correlations between youth callousness and each of the parenting variables at each wave, indicating that at times when youth are exposed to more rejection or less consistent discipline relative to their typical levels, they also exhibit more callousness compared to their own average. Overall, results suggest that youth callousness and parenting practices and attitudes were associated both between and within individuals across all three grades at baseline, but there were some slight differences across grades. Youth callousness appears more likely to precede adverse parenting practices and attitudes for 4th grade students, while parental rejection is more likely to precede youth callousness for 2nd grade students.

Discussion

In this study, we examined how parenting attitudes and behaviors are related to youth callousness, both between and within individuals, from childhood through adolescence. We applied random-intercept cross-lagged panel models to test for associations at the between-person level as well as the within-person level, and to examine cross-lagged paths at the within-person level. The results from these analyses indicate that parenting variables – specifically, parental rejection and consistency of discipline – were associated with callousness at both levels, even while controlling for age, gender, race, parent's education, type of neighborhood, and child aggression. Thus, children and adolescents who experience more parental rejection and lower levels of consistent discipline compared to their peers tend to also exhibit higher levels of callousness, and during times when parents are engaging in more rejection or less consistent discipline compared to their own typical level, children tend to display more callousness relative to their own personal average.

We tested for bidirectional influences between parenting and youth callousness over time, and results generally supported the influence of youth callousness on parents' behaviors and attitudes rather than the reverse. When youth exhibit higher levels of callousness relative to their typical level, they are more likely to experience subsequent parental rejection and less consistent discipline. Thus, while contemporaneous and between-individual associations support a link between youth callousness and parents' behaviors, examining these variables over time indicates that youth callousness may be more likely to drive changes in parents' attitudes and behaviors, rather than vice versa. While cross-lagged associations only partially support our initial hypotheses, our findings highlight the influence of youth callousness on eliciting parental rejection and diminishing the use of consistent discipline. In addition, there was high within-individual carry-over of callousness across waves, such that waves in which youth had higher callousness than their average were more likely to be followed by waves in which youth's callousness remained higher than their average.

We then examined moderation by gender and developmental stage. Results did not support differences by gender, indicating that associations between youth callousness and parenting behaviors might be operating similarly for boys and girls from childhood through adolescence. This is in line with some previous work which similarly found that parenting and callousness are related to each other in similar ways for boys and girls (Clark & Frick, 2016; Fanti et al., 2017; Fontaine et al., 2010). In addition, relevant theoretical models such as the moral socialization model or the Sensitivity to Threat and Affiliative Reward (STAR) model of callousness do not posit different etiologies or consequences of youth callousness for boys and girls. Nevertheless, it is worth noting that some previous studies have found that gender moderated associations between parenting and callousness, albeit not always in consistent ways. Importantly, two studies found that parental warmth was more strongly related to lower callousness for girls compared to boys (Barker et al., 2011; Hawes et al., 2011); however, because we did not measure parental warmth in this study, we were unable to directly replicate those prior results.

We did find evidence for significant moderation by developmental stage, however, indicating some developmental differences in the strength of between- and within-individual associations of parenting practices and attitudes with youth callousness. In particular, youth with higher average levels of callousness tended to have higher average levels of parental rejection, and this was especially the case for the adolescents in 9th grade. In addition, although youth with higher average levels of callousness tended to have lower average levels of parental discipline, this association was not significant for the pre-adolescents (4th grade students). When examining cross-lagged associations, youth callousness was generally a stronger predictor of parenting behaviors in pre-adolescence (4th grade) than childhood or adolescence (2nd and 9th grade). It is possible that the transition to adolescence is a particularly vulnerable time in the parent-child relationship, as youth at this age are struggling to establish their autonomy from parents, and parent-child relationships become characterized by a more equal balance of power in adolescence than in childhood (Branje, 2018; Holmbeck, 2016; Spring et al., 2002). Thus, parenting practices and attitudes may be more likely to be influenced by a child's behaviors and personality during this time. Although this would be in line with some previous work that found boys' conduct problems to be more predictive of parenting behaviors (Pardini et al., 2008) and maternal

depression (Gross et al., 2008) during the transition to adolescence than in childhood or mid-adolescence, future research is needed to further elucidate the changing nature of parent-child bidirectional influences across the transition to adolescence.

Interestingly, we found some support for parenting behaviors preceding changes in youth callousness in childhood (2nd grade students); higher levels of parental rejection at one wave were followed by higher youth callousness at the subsequent wave. Thus, although we did not find support for this hypothesis in the general model, the developmental model indicated that callousness in childhood may be more susceptible to rejection by parents. We also found that within-individual associations from parenting behavior at one wave to the subsequent wave were stronger in adolescence compared to childhood and pre-adolescence, for both rejection and consistency of discipline. This indicates a possible "downward spiral" of parenting that occurs in adolescence, such that once parents begin engaging in adverse behaviors towards their child, they are more likely to continue to do so in the future. It is possible, then, that parenting behaviors may be particularly influential for youth callousness during childhood, and then the reverse becomes true (youth callousness influences parenting behaviors) during the pre-adolescent years. Then, by the time youth reach adolescence, these adverse parent-child dynamics have become more stable and less susceptible to change. According to the STAR model of callousness, lack of affiliative inputs, such as parental warmth and affection, early in life may confer risk of developing callousness, which in turn can decrease affiliative inputs later on (Waller & Wagner, 2019). Although this study did not directly test this model, our findings were generally in line with these predictions, as we explain in more detail below.

These findings highlight a potential environmental pathway for the development of callousness, contrary to literature which has proposed that callousness begins early and tends to remain stable across the life course (Frick, Kimonis, et al., 2003) but in line with theoretical and empirical work highlighting the importance of the parenting environment for the development of callousness (Hyde et al., 2016; Waller et al., 2013; Waller & Hyde, 2018; Waller & Wagner, 2019). Specifically, these findings appear to be in line with the STAR model of callousness (Waller & Wagner, 2019), such that parents who are more rejecting toward their children may not be offering sufficient affiliative rewards and thus contributing to the development of youth callousness; however, it is important to note that we did not measure affiliative reward or sensitivity to threat directly. These findings would also be in line with the moral socialization model, such that parental rejection may harm youth's affiliation with their parents and thus their internalization of moral standards communicated by their parents. We also found evidence of bidirectional influences, which would be posited by the moral socialization model; however, we did not assess whether associations varied as a function of youth temperament, which this model theorizes. Although not explicitly measured in this study, it is possible that parental rejection and lack of acceptance can hinder the child's ability to accurately perceive parents' moral standards and their motivation to adhere to these standards (Grusec et al., 2013). In addition, parents' rejection might cause children to feel shame and focus on their own distress, which can harm their ability to experience other-oriented empathy (Tangney et al., 2007).

This work indicates that there may be different etiological pathways to callousness, depending on a youth's exposure to adverse parenting behaviors and the timing of that exposure. Given these different pathways, it might be that prevention and intervention efforts can be differentially tailored to meet the needs of youth who have developed callousness in response to environmental factors. For example, some interventions that focus on youth's emotional development, on building interpersonal skills, or on training parents have been effective in reducing callousness (Hawes et al., 2014). One specific intervention – parent-child interaction training (PCIT) – was recently adapted to target callousness in preschool children by enhancing parents' expressions of warmth along with the use of positive reinforcement. This intervention was able to reduce callousness and externalizing problems and increase empathy, albeit in a sample of 23 families (Kimonis et al., 2019). Of course, future studies also should take into account the broader construct of psychopathic traits, given that callousness represents just one facet of this challenging constellation of characteristics (Salekin et al., 2018).

This study has a number of strengths, including a relatively large sample size, collection of similar data across time points to be able to track longitudinal changes, and the use of valid and reliable measures. However, there are a number of limitations as well. For example, the main study variables were all obtained through parent report; thus, associations may be inflated due to common method variance, although common method variance may be partially accounted for by including multiple parent-reported predictors in the models. Future research should examine these associations using converging data across multiple sources, and include other parental variables that could impact observed relations – especially indicators of parental psychopathology that might influence not only parenting practices but also ratings of child behavior. Our findings also are limited to generalizations regarding callousness, so future studies should integrate measures of other facets of the broader construct of psychopathic traits (Salekin et al., 2018). Given the relatively low levels of adverse parenting in our sample, it is unclear how our findings would generalize to higher-risk samples in which youth may be experiencing greater parental rejection and less consistent discipline. Although we accounted for parent education in our models, it is possible that other factors – such as parent income, marital/cohabitation status, and family support – might be influential for both parenting behaviors and youth callousness. Finally, our measure of parental rejection focused on parents' disapproval of or dissatisfaction with their child and does not include other aspects of rejection (e.g., hostility or neglect).

The findings of this study generally support bidirectional influences between youth callousness and aspects of the parenting environment, with some differences depending on developmental timing. Youth may be particularly influenced by parental rejection in childhood, while parents of pre-adolescents are more likely to engage in less effective parenting practices in response to elevated youth callousness. These results also indicate that research into the development of callousness might benefit from analyzing between- and within-individual associations separately, as the magnitude of associations can differ across these levels, as well as from incorporating cross-lagged associations to examine temporal ordering. Understanding how these associations operate at both the level of the individual as well as within individuals across time can help inform clinical practice by indicating who

might be at greater risk for developing callousness, and in what particular situations these individuals may be at relatively higher risk.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Data Availability Statement.

A de-identified version of the data that support the findings of this study are available from the corresponding author, Meagan Docherty, upon reasonable request.

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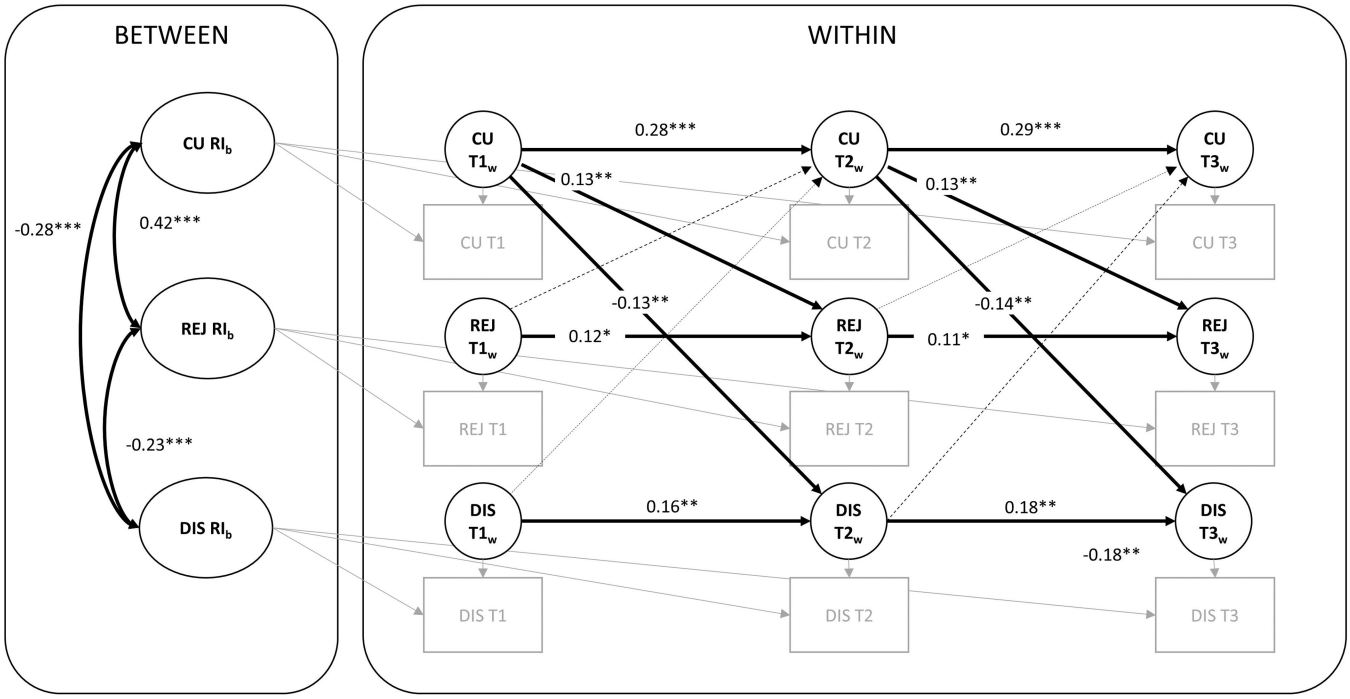

Figure 1.

Random-intercept cross-lagged panel model of callousness (CU), parental rejection (REJ), and consistent discipline (DIS) across three waves. Random intercepts (RI_b) represent differences between individuals, while residuals at each time point (noted with $_w$) represent time-specific deviations from person-level means within individuals. All paths among callousness and parenting variables included in the model are shown, except for covariances among within-person residuals at each time point, each of which was significant at $p<.05$. Not shown are relations with control variables: each random intercept was regressed on age, gender, race, parent education, and type of neighborhood at T1, and each of the callousness and parenting variables were regressed on child aggression measured at that particular wave. Paths that were not significant at $p<.05$ are depicted with dashed lines, while significant paths are represented by bolded solid lines.

Table 1

Model Fit Indices of the Random-Intercept Cross-Lagged Panel Models: Comparisons of Constrained Models (Autoregressive and Cross-lagged Paths and Within-Time Covariances among Constructs Constrained to Equality) vs. Unconstrained Models (Parameters Free to Vary)

Model	χ^2(df)	SB χ^2(df) difference test between models		AIC	BIC	aBIC	CFI	TLI	RMSEA	SRMR
		Compared models	SB χ^2(df) test results							
Main model										
M1a: Main model unconstrained	156.09(67)***			21075.91	21717.52	21329.97	.986	.976	.031	.025
M1b: Main model constrained	164.62(80)***	M1b vs. M1a	10.47(13)	21062.50	21635.74	21289.49	.987	.981	.027	.026
Gender moderation models										
M2a: Unconstrained by time and gender	217.93(122)***			19037.45	20183.94	19491.43	.985	.973	.033	.029
M2b: Constrained by time, unconstrained by gender	239.53(148)***	M2b vs. M2a	23.33(26)	19012.91	20022.66	19412.75	.985	.979	.030	.030
M2c: Constrained by gender, unconstrained by time	248.86(148)***	M2c vs. M2a	32.10(26)	19023.52	20033.27	19423.35	.984	.977	.031	.032
M2d: Constrained by gender and time	257.82(161)***	M2d vs. M2b M2d vs. M2c	18.56(13) 10.07(13)	19009.68	19951.07	19382.45	.985	.979	.029	.033
Grade moderation models										
M3a: Unconstrained by time and grade	288.71(186)***			14793.08	16497.03	15467.80	.984	.972	.034	.034
M3b: Constrained by time, unconstrained by grade	330.11(222)***	M3b vs. M3a	42.68(36)	14771.59	16286.22	15371.34	.983	.975	.032	.041
M3c: Constrained by grade, unconstrained by time	360.54(235)***	M3c vs. M3a	72.24(49)*	14782.05	16228.30	15354.73	.980	.973	.034	.044
M4c: Constrained by grade and time	369.55(248)***	M3d vs. M3b M3d vs. M3c	39.34(26)* 10.38(13)	14769.08	16146.97	15314.69	.981	.975	.032	.046

Note. SB = Satorra-Bentler chi-squared difference test comparing models; AIC = Akaike information criterion; BIC = Bayesian information criterion; aBIC = sample size-adjusted BIC; CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual.

*** $p < .001$.

Table 2

Results of the Random-Intercept Cross-Lagged Panel Model: Relations among Callousness and Parenting Variables

	Rejection			Discipline		
	Est.	**(S.E.)**	**95% CI**	**Est.**	**(S.E.)**	**95% CI**
Cross-lagged paths						
CU → parenting	0.08**	(0.03)	[0.03, 0.13]	0.18**	(0.07)	[−0.31, −0.05]
Parenting → CU	0.11	(0.07)	[−0.02, 0.23]	0.01	(0.03)	[−0.06, 0.04]
Autoregressive paths						
CU → CU[a]	0.30***	(0.06)	[0.19, 0.40]	--		
Parenting → Parenting	0.11*	(0.05)	[0.01, 0.22]	0.17**	(0.06)	[0.06, 0.28]
Within-time correlation between CU and parenting	0.01***	(0.00)	[0.01, 0.02]	0.02***	(0.00)	[−0.03, −0.02]
Correlation between random intercepts of CU and parenting	0.02***	(0.00)	[0.01, 0.02]	0.03***	(0.01)	[−0.04, −0.02]

Note. CU = callousness. Unstandardized coefficients are presented. Not depicted are covariates: age, sex, race, parent education, and type of neighborhood were included as time-invariant covariates by predicting random intercepts, and child aggression was included as a time-varying covariate by predicting the within-individual callousness and parenting variables. Cross-lagged paths, autoregressive paths, and within-time correlations were constrained to equality across time, but slight differences may occur due to standardization. The model was estimated using robust maximum likelihood (MLR). $N = 1{,}421$.

[a] Autoregressive paths for callousness are shown in the column for rejection but are the same across both parenting variables (i.e., there were only two autoregressive callousness paths for the entire model).

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 3

Results of the Random-Intercept Cross-Lagged Panel Model: Relations among Callousness and Parenting Variables, Moderated by Grade

	Rejection						Discipline					
	2nd grade		4th grade		9th grade		2nd grade		4th grade		9th grade	
	Est.	(S.E.)	Est.	(S.E)	Est.	(S.E.)	Est.	(S.E.)	Est.	(S.E.)	Est.	(S.E.)
Cross-lagged paths												
CU → Parenting	0.06	(0.05)	0.15^{**}	(0.05)	0.03	(0.05)	-0.04_{a}	(0.11)	$-0.43_{b}{}^{***}$	(0.12)	-0.06_{a}	(0.12)
Parenting → CU	$0.26_{a}{}^{*}$	(0.11)	0.20_{a}	(0.11)	-0.14_{b}	(0.11)	0.01	(0.05)	−0.03	(0.05)	0.00	(0.04)
Autoregressive paths												
CU → CU[a]	0.23^{*}	(0.10)	0.34^{***}	(0.09)	0.36^{**}	(0.11)	--		--		--	
Parenting → Parenting	0.12	(0.09)	0.02	(0.10)	0.23^{*}	(0.09)	0.13	(0.10)	0.12	(0.09)	0.30^{**}	(0.10)
Within-time correlation between CU and parenting	0.01^{***}	(0.00)	0.02^{***}	(0.00)	0.01^{***}	(0.00)	-0.02^{**}	(0.01)	-0.03^{***}	(0.01)	-0.02^{***}	(0.01)
Correlation between random intercepts of CU and parenting	$0.01_{a}{}^{***}$	(0.00)	$0.01_{a}{}^{**}$	(0.00)	$0.03_{b}{}^{**}$	(0.01)	-0.04^{***}	(0.01)	−0.01	(0.01)	-0.04^{***}	(0.01)

Note. CU = callousness. Unstandardized coefficients are presented. Not depicted are covariates: age, sex, race, parent education, and type of neighborhood were included as time-invariant covariates by predicting random intercepts, and child aggression was included as a time-varying covariate by predicting the within-individual callousness and parenting variables. When there are significant differences between model parameters by grade as indicated by Wald tests comparing the coefficients, significant differences are noted with the use of subscripts. The model was estimated using robust maximum likelihood (MLR). N = 447 for 2nd grade, 517 for 4th grade, and 457 for 9th grade.

[a]Autoregressive paths for callousness are shown in the column for rejection but are the same across all parenting variables (i.e., there were only two autoregressive callousness paths within each grade group for the entire model).

$^{*}p < .05$.

$^{**}p < .01$.

$^{***}p < .001$.