


Regular Article

Explaining the “parenting – callous-unemotional traits – antisocial behavior” axis in early adolescence: The role of affiliative reward

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Abstract

In explaining the “parenting – callous-unemotional traits – antisocial behavior” axis, recent theoretical advances postulate a critical role for affiliative reward. Existing empirical studies focus on early childhood and the appetitive phase of the reward process (i.e. affiliation-seeking behavior) rather than the consummatory phase (i.e. affective rewards). This study focuses on experienced affiliative reward (i.e. companionship, intimacy, affection, and worth) in relation to parents and best friends in early adolescence. The Alabama Parenting Questionnaire, Network of Relationships Inventory, Inventory of Callous and Unemotional Traits, and Youth Self Report were completed by 1132 12-year-olds and analyzed via structural equation models. In this cross-sectional sample, parent-related affiliative reward mediated the path from perceived parenting practices to callousness and further to aggression and rule-breaking. Parent-related affiliative reward was also related to uncaring traits and further to aggression and rule-breaking. In contrast, friend-related affiliative reward was not a mediator in this theoretical causal chain and largely not related to perceived parenting practices or CU traits. Low parent-related experienced affiliative reward is a mechanism through which corporal punishment, poor monitoring, and low involvement translate into callousness, and therefore to aggression and rule-breaking. Friend-related affiliative reward does not yet play a role in early adolescence.

Keywords: callous-unemotional; affiliative reward; parenting; aggression; rule-breaking

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Introduction

The “parenting – callous-unemotional traits – antisocial behavior” axis

Callous-unemotional (CU) traits (e.g. shallow affect, lack of empathy, callousness, uncaring attitudes, indifference to others’ emotions) represent one of the main precursors of aggression and delinquency (e.g. Frick et al., 2003). About 36%–67% of variation in CU traits has been attributed to genetic variation (for a recent review, see Moore et al., 2019), with a complementary role assigned to psychosocial determinants. Here, a growing body of research has highlighted a broad and complex role of parenting practices, including maltreatment, harsh parenting, neglect, as well as parental warmth and involvement (for a recent review, see Craig et al., 2021). However, very little is known about the processes that intervene to facilitate these observed effects from parenting practices to CU traits and further to antisocial behavior.

Callous-unemotional traits and affiliative reward

Building on a developmental-evolutionary theoretical framework, the “Adaptive Calibration Model” posits that CU traits are the result of an adaptive match between stress responsivity and

environmental conditions (Del Giudice et al., 2011). Specifically, exposure to extremely harsh environments produces a pattern of very low-stress responsivity that is insensitive to external feedback and information about external threats in the environment (Del Giudice et al., 2011) – in other words, CU traits are underpinned by a rigid dampened stress and threat response system. The more recent “Sensitivity to Threat and Affiliative Reward” (STAR) model similarly posits a two-dimensional pathway, comprising a dampened response system along dimensions of threat, but replacing the stress dimension with “affiliative reward” (Waller & Wagner, 2019). This latter element is derived from the “Affiliative Bonding” theory (2005a, Depue & Morrone-Strupinsky, 2005b), whereby affiliative reward is defined as comprising: (a) an appetitive phase represented by affiliative behaviors aimed at building social bonds, and (b) a consummatory phase represented by experienced affiliative reward, denoting feelings of pleasure derived from such bonds. Building on this framework, the STAR model posits that children with low inherited threat sensitivity who simultaneously have low inherited social affiliation tendencies (i.e. engage less in bond-building behaviors and experience low affiliative reward), go on to exhibit heightened CU traits. This study is focused on the consummatory phase: experienced affiliative reward.

We define experienced affiliative reward as a multi-dimensional construct representing perceptions of high companionship, affection, and intimacy, paired with a sense of high worth within a relationship. This is different from the concept of “relationship quality,” which encompasses an entire spectrum of objective and

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subjective evaluations of a relationship (Halliday Hardie & Lucas, 2010), by referring specifically to the subjective experience of emotional rewards and excluding dimensions such as “satisfaction” or “conflict” (Hoellger *et al.*, 2021; Luijten *et al.*, 2021). It is also different from “perceived social support”, as it does not include dimensions such as “nurturance,” “instrumental aid,” or “reliable alliance” (e.g. Guedes *et al.*, 2022; Lesch & de Jager, 2014). Finally, it differs from “popularity,” which may not translate into actual perceptions of heightened emotional rewards (or at least not to the same extent across people).

Within the remit of the definition given here, a role of experienced affiliative reward for CU traits is supported by theory and research on identity and the self, according to which people construct idealized self-concepts representing “identity images” that guide behavior and self-expression (Schlenker, 1982). These are socially constructed and continually evaluated and updated through a process of social self-analysis (e.g. Alicke *et al.*, 2012), and achieving a match between a current and ideal self-image is critical for well-being. Accordingly, we posit that relationships that generate perceptions of high companionship, intimacy, affection, and worth provide external social-affective feedback congruent with a match between a current and an ideal self. Over time, as children develop a sense of the contingency between supporting others and obtaining the afferent emotional reward, this mechanism serves to construct and sustain internal self-concepts centered around the well-being of others. Conversely, low levels of experienced affiliative reward may promote the development of internal self-schemas that are disjointed from external social-affective input, giving rise to callous behaviors. Hence, this study’s first aim is to investigate whether low levels of experienced affiliative reward translate into heightened levels of CU traits and antisocial behavior.

Parenting practices and affiliative reward

If experienced affiliative reward serves as a mechanism for the development of socially-sensitive internal self-schemas, then it is crucial to determine how core social contexts may enhance or hinder experiences of affiliative reward. A putative key social context is arguably the parent-child relationship. Although no study has yet directly explored the relationship between children’s subjective experience of exposure to specific parenting practices and their experiences of affiliative reward, children exposed to less sensitive caregiving have been shown to develop dysregulated representations of attachment relationships, of parents and of self (Martoccio *et al.*, 2016; Toth *et al.*, 2009).

The early adolescence period (ages 10-14 years; Harter, 2012) is particularly relevant when experienced affiliative reward is seated within the framework of self-concepts and their susceptibility to external input, as this is a period when children begin to show a marked increase in self-awareness and a particularly heightened sensitivity to and concern with appraisals from others (Lerner, 2002). At this pivotal point, early adolescents begin to internalize diverse and often contradictory appraisals from parents and peers which prompt the differentiation of self-concept across contexts (i.e. “multiple selves”) while simultaneously struggling to integrate this diverse feedback into a coherent self-concept (Harter, 2012). Accordingly, parenting practices might translate specifically into heightened experienced affiliative reward with the parents, but not necessarily with friends, and, in turn, low levels of experienced affiliative reward derived from relationships with parents versus friends might not translate equally strongly into CU traits.

In a contrasting argument, the well-established “developmental cascades” phenomenon (Masten & Cicchetti, 2010), whereby deficits in one domain of functioning are shown to produce consequences across a wide range of domains, might be taken to indicate that ineffective parenting practices may not solely affect children’s experienced affiliative reward within their relationships with their parents, but also in their relationships with other significant others, such as their best friends. Similarly, the STAR model, where a role for affiliative reward in relation to CU traits was first theorized, relies on the assumption that affiliative reward acts as an underlying sensitivity-based organizational system (Waller & Wagner, 2019), with the expectation that exposure to ineffective parenting might show systemic effects that are reflected in children’s capabilities to derive affiliative rewards across a wide range of relationship contexts. Hence, this study’s second aim is to examine whether exposure to different parenting practices is related to experienced affiliative reward and whether any effects are confined to parent-related affiliative reward or also impact friend-related affiliative reward.

Current work

Overall, theoretical support exists for a central role of experienced affiliative reward in the theoretical causal chain from parenting practices to adolescent CU traits and therefore to rule-breaking and aggressive behaviors. In contrast, no empirical studies currently exist to specifically test this hypothetical causal chain. Currently, three studies on early childhood exist with regard to affiliative behaviors in relation to parents, but not experienced reward (Domínguez-Álvarez *et al.*, 2021; Perlstein *et al.*, 2022; Waller *et al.*, 2021). One study of early adolescents focuses on teacher- and peer-related affiliative reward, but uses a measure of peer popularity as a proxy for peer affiliation (Hwang *et al.*, 2021), which may not directly reflect children’s internal experiences of affiliative reward. As such, this study is, to our knowledge, the first to conduct an empirical test of the role played by affiliative reward in this theoretical causal chain, the first to focus on the role of experienced affiliative reward as opposed to affiliative behaviors, the first to examine affiliative reward with parents and friends in tandem, and the first to focus on the critical early adolescence period. Therefore, bridging the gap in existing literature this study aims to answer the following research questions:

1. Does experienced parent-related affiliative reward matter for CU traits to the same extent as experienced friend-related affiliative reward, in early adolescence? Our main hypothesis is that both parent-related and friend-related affiliative reward translate into lower CU traits, with parent-related effects potentially stronger at this age than friend-related effects.
2. Do different parenting practices influence experienced affiliative reward? If so, is this a generalized effect influencing experienced affiliative reward across relationships with parents and friends, or is it a specific effect pertaining only to relationships with parents? With regard to parent-related experienced affiliative reward, we hypothesize that those parenting practices more likely to provide foundational support for the development of attachment and a sense of self (i.e. positive parenting, parental involvement, and, conversely, corporal punishment) translate into heightened affiliative reward, whereas instrumental parenting practices (i.e. poor monitoring and inconsistent discipline) do not. With regard to

a relationship between parenting practices and friend-related affiliative reward we test competing theoretical frameworks and hence do not advance a specific hypothesis.

- Does experienced affiliative reward act as mediator in the parenting – CU traits – antisocial behavior axis? Our hypothesis is that a causal chain will be observed when the mediator is parent-related affiliative reward. Similar to the second research question and in line with the fact that contradictory hypotheses are derived from different theoretical frameworks we do not advance a hypothesis with regard to friend-related affiliative reward.

Methods

Sample

The sample comprised 1132 early adolescents (mean age = 12.14 years; SD = 0.68 years), of whom 54% were girls and 46% were boys. Participants were recruited from 23 schools across 15 cities, towns, and villages in Transylvania, Romania, and ethnicity composition was representative of the region's population (92.62% Romanian, 5.69% Hungarian, 1.42% Roma, and 0.27% Other). Socioeconomic status, measured using the Family Affluence Scale (Currie et al., 2008), was highly diverse (Range = 0–12; Mean = 5.10; SD = 2.12).

Procedure

Ethical approval was obtained from the Ethics Committee of Babes-Bolyai University at the start of the study. Information was obtained within the context of a larger study, which tapped into a wide range of concepts (e.g. Balan et al., 2017; Florean et al., 2021). Recruitment was conducted by contacting and obtaining permission from the school principals of local public schools, selected based on accessibility and previous collaborations with the university that hosted the data collection team (for further details see Balan et al., 2017). Data were collected in classrooms, utilizing pen and pencil survey booklets. Active informed consent was obtained from all participants, who were debriefed with regard to the study objectives and their right to withdraw or withhold information on some questions. Prior to data collection commencement, additional passive consent was obtained from parents, who were sent opt-out forms which included a full description of the study. The study duration was between 90 and 120 minutes and was administered by trained researchers, with support from teachers. Children were rewarded with sweets and a raffle was organized at the end of the study, with the results regarding the winner of a cash prize published online and disseminated via the schools (further details on the prize procedure are described in Balan et al., 2017).

Measures

The study focused on children's perceptions, hence all constructs were measured as self-reports. The measures represented known questionnaires, which were translated into Romanian using a three-step procedure: (1) translation into Romanian by a bilingual Romanian-British researcher; (2) back-translation into English by a Romanian researcher; and (3) comparison of back-translated version against the original scale by a native English-speaking researcher (Tyupa, 2011). Scale internal consistency was investigated with ordinal Cronbach's alpha, which relies on polychoric correlations (this type of correlation is designed for ordered

categorical data) (Dunn et al., 2014; Gadermann et al., 2012). Tables S1 and S2 present descriptive statistics (e.g. means, variances) and correlations of total scores derived by summation; the main study variables were, however, conceptualized as latent variables.

Child-perceived parenting practices were measured via the Alabama Parenting Questionnaire (Frick, 1991). Data were collected on the full questionnaire and factorial structures were fitted to both the full (i.e. 24 items) and abbreviated (i.e. 12 items) forms, with the latter being entered into the main analyses (APQ-short; Scott et al., 2011). APQ-short, like the long form of the scale (Frick, 1991), measures five domains of parenting practices, namely positive parenting, parental involvement, inconsistent discipline, poor monitoring, and corporal punishment. Each domain is measured by three items (Scott et al., 2011). The answers are given on a five-point Likert scale indicating the frequency to which the statements (e.g., "Your parents praise you if you behave well") apply to the lives of children (i.e., 1. Never – 5. Always). In this study, the scale reliability scales was acceptable for positive parenting ($\alpha = .62$), poor monitoring ($\alpha = .68$), and corporal punishment ($\alpha = .86$). Internal consistency was comparatively modest for parental involvement ($\alpha = .52$) and inconsistent discipline ($\alpha = .55$).

Experienced affiliative reward was measured with the Network of Relationships Inventory – Social Provisions Version (NRI-SPV; Furman & Buhrmester, 1985). In this study, the subscales of companionship, intimacy, affection, and worth were deployed to tap into affiliative reward with best friends, mothers, and fathers, with the latter two combined into a single parent-related score via higher-order factor analysis. Each subscale is made up of 3 items (Furman & Buhrmester, 1985), completed separately in relation to mothers, fathers and best friends, to a total of 36 items. An item example is "How often do you spend fun time with this person?." Scale reliability scores were good in relation to mothers (companionship, $\alpha = .75$; intimacy, $\alpha = .81$; affection, $\alpha = .89$; and worth, $\alpha = .81$), fathers (companionship, $\alpha = .76$; intimacy, $\alpha = .81$; affection, $\alpha = .92$; and worth, $\alpha = .82$) and best friends (companionship, $\alpha = .69$; intimacy, $\alpha = .79$; affection, $\alpha = .83$; and worth, $\alpha = .80$).

Callous-unemotional traits were measured via the Inventory of Callous and Unemotional Traits (ICU; Frick, 2004). Factorial structures were applied to both the 24-item version and a brief 12-item version (Ueno et al., 2021), with the latter ultimately included in the main analyses. An item example is "I do not care who I hurt to get what I want." Answers are given on a four-point Likert scale (0. Not at all true – 3. Definitely true). The 12-item short form measures two dimensions: callousness and uncaring traits. The reliability of these subscales was good (i.e., callous, $\alpha = .80$; uncaring, $\alpha = .76$).

Aggression and rule-breaking were measured with the Youth Self-Report (YSR; Achenbach & Rescorla, 2001). Specifically, we used two subscales from the YSR, namely aggression and rule-breaking. The YSR is among the most widely used and validated instruments used to measure mental health symptoms in adolescents. Furthermore, the YSR has been adapted and validated with Romanian samples (Ivanova et al., 2007). The answers are provided on a three-level Likert scale (i.e., 0 – not true; 2 – very often true). Example items are "I destroy my own things" (aggression) and "I drink alcohol without my parents' approval" (rule-breaking). To derive total scores for aggression and rule-breaking, we applied confirmatory factor analysis to the

full sub-scales and to a shortened version (for model fit comparisons, see Table M5). In the shortened version, items were excluded to avoid potentially over-inflated regression coefficients caused by item overlaps with scales measuring some of the predictors. The decision regarding item exclusion was performed in a single step at the start of the analyses (i.e. a priori) and no modifications were made thereafter. Accordingly, items were excluded because (a) they overlapped in meaning with the concept of CU traits: (e.g. “I don’t feel guilty after doing something I shouldn’t”), (b) reflected general impulsivity (e.g. “I have a hot temper”), (c) included possible confounders for affiliative reward (e.g. “I try to get a lot of attention”), (d) referred to having potentially heightened exposure to crime-prone peers rather than actual engagement in rule-breaking (e.g. “I hang around with kids who get in trouble”), or (e) were meant to measure aggression but were considered too mild (e.g. “I disobey my parents”). Thus, our final scale included 6 items for aggression and 9 for rule-breaking. In our sample, Cronbach’s alpha was good for both scales (that is, aggression, $\alpha = .86$; rule-breaking, $\alpha = .92$), indicating high reliability.

Analytic plan

Analyses were conducted utilizing full information maximum likelihood estimation with the software Mplus (v 8.4; Muthén & Muthén, 1998–2022), under the assumption that data are missing at random or completely at random. For each construct, factors were created using confirmatory factor analysis (CFA). The factors were respecified jointly within full structural equation models in order to test the three main aims. Indirect effects and 95% confidence intervals were also computed. To account for skewness, all models were estimated using the robust maximum likelihood (MLR) estimator, which utilizes a sandwich estimator to compute standard errors robust to non-normality and a chi-square test statistic asymptotically equivalent to the Yuan-Bentler T2 test statistic (Yuan & Bentler, 2000). The initial model specification included correlations between predictors, between mediators, and between outcomes, as well as all possible regression paths within the causal chains of interest. Non-significant paths were then removed from the final models. Model fit was assessed using the following fit indicators: the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), the Root Mean Square Error of Approximation (RMSEA), and the Standardized Root Mean Residual (SRMR). The following cutoffs were used: excellent fit: $CFI \geq .95$, $TLI \geq .95$, $RMSEA \leq .06$, $SRMR \leq .08$; adequate fit: $CFI \geq .90$, $TLI \geq .90$, $RMSEA \leq .08$, $SRMR \leq .08$ (Bentler, 1990; Hu & Bentler, 1999).

In addition to the models presented here, several further models were conducted and are presented in the accompanying Supplementary Information document. First, comparative model fit information is presented regarding competing factorial structures for each construct (Tables M1–M5). Second, to examine the potential relevance of several variables as “control variables” we specified a model whereby child age, biological sex, self-reported stress, and family affluence were entered alone as predictors of aggression and rule-breaking. The model (Table S3) informed the decision to not integrate covariates into further models. Third, to probe directionality of effects within this cross-sectional sample, an “alternative models” framework was employed with regard to the relationships between parenting, affiliative reward, and CU traits (Figure S1).

Results

Preliminary analyses: confirmatory factor analysis

Measurement models in the form of CFA were specified to construct factors representing the main study variables. For each construct, several factorial structures were tested in line with previous literature and the model with best fit was chosen in each case.

To obtain a total score for parenting practices, we applied CFA models to the full 24-item APQ questionnaire (Frick, 1991) (using both the MLR and WLSMV estimators), as well as to the brief 12-item form (Scott *et al.*, 2011) (using the MLR estimator). In each case, we specified factors of positive parenting, inconsistent parenting, parental involvement, poor monitoring, and corporal punishment. Only the CFA applied to the 12-item brief form exhibited good fit ($\chi^2 = 146.082$, $df = 84$): $CFI = .969$, $TLI = .961$, $RMSEA = .026$ [95% CI = .018–.032], $SRMR = .036$ (see Table M1). As depicted in Figure 1, the factors representing positive parenting and parental involvement were highly correlated, whereas correlations between other factors were modest in magnitude or not significant.

To obtain total scores for affiliative reward, we attempted factorial structures applied to the NRI (NRI-SPV; Furman & Buhrmester, 1985) with second-order factors constructed by dimension (e.g. companionship derived from mother-related, father-related, and friend-related companionship) and by informant (e.g. mother-related reward derived from companionship, affection, intimacy, and worth). The model with best fit was “by informant” and with several permitted residual correlations (for a comparison of model fit, see Table M2; for a detailed list of factor loadings, see Table M3). Figure 2 depicts the higher-order structure of the final model, which fits the data well ($\chi^2 = 1223.145$, $df = 543$): $CFI = .951$, $TLI = .943$, $RMSEA = .034$ [95% CI = .031–.036], $SRMR = .064$.

To obtain total scores for callous-unemotional traits, we followed the procedure described by Ueno *et al.* (2021) and attempted factorial structures as follows: a 3-factor model (“callous,” “uncaring,” and “unemotional”) applied to the full 24-item questionnaire and a 2-factor model (“callous” and “uncaring”) applied to a short 12-item version. In each case, we conducted the factor analyses twice: treating the variables as continuous and skewed and applying the MLR estimator, and treating the variables as categorical (with 4 response categories) and applying the WLSMV estimator. The 3-factor models had unsatisfactory fit, non-significant item loadings, and cross-loadings (see Table M4 for details). In contrast, the 2-factor models showed excellent fit and significant loadings for all items. This is in line with a recent meta-analysis of the ICU, which indicated that the factors of callous and uncaring traits function well, but the unemotional traits one does not (Cardinale & Marsh, 2020). We favored the solution based on the MLR estimator in line with the other models included here and this model fit the data well ($\chi^2 = 102.463$, $df = 53$): $CFI = .964$, $TLI = .955$, $RMSEA = .029$ [95% CI = .020–.037], $SRMR = .034$. As depicted in Figure 3, the factors representing callousness and uncaring traits were only mildly correlated.

Finally, with regard to aggression and rule-breaking, the model applied to the short version showed adequate fit to the data ($\chi^2 = 153.617$, $df = 86$): $CFI = .935$, $TLI = .920$, $RMSEA = .026$ [95% CI = .020–.033], $SRMR = .046$. The factors of aggression and rule-breaking were very highly correlated, as shown in Figure 4.

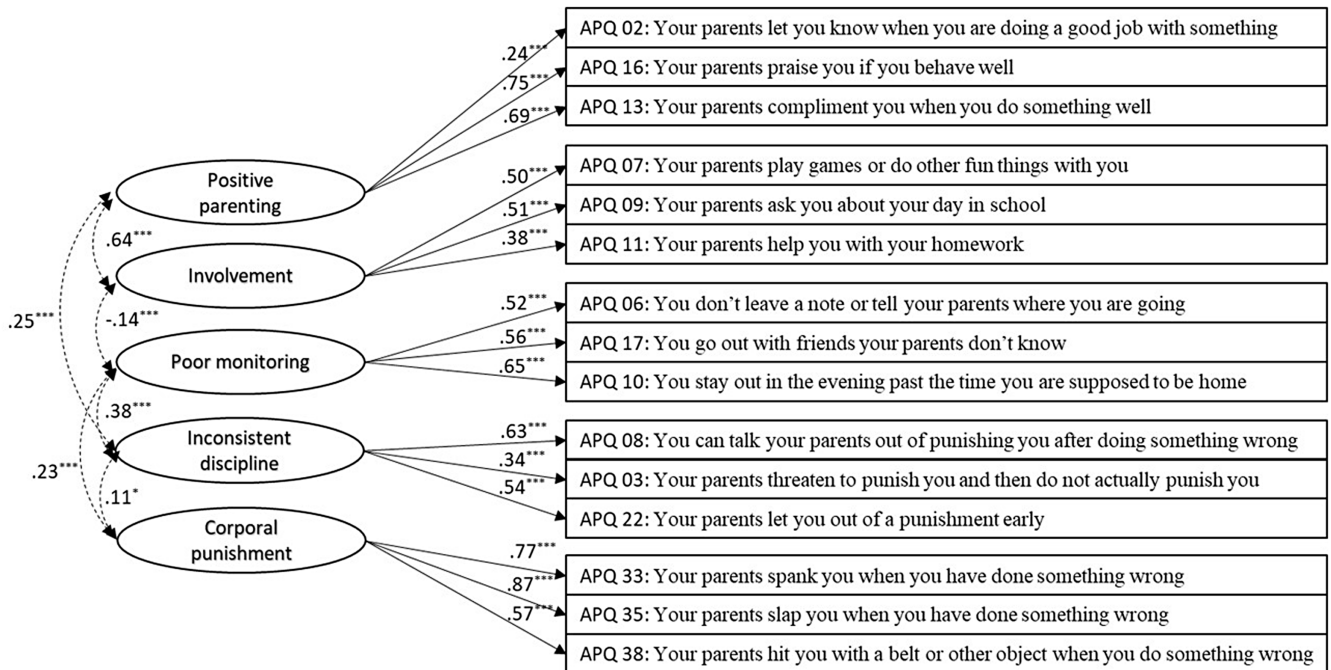


Figure 1. Parenting practices: confirmatory factor analysis for the final factorial structure. Standardized coefficients are presented. $p < .05^*$, $p < .01^{**}$, $p < .001^{***}$.

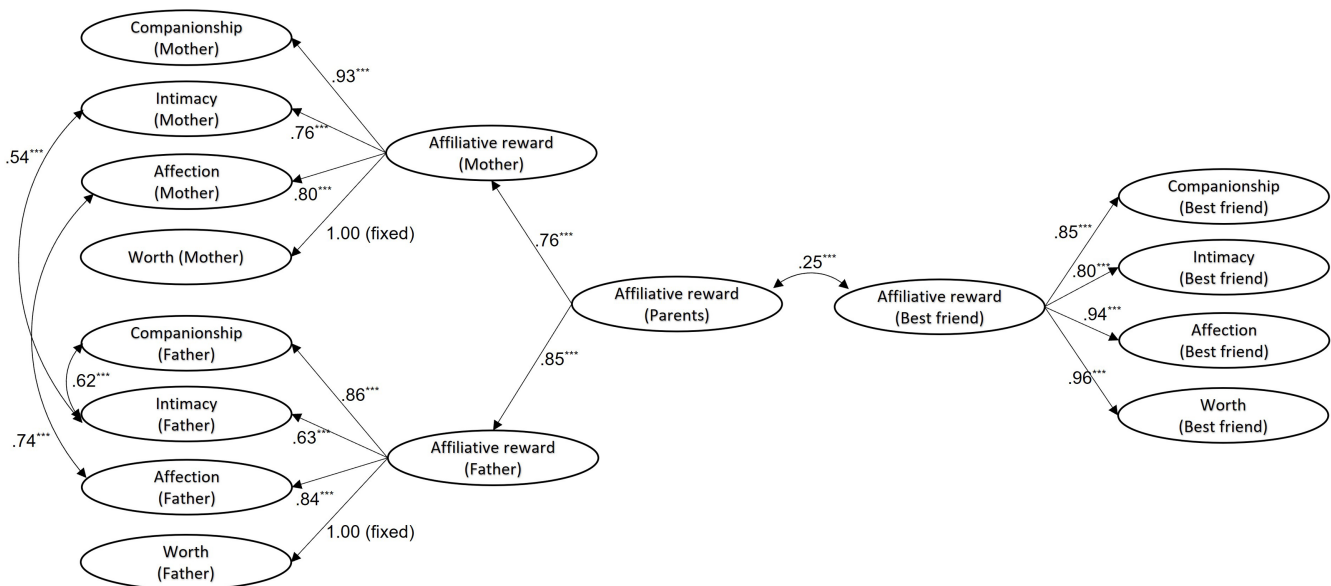


Figure 2. Affiliative reward: confirmatory factor analysis for the higher-order component of the final factorial structure. Standardized coefficients are presented. To stabilize the model, the two non-significant residual variances of the first-order factor of "worth" in relation to mothers and fathers were fixed at zero, which produced a fixed standardized loading of 1 for corresponding loading onto the second-order factor. $p < .05^*$, $p < .01^{**}$, $p < .001^{***}$.

Aim 1: affiliative reward and CU traits

The first aim was to investigate whether, in early adolescence, affiliative reward translates into lower CU traits and antisocial behavior (i.e. aggression and rule-breaking), and, if so, whether effects are similarly strong across affiliative reward contexts. The model, presented in Figure 5, fit the data well ($\chi^2 = 3125.149$, $df = 1826$): CFI = .932, TLI = .928, RMSEA = .025 [95% CI = .024–.027], SRMR = .052. The two dimensions of affiliative reward were weakly, but significantly, correlated. In addition to a

weak direct influence on aggression and rule-breaking, low levels of experienced affiliative reward with parents translated into both heightened callousness and heightened uncaring traits, which, in turn, translated into heightened levels of aggression and rule-breaking. All indirect effects were significant (Table 1). In contrast, experienced affiliative reward with friends was unrelated to callousness, showed only a weak effect on uncaring traits, and showed no direct or indirect effects in relation to aggression or rule-breaking.

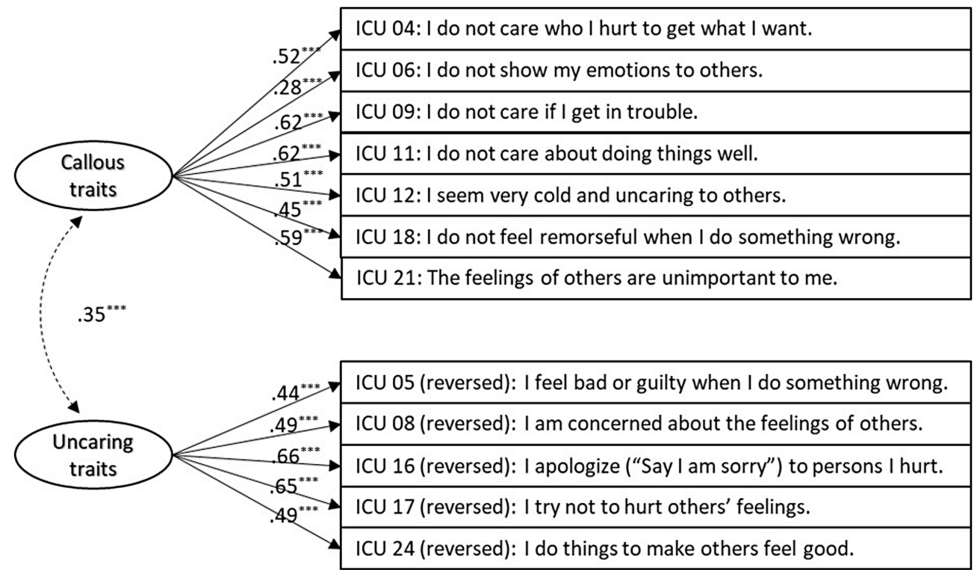


Figure 3. CU traits: confirmatory factor analysis for the final factorial structure. Standardized coefficients are presented. $p < .05^*$, $p < .01^{**}$, $p < .001^{***}$.

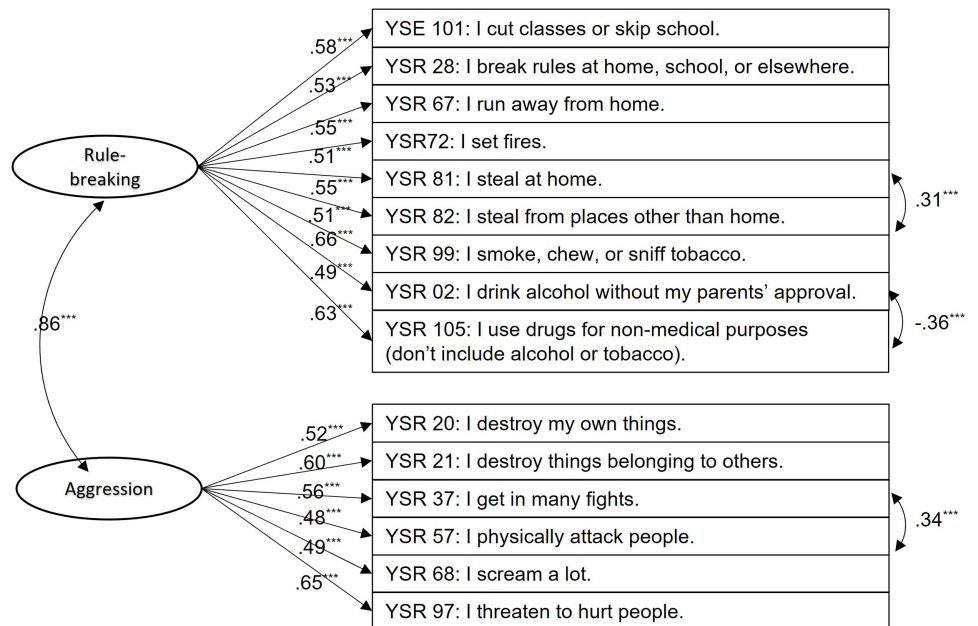


Figure 4. Aggression and rule-breaking: confirmatory factor analysis for the final factorial structure. Standardized coefficients are presented. $p < .05^*$, $p < .01^{**}$, $p < .001^{***}$.

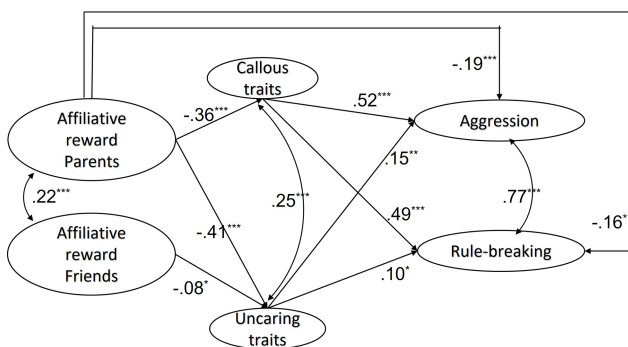


Figure 5. The structural model component of an SEM examining the role of parent-related and friend-related affiliative reward in the pathway from CU traits to aggression and rule-breaking. All constructs represent factors. $*p < .05$. $**p < .01$. $***p < .001$.

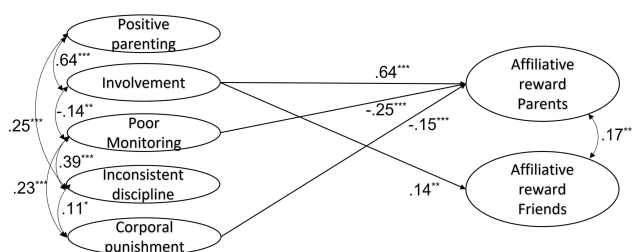
Aim 2: parenting practices and affiliative reward

The second aim was to investigate whether different parenting practices translate into experienced affiliative reward and if so, whether this is a generalized effect that affects both relationships with parents and friends, or whether it is a specific effect related only to early adolescents' relationships with parents (i.e. only the relationships within which they act). The model, presented in Figure 6, fit the data well ($\chi^2 = 2200.050$, $df = 1164$): CFI = .944, TLI = .938, RMSEA = .028 [95% CI = .026–.030], SRMR = .055.

No roles for positive parenting and inconsistent discipline emerged in relation to early adolescents' experiences of affiliative reward. Parental involvement showed a generalized effect on affiliative reward: it was related strongly to affiliative reward derived from relationships with parents and weakly to affiliative reward derived from relationships with best friends. Additionally,

Table 1. Indirect effects for the SEM examining the role of parent-related and friend-related affiliative reward in the pathway from CU traits to aggression and rule-breaking

Causal chain	β	p-value	95% CI
AR parent → callousness			
→ aggression	-.187	< .001	-.246; -.128
→ rule-breaking	-.177	< .001	-.235; -.118
AR parent → uncaring traits			
→ aggression	-.061	.008	-.106; -.016
→ rule-breaking	-.042	.042	-.082; -.002
AR best friend → callousness			
→ aggression	n/a	n/a	n/a
→ rule-breaking	n/a	n/a	n/a
AR best friend → uncaring traits			
→ aggression	-.012	.099	-.026; .002
→ rule-breaking	-.008	.164	-.020; .003

* $p < .05$.** $p < .01$.*** $p < .001$.**Figure 6.** The structural model component of an SEM examining the relationship between parenting practices and parent-related and friend-related affiliative reward. All constructs represent factors. * $p < .05$. ** $p < .01$. *** $p < .001$.

poor monitoring and heightened corporal punishment showed a specialized effect on parent-related affiliative reward only. Together, the different parenting practices explained 54.6% of variance in parent-related affiliative reward, but only 1.9% of variance in friend-related affiliative reward.

Aim 3. The causal chain from parenting practices to antisocial behavior, via affiliative reward and CU traits

The third aim was to investigate whether experienced affiliative reward acts as mediator in the “parenting – CU traits – antisocial behavior” axis. In light of the findings from the second aim, this analysis focused solely on parent-related affiliative reward.

The model, presented in Figure 7, fits the data well ($\chi^2 = 3284.614$, $df = 2026$): CFI = .931, TLI = .927, RMSEA = .023 [95% CI = .022–.025], SRMR = .048. Indirect effects indicated the presence of a causal chain from low parental involvement, poor monitoring and heightened corporal punishment to both aggression and rule-breaking when mediated via parent-related affiliative reward and callousness, but not uncaring traits (Table 2).

The different parenting practices, together with parent-related affiliative reward, explained 37.8% of variance in callousness and 23.1% of variance in uncaring traits. Additionally, the effects from

parenting practices, parent-related affiliative reward, and CU traits explained 47.2% of variance in aggression and 37.9% of variance in rule-breaking.

Discussion

Overall, this study offers support for a theoretical causal chain from parenting to parent-related affiliative reward, to CU traits, to antisocial behavior. This study established that parent-related and friend-related affiliative reward are only weakly correlated in early adolescence, thus providing support for the increasing diversification in social bonds in this developmental period and the differential roles of relationships with parents and friends (e.g. Laursen & Bukowski, 1997). Furthermore, a strong relationship emerged between parent-related affiliative reward and both callousness and uncaring traits, but a relationship between friend-related affiliative reward and CU traits did not exist regarding callousness and was limited in magnitude with regard to uncaring traits. This indicates that any process through which friend-related affiliative reward might act upon CU traits and thus provide an alternative pathway towards low CU traits and prosocial outcomes will not have fully commenced in the very early stages of adolescence (age 12 years). Future longitudinal work on the roles of both parent-related and friend-related affiliative reward straddling the entire adolescence period could provide real insights into the underlying developmental processes. Indeed, adolescence is marked by multiple pivotal points, both with regard to the development of the prefrontal cortex and limbic system that is known to underpin CU traits (e.g. Depue & Morrone-Strupinsky, 2005a; Waller & Wagner, 2019), but also with regard to the development of social- and self-cognitions, including self-awareness, self-agency, self-continuity, self-appraisals and self-esteem (e.g. Harter, 2012).

Parental involvement showed a generalized effect on affiliative reward, with a strong effect on parent-related affiliative reward, and an additional weaker effect on friend-related affiliative reward. This indicates that perhaps parental involvement may work to build underlying cognitive-affective schemas that are used to derive reward from a variety of sources and may explain findings from existing intervention studies, which showed that promoting parental involvement reduces child CU traits (e.g. Pasalich et al., 2016). However, no role for positive parenting emerged in relation to early adolescents’ experiences of either parent-related or friend-related affiliative reward, although we note that positive parenting was highly correlated with parental involvement, corroborating similar findings in the broader literature (e.g. Florean et al., 2022). In this context, experimental studies that directly manipulate different degrees of parental positivity and involvement might be able to shed more light on how these two parenting dimensions operate, jointly or separately, to create an experience of companionship, intimacy, affection, and high worth.

Poor monitoring and heightened corporal punishment showed a direct effect on CU traits, as well as an indirect effect via lower experienced parent-related, but not friend-related, affiliative reward. We note here that the “poor monitoring” subscale of the Alabama Parenting Questionnaire differs in phrasing from the other subscales by asking early adolescents about their direct behaviors (e.g. “You go out with friends your parents don’t know”) rather than about their perceptions of their parents’ actions (e.g. “Your parents ask you who you go out with”). This said, our findings are corroborated by similar findings from a study where the questionnaire directly addressed adolescents’ perceptions of

Figure 7. The structural model component of an SEM examining the causal chain from parenting practices to child aggression and rule-breaking, under mediation by parent-related related affiliative reward and callous and uncaring traits. All constructs represent factors. * $p < .05$. ** $p < .01$. *** $p < .001$. Dashed lines accompany paths that are not a direct part of the causal chain and are included simply to enhance readability.

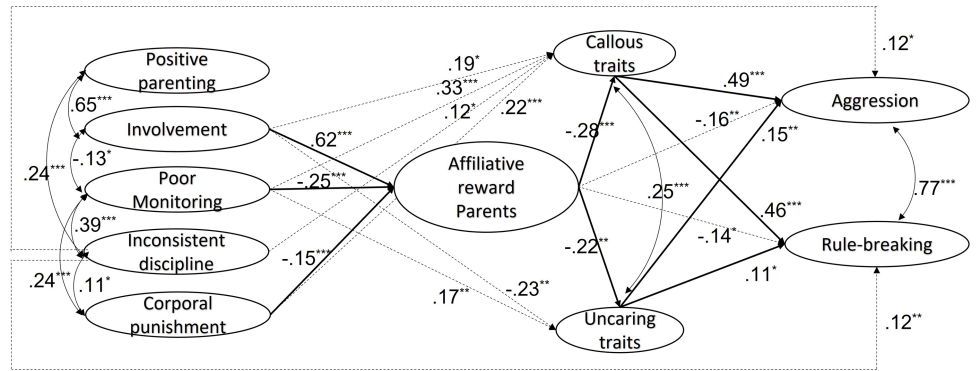


Table 2. Indirect effects for the SEM examining the causal chain from parenting practices to child aggression and rule-breaking, under mediation by parent-related related affiliative reward and callous and uncaring traits

Causal chain	β	p-value	95% CI
Involvement → AR parent → callousness			
→ aggression	-.086	.005	-.147; -.026
→ rule-breaking	-.080	.005	-.136; -.024
Involvement → AR parent → uncaring traits			
→ aggression	.020	.059	-.041; .001
→ rule-breaking	-.014	.097	-.032; .003
Poor monitoring → AR parent → callousness			
→ aggression	.035	.006	.010; .060
→ rule-breaking	.033	.005	.010; .055
Poor monitoring → AR parent → uncaring traits			
→ aggression	.008	.069	-.001; .017
→ rule-breaking	.006	.112	-.001; .013
Corporal punishment → AR parent → callousness			
→ aggression	.021	.025	.003; .040
→ rule-breaking	.020	.027	.002; .037
Corporal punishment → AR parent → uncaring traits			
→ aggression	.005	.100	-.001; .011
→ rule-breaking	.004	.133	-.001; .008

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

parental monitoring and which examined how these two parenting practices act (i.e. poor monitoring and corporal punishment) as determinants of trajectories of CU traits over the course of adolescence (Waller et al., 2018). Our cross-sectional results extend the existing empirical evidence base by adding new evidence with regard to the mediating role of affiliative reward.

A limitation of this study is the cross-sectional nature of the data, which restricts conclusions regarding the directionality of effects, specifically with regard to affiliative reward and CU traits. However, additional models specified within an “alternative models” framework (Figure S1) showed a stronger unidirectional

path from parent-related affiliative reward to both callousness and uncaring traits than the reverse. Additional indirect support comes from a longitudinal study applied to early childhood, which showed a unidirectional relationship from age 2 affiliative behaviors with mothers to age 3 CU traits (Waller et al., 2021). Results from alternative models are less clear with regard to friend-related affiliative reward: (a) there were no significant paths between friend-related affiliative reward and callousness in either direction; and (b) there was a weaker unidirectional path from friend-related affiliative reward to uncaring traits than the reverse. This suggests that further work is urgently needed to disentangle how social bonds and associated emotional rewards from bonds with friends develop as children’s network of relationships expands during adolescence.

This study presents several methodological, measurement, and analytical strengths and limitations. A main methodological contribution of this study is the application of well-known and widely-used scales to a sample drawn from Eastern Europe, thus shedding light on the scale functioning of instruments produced in the US onto other populations. On the other hand, a drawback was the measurement of affiliative reward via a scale that references behavioral indices of emotional rewards, rather than directly measuring its affective dimension. Thus, this study calls for future psychometric work on the development of a new measure dedicated specifically to testing experienced affiliative reward.

A further methodological strength was the application of full structural equation models as opposed to path analyses applied to saved factor scores, and the reliance on data with high internal reliability for all scales except for the concepts of parental involvement and inconsistent discipline. Due to issues arising from model complexity, models reliant on categorical items were ultimately estimated using maximum likelihood estimation rather than the arguably more appropriate weighted least squares estimation. However, re-running the models under weighted least squares estimation produced the same pattern and magnitude of effects, thus the results can be interpreted with confidence.

Importantly, our measure of CU traits captured callousness and uncaring traits but did not capture unemotional traits. Mutual influences may exist between the ability to detect and express emotions, and experienced affiliative reward. Therefore, this study calls for future work on the relationship between experienced affiliative reward and unemotional traits and highlights the specific need for studies whereby emotion processing is assessed using experimental tasks.

An important avenue for further research refers to gender and sex differences. It is known that boys and girls differ in the type of

socialization they receive (for a recent review, see Morawska, 2020), therefore it may be that affiliative reward is experienced differently by adolescents of different genders and, furthermore, that the entire functional pathway from parenting to antisocial behavior via affiliative reward and CU traits might differ. As such, further studies aimed at decomposing the theoretical causal chain with a direct focus on gender differences would be a welcome next step.

This is, to our knowledge, the first empirical study to investigate the role of parent-related and friend-related affiliative reward in the relationship between parenting practices, CU traits and antisocial behavior. The findings of this study establish that in early adolescence, a role exists for parent-related affiliative reward but not yet for friend-related affiliative reward, and thus sets the stage for further tests that focus on exploring: (a) the in-depth processes posited by different underlying theories; (b) the extent to which the “balance of power” might shift away from parents towards best friends over the course of adolescence; and (c) the ways in which this pattern of relationships might be shaped according to sex as a result of differential socialization and other underlying gender-differing psychosocial processes.

Supplementary material. The supplementary material for this article can be found at <https://doi.org/10.1017/S0954579423001050>.

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