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Predicting Criminal Charges in Adolescents Using Multi-Informant Assessments at Child Welfare Intake

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Research Article

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Abstract

Youth crime rates have stabilized after prior declines, underscoring the need for early identification of adolescents at risk of offending within Child Welfare Services (CWS). We analyzed multi-informant assessments collected at CWS intake from 129 youths enrolled in a randomized controlled trial that compared Functional Family Therapy (FFT) with Treatment as Usual (TAU). These data were linked to national registry records of criminal charges at 18 and 36 months post-intake. Parent-, self-, and teacher-reported rule-breaking behavior, self-reported delinquency, and teacher-reported callous-unemotional traits significantly predicted later criminal charges. FFT was associated with reduced offending among school-attending youths, particularly those with higher risk profiles. Incorporating multi-informant assessments at CWS intake may help identify youth at risk and inform targeted preventive interventions.

Can we predict which adolescents in Child Welfare Services (CWS) will later commit crimes after treatment?

There is substantial evidence from national and statewide crime statistics and cross-sectional youth surveys that both adult and juvenile crime have declined markedly in recent decades (Burt et al., 2025). However, this decline in youth crime appears to have plateaued in recent years, with self-reported offending increasing since 2015, and reductions in violence slowing or stabilizing (Oberwittler & Svensson, 2025). Importantly, some studies suggest that the earlier decrease was primarily due to fewer individuals offending, rather than a reduction in the number of life-course-persistent or high-severity offenders (e.g., Andersen, Anker, & Andersen, 2016; Sivertsson et al., 2025). Developing effective strategies to reduce the proportion of youth who progress into a life-course-persistent offending trajectory is therefore crucial for achieving further reductions in violence and crime at the societal level.

Many young people receive interventions from Child Welfare Services (CWS) before engaging in serious criminal acts, yet these interventions are often unsuccessful in preventing later offending. Identifying which youths involved with CWS are at elevated risk of future criminal behavior at the time they enter treatment is therefore a critical public health and policy priority. Accurate and practical measures that can predict subsequent criminal behavior among children and youth in CWS would enable providers to target preventive interventions earlier, focusing on those less likely to respond to standard treatment and before they become involved in the juvenile justice system. Early, appropriately tailored interventions have the potential to avert trajectories leading to recurrent offending, incarceration, and the lifelong social, health, and economic costs that follow (see for example, Cohen & Piquero, 2009). Despite this imperative, routine identification of those most likely to benefit from early evidence-based prevention within CWS remains inadequate.

A key challenge in current practice is the timing of interventions. Evidence-based programs that reduce recidivism such as cognitive-behavioral therapies, family-focused interventions, and multi-systemic approaches are typically implemented only after young people have committed offenses and entered the juvenile justice system (Olseth et al., 2024). This reactive approach misses a crucial window of opportunity: the pre-offending or early-problem stage, when modifying family environments, school engagement, or youth behavior may be more feasible and when the harms of justice system contact can be avoided. To enable earlier and more preventive action, practitioners and policymakers need valid and

reliable screening and assessment tools tailored specifically to CWS populations. Such tools help identify which youth entering treatment require more intensive or additional interventions to prevent future involvement with the criminal justice system.

Risk assessments in CWS

Although promising assessment instruments exist, their applicability to CWS populations is uncertain. A large meta-analysis of the Level of Service scales found that risk-assessment tools developed for juvenile justice intake can predict reoffending with reasonable accuracy (Olver, Stockdale & Wormith, 2014). However, these tools are typically validated in samples already selected for offense history, raising questions about their performance in CWS settings such as the Norwegian where youths are referred for disruptive behavior or family dysfunction rather than criminal acts (Ayano et al., 2024). CWS populations differ from juvenile justice samples in behavioral problems, service needs, and contextual risk factors (Olseth et al., 2026a), so instruments validated in justice settings may misclassify risk if used without adaptation. Furthermore, agencies like CWS, which encounter youths earlier in the risk trajectory, may have less reliable information than criminal justice agencies that will potentially have information from police investigation and court proceedings. As a result, it remains unclear how well "gold standard" instruments such as the Level of Service scales predict future crime in this context (Wormith & Bonta, 2018).

At the same time, a robust body of longitudinal research has identified that parent, self, and teacher reports of specific traits and behaviors, level of behavioral problems and interpersonal difficulties, are meaningful predictors of later offending. Some of the factors that previous research suggests may predict later crime are hyperactivity-impulsivity (Babinski et al., 1999, Mohr-Jensen & Steinhausen, 2016), callous-unemotional traits (Geerlings et al., 2020), delinquency (Mason et al., 2010), aggression (Pingault et al., 2013), social competence (Durlak et al., 2011), and Oppositional Defiant Disorder (ODD, Pardini & Fite, 2010).

Hyperactive/Impulsivity. According to Bennett et al. (2005), hyperactivity and impulsiveness are among the most important personality or individual-difference factors predicting later crime and violence. In line with this, childhood ADHD has been associated with an increased risk of later criminal behavior: in a meta-analysis of 15,442 individuals with ADHD, Mohr-Jensen and Steinhausen (2016) reported elevated risks of arrests (RR = 2.2, 95% CI [1.3, 3.5]), convictions (RR = 3.3, 95% CI [2.1, 5.2]), and incarcerations (RR = 2.9, 95% CI [1.9,

4.3]) in adolescence and adulthood. Furthermore, a longitudinal study by Babinski et al., (1999) that followed 305 individuals from age 9 to 26 found that both hyperactivity–impulsivity and early conduct problems, independently as well as jointly, predicted a greater likelihood of having an arrest record and a high level of self-reported crime for males, but not for females. For male participants with 10 or more self-reported crimes, both early conduct problems and hyperactivity–impulsivity were significant predictors, either alone or in combination. Inattention did not significantly predict crime or arrests.

Rule breaking behavior. Meta-analyses further indicate that self-reported delinquent involvement in late childhood is associated with later offending (i.e., Mason et al., 2010), and large longitudinal studies show that parent and teacher reports of rule-breaking and delinquency predict young adult crime (i.e., Fergusson et al., 2005).

Callous Unemotional Traits: Geerlings et al. (2020) conducted a meta-analysis examining the associations between measures related to psychopathy in juveniles and delinquency and found that callous–unemotional (CU) traits were moderately, positively associated with delinquency (r = 0.23). The associations between self-report and other report measures of CU and delinquency were approximately similar.

Aggression. In Matlasz et al. (2020), self-reported aggression predicted criminal charges. Meta-analyses (e.g., Leschied et al., 2008) show that childhood aggression is one of the strongest predictors of adult crime. In Pingault et al. (2013), children classified by mothers and teachers as high on physical aggression had a 43.4% probability of having a criminal record by age 25 years. They conclude that physical aggression systematically predicted non-violent-only and mixed types of crimes in adolescence and adulthood, irrespective of the age at assessment (i.e., 6–7 or 8–12 years), and for both mother and teacher reports.

Oppositional Defiant Disorder (ODD). Symptoms of oppositional defiant disorder (ODD) have also been identified as predictors of later offending (Pardini & Fite, 2010). ODD is associated with reactive aggression hypothesized to stem from temperamental vulnerabilities where individuals have a low threshold to act swiftly and strongly when effort to achieve desired goals are frustrated or blocked (Brotman et al., 2017; Leibenluft et al., 2024; Vidal-Ribas et al., 2016; Wakschlag et al., 2012). Instrumental or proactive aggression (i.e., using aggression deliberately to achieve goals) very rarely occurs in isolation but rather in combination with reactive aggression (Waschbusch et al., 2020). In some instances, children will experience that acts of aggression are effective for avoiding demands or achieving goals

(Forgatch & Patterson, 2010; Patterson, 2016). Accordingly, children with ODD symptoms may be at risk for future offending behavior if they learn that reactive aggression is reinforced by their environment, thereby increasing the risk of aggression subsequently being used instrumentally as a strategy for goal achievement (e.g., Høstmælingen et al., 2026).

Social skills. In a meta-analysis examining potential protective factors for antisocial behavior, Gubbels et al. (2024) identified 14 studies, with a mean $r = -0.203$ (0.040), that had investigated social skills as a protective factor. In that context, social skills were among the protective factors with the strongest empirical support. This is supported by Durlak et al.'s (2011) meta-analysis, which found that the promotion of social and emotional competencies in schools may reduce various antisocial behaviors and foster healthy, socially adjusted development.

In short, we need validated, feasible measures tailored for CWS contexts that can reliably flag youth at heightened risk of later offending. Doing so may give us the opportunity to enable timely deployment of evidence-based preventive services within child welfare potentially reducing later justice contact and its profound consequences. Research that evaluates existing justice-derived instruments in CWS samples, adapts them as needed, and tests screening protocols that synthesize multi-informant reports is therefore an urgent priority for both science and practice.

The present study is relevant for several reasons. First, examining the predictive value of different risk factors advances the fundamental knowledge of the types of risk factors that contribute to criminal charges. Second, gaining more insight into how risk factors operate, and in which treatment they influence future charges, can help improve current risk assessment practices. This multi-informant knowledge base could be translated into practical assessment strategies at CWS intake: integrating caregiver, youth, intake team, and teacher reports into structured screening could enhance predictive accuracy and help discriminate youth who are likely to benefit from early, targeted interventions.

Study Aims

The aim of the study is to examine the extent to which various types of previously identified risk factors (i.e., behaviors and traits), as reported by different informants prior to treatment initiation, predict criminal activity 18 and 36 months after treatment onset among adolescents receiving Functional Family Therapy (FFT; experimental group) or Treatment As Usual

(TAU; control group) within Child Welfare Services (CWS). The current analyses supplement previously published results from this study showing no significant differences between FFT and TAU on a total of 25 primary and secondary outcomes including criminal charges, self-reported delinquency, out-of-home placement, disruptive problem behavior, family functioning and broader domains of adolescent functioning (e.g., internalizing problems, social skills, school performance and adaptation; Olseth et al., 2024; 2026a; 2026b).

Because the assessment instruments were selected based on prior evidence of their predictive value for criminality, we expect to find positive associations in this study. However, since most previous research has not focused on adolescents in a CWS context who are receiving treatment, it is challenging to formulate specific hypotheses for each individual construct.

Methods

Intake and Enrollment

The data were drawn from a two-arm randomized controlled trial conducted in routine child welfare services (CWS) at four sites in Norway (for more information see Olseth et al., 2024, 2026b). Youths and their families were referred to CWS for adolescent behavior problems. Families and adolescents were assessed at three time points: intake (pretest), 6 months after intake (post-test), and 18 months after intake (follow-up). Teacher reports were collected for youths enrolled in school. Predictor variables for the present study were taken from the pretest assessment, completed before random assignment. Randomization was conducted by the project leader or designated staff at the Norwegian Center for Child Behavioral Development (NCCBD), and the allocation outcome was then communicated to CWS leaders, who either assigned FFT therapists or referred families to control treatment.

In total, 161 youths and their families were recruited. Of these, 129 provided a valid Norwegian national identification number, which allowed linkage to registry data on criminal charges (CC). CC at 18 and 36 months after treatment start served as outcome variables. The trial was conducted between 2013 and 2017 in four CWS sites in the mid- and southern parts of Norway. In the Norwegian CWS context, criminal charges or justice system involvement are not required for referral; instead, CWS aims to prevent delinquency by offering developmentally appropriate, minimally intrusive interventions (Enell et al., 2022). This was

reflected in the sample: only 7 (5%) of the 129 youths had been referred for a criminal offense, and 2 had been arrested prior to intake (for more details see; Olseth et al., 2026a).

Inclusion criteria followed the national criteria for FFT in Norway: youths aged 11–18 years with violent, criminal, or aggressive behavior in the home, community, or school; at risk of out-of-home placement; or with school-related problems such as truancy or significant absenteeism. Exclusion criteria were autism, psychosis, or acute suicide risk; youths living alone; youths living in families under investigation for suspected abuse or neglect; and homes assessed as unsafe for therapists. FFT leaders at each site evaluated inclusion and exclusion criteria based on referral information.

Data were collected by research staff who were blind to treatment allocation. They met with families, primarily in their homes or at CWS offices, to provide study information and obtain written informed consent. Youths and parents completed questionnaires on separate laptop computers or on paper. Families received monetary compensation of approximately $38 per assessment. Teachers were mailed paper questionnaires if the family provided contact information and allowed us to contact the teacher. The intake team at the CWS scored the Youth Level of Service/Case Management Inventory (YLS/CMI) based on information received as part of the referral. Cases without a valid national identification number were excluded from the analysis. For the current analyses using parent-reported pretest data, one parent response was selected per family. We selected the parent who participated in the most data collections throughout the study, using the mother's response when participation was equal. This selection was made prior to any analysis.

We conducted comparisons to examine potential systematic differences between participants for whom we were able to extract registry data (n = 129) and those who did not consent or did not provide a valid national identification number (n = 30). Analyses comparing participants with available registry data (coded 1) to those without registry data (coded 0) revealed two significant differences: The subsample used in the current analyses scored significantly higher on parent-reported aggressive behavior ($d = -0.64$, 95% CI $[-1.05, -0.23]$, $p = .002$) and lower on social skills ($d = 0.51$, 95% CI $[0.09, 0.93]$, $p = .016$). Surprisingly, it may therefore appear that those for whom we obtained registry data actually had a higher level of problems at study entry rather than a lower one.

CWS Treatment

Functional Family Therapy (FFT)

FFT aims to reduce the development of youths' challenging and disruptive behaviors, such as violence, family conflict, substance abuse, and criminal offenses (Hagen et al., 2025; Thøgersen et al., 2022). The treatment model is grounded in several theoretical frameworks, including systemic, behavioral, and cognitive theories. FFT views youth problem behavior as a symptom of family dysfunction; by addressing the underlying causes within the family, therapists help family members improve individual functioning and strengthen relationships. For example, techniques such as modelling more effective, positive communication and problem-solving skills are commonly used in FFT (Alexander et al., 2013). FFT targets both the youth and the risk and protective factors in their environment, and is organized into five phases: engagement, motivation, relational assessment, behavior change, and generalization. Early phases focus on reducing negativity, motivating the family, and establishing a balanced alliance with parents and youth. The relational assessment identifies "relational functions", how family interactions contribute to the problems, and these findings guide tailored interventions in the behavior change phase, which aims to alter problem behavior or dysfunctional interactions (e.g., communication training, parent training). Finally, the generalization phase extends and helps sustain improvements across settings (Alexander et al., 2013; Robbins et al., 2016).

Meta-analyses indicate that FFT produces significant behavioral improvements compared with control groups (Hartnett et al., 2017). FFT has also been found to outperform some established interventions—for example, girls receiving FFT show lower recidivism, and low-risk youth have fewer offenses and probation violations during treatment than those receiving Multisystemic Therapy (MST) (Baglivio et al., 2014). FFT has further shown effects comparable to Brief Strategic Family Therapy (BSFT), Multidimensional Family Therapy (MDFT), and MST when delinquency and substance use are outcomes (Baldwin et al., 2012). Results from some recent studies also suggest that FFT may reduce aggression and rule-breaking behavior among adolescents who score high on CU (Thøgersen et al., 2021; Thøgersen et al., 2022; White et al., 2013). However, two more recent meta-analyses covering a wide range of outcomes (Hunkin et al., 2025; Littell et al., 2023) and a scoping review of severe and persistent conduct problems (Lee et al., 2024) report mixed results across studies and outcomes, and only possibly clinically important effects for some outcomes. Results from these more recent reviews thus suggest that though FFT has been shown to be effective in some contexts, there is not consistent evidence showing that FFT performs better than TAU. Recent studies on the current sample confirms this with no

significant difference between FFT and TAU on a wide range of outcomes (Olseth et al., 2024; 2026a; 2026b).

TAU

In the present study, TAU was the standard service offered at different sites in either the CWS or the Family Counselling Services (FCS). The FCS is a nationwide service offering voluntary support to families with problems such as conflict or crisis (Norwegian Directorate for Children, Youth and Family Affairs, n.d.). Participants in the TAU group received different types of treatment: MST (n = 24, 40.7%); parent training in the CWS (n = 16, 27.1%) and family counseling in the FCS (n = 5, 8.5%); two families (3.4%) were referred to the National Child and Adolescent Psychiatric Services; two (34%) received no treatment; and one (1.7%) youth referred to FCS received additional parent training in CWS. For seven cases (5.4%) information about treatment was missing. Two families (3.4%) randomized to TAU were registered as having received FFT during the 18-month study period.

Instruments

Youth Level of service / case management inventory (YLS, Hoge & Andrews, 2002)

YLS is a structured assessment tool designed to evaluate the risk of reoffending and criminogenic needs among youth offenders, typically aged 12–18. It is based on the risk–need–responsivity (RNR, Andrews & Bonta, 2010) model and covers key domains such as prior offenses, family circumstances, education/employment, peer relations, substance use, leisure/recreation, personality/behavior, and attitudes/orientation. In this sample, the risk score appears to be moderate, but the variation between individuals is relatively large. M = 13.98, SD = 5.90. The risk classification in YLS total score is low = 0–8, moderate = 9–22, high = 23–34, and very high = 35–42.

Inventory of Callous Unemotional traits (ICU). We use the ICU to measure callous unemotional traits because the self-, parent-, and teacher-report versions have been translated into Norwegian (see Thøgersen et al., 2020). The ICU is a 24-item questionnaire. Examples of standard-scored items are “I seem very cold and uncaring to others” and “I do not care who I hurt to get what I want”. Items are rated on a 4-point scale: 0 (not true at all), 1 (somewhat true), 2 (very true), and 3 (definitively true). A total score is calculated by adding all item scores together. In this sample, the ICU means were 35.13 (SD = 11.70) for the

parent-version, 29.20 (SD = 11.09) for the self-report version and 36.61 (SD = 13.08) for the teacher-version.

Hyperactivity / Impulsivity scale on Swanson, Nolan, and Pelham-IV questionnaire (SNAP-IV). The level of Hyperactivity/impulsivity was assessed by teacher responses to the hyperactivity/impulsivity scale on the Swanson, Nolan, and Pelham—IV questionnaire (SNAP-IV; Swanson et al., 2001). The hyperactivity/impulsivity scale comprises 9 items, that are rated on a 4-point scale from (0) not at all to (3) very much.

Social Skills Rating System (SSRS)-Parent and Teacher Ratings. Youth social skills were rated by parents and teachers using the Social Skills Rating System (SSRS, Gresham & Elliott, 1990). The SSRS was translated and adapted to Norwegian by Ogden (2003). The instrument consists of 40 items in the parent version and 30 items in the teacher version, and each item is rated on a 4-point scale (1 = never, 4 = very often). Higher scores indicated a higher degree of social skills.

Child Behavior Check List (CBCL) and Teacher Report Form (TRF) – Aggressive behavior and Rule breaking sub-scales. CBCL is the parent rating scale of the Achenbach System of Empirically Based Assessment (ASEBA; Achenbach & Rescorla, 2001). The scale has been standardized and validated in a Norwegian norming study (Jozefiak et al., 2011). In the current analyses, aggressive behavior (18 items) and rule-breaking behavior (17 items) were used. Teacher Report Form (TRF) is the teacher rating scale of the ASEBA. In this study, the subscales for aggressive behavior (20 items) and rule-breaking behavior (12 items) were used. Both subscales, in CBCL and TRF, were scored on a 3-point scale (0 = not true, 1 = sometimes or somewhat true, 2 = very true or often true). Higher scores indicated higher levels of problems.

Self-Reported Delinquency (SRD). SRD is a self-report measure covering a representative set of offenses based on data from the U.S. Uniform Crime Report (Elliott & Ageton, 1980). In the present study, an SRD total sum score consisting of 40 items was used. Items regarding substance abuse were not included in this sum score. The youths were asked to indicate how many times (from 0 to 9) in the last 3 months they have engaged in specific criminal acts or delinquent behaviors. Higher scores indicated more delinquency.

Oppositional-defiant (OD) behavior was rated with the IOWA, Conners Rating Scale (Loney et al, 1982). The scale has 5items that measure aggression, defiance, and negative interactions with peers and authority. Items: quarrelsome, acts smart, temper outbursts – behavior

explosive and unpredictable, defiant, and uncooperative. Anchors: not at all (0); just a little (1); pretty much (2); and very much (3). We used the five items on the IOWA designed to measure oppositional-defiant (OD) behavior. Higher scores indicate more oppositional-defiant behavior.

Criminal Charges (CC)

The main dependent variable in our study was criminal charges (CCs). In the present study, registered CCs, rather than court convictions, were used as the measure of crime, given that individuals under 15 years of age are not criminally responsible under Norwegian law, and that court proceedings for those under 18 are relatively rare.

Two variables were constructed to reflect whether any CCs were recorded within 18 months and 36 months after enrollment in the study. Variables were coded 0 = no criminal charge recorded and 1 = criminal charge recorded. For some participants, there was more than one charge. As the total number of charges was low, and even fewer youths received more than one charge, we therefore created a dichotomous variable based on the month and year when charges were first registered against the youth.

The Norwegian police record all criminal charges brought against individuals in Norway regardless of age. There are, however, differences in registration for individuals under and over the minimum criminal age of 15. For individuals over the age of 15, the statistics contain all charges that end with some form of final legal judgement indicating that the person charged is guilty. This includes both court decisions such as sentences of imprisonment, fines, and suspended sentences. These statistics also include decisions made by the prosecutor's office, such as waiver of prosecution or specific Norwegian types of interventions for defendants under the age of 18, such as referral to mandated arbitration for youths.

For youths under the age of 15 at the time of the crime, almost all criminal charges are registered as "waiver of prosecution due to age" without further investigation or a court decision. The likelihood of having a CC registered therefore differs depending on the age of the youths (Statistics Norway, 2025).

The CC data were received from Statistics Norway (SSB) in June 2025.

Control variables

Treatment condition was included as a control variable, coded as 0 = business as usual and 1 = Functional Family Therapy. In the current study, parents were asked to report their child's

gender using a binary variable, where 0 = male and 1 = female. Socioeconomic status (SES) was operationalized by combining information about selected parents' education level and income. Youth age (in years) was included as a continuous control variable.

Analytic plan

All analyses were conducted using IBM SPSS statistics (version 31).

I. Initial group comparisons (crime vs. no crime at 18 and 36 months) were performed to identify the key predictors for further analysis using Welch's t-test. Variables that significantly predicted CC at both 18 and 36 months were retained for further analysis.

II. Predictors that were significant on both 18 and 36 months were then examined in separate logistic regression models where we estimated whether predictors remained significant after controlling for treatment condition, baseline covariates and interaction between predictor and treatment condition. These models were tested for prediction of CC for the 18- and 36-month outcomes. Models were estimated stepwise as follows: Step 1 predictor only; Step 2 predictor plus treatment condition; Step 3 predictor, treatment condition, and baseline covariates (youth age, sex, parental education, and income); and Step 4 - step 3 plus predictor × treatment interaction to assess moderation. We only proceeded to step 4 and tested interactions in cases where there was a significant effect of treatment in the previous steps. Effects are reported as odds ratios (ORs) with 95% confidence intervals. A two-tailed significance threshold of $\alpha = 0.05$ was used.

III. Finally, the predictive performance of significant variables was evaluated using receiver operating characteristic (ROC) curves and the area under the curve (AUC) at 18 and 36 months.

Results

Sample and Demographics

Demographic characteristics of the sample is presented in Table 1. The mean age of the sample was 15 years at intake, with about half the sample being female. A majority (67%) were living in single-parent households, with 42% of parents having university or college education. 93% of the youths attended school at pretest (n = 120).

Table 1. *Participant Characteristics*

Variable	Overall	*n*
Youth age (*M* (*SD*))	14.71 (1.44)	
Female (%)	60 (46.5)	129
Parent age[1] (*M* (*SD*))	44.03 (7.10)	128
Family situation		123
?Parents living together (%)	33 (26.8)	
?Parents living apart (%)	82 (66.7)	
?Long-term foster care or adoption (%)	8 (6.5)	
Parent education		127
Primary school– 7, 9 or 10 years (%)	21 (16.5)	
High school- minimum 11 years (%)	53 (41.7)	129
University or college education (%)	53 (41.7)	

Note. Based on selected primary parent.

The mean YLS total score in the sample ($M = 13.98$, $SD = 5.90$) indicates a moderate level of risk, with the standard deviation suggesting substantial variability. For comparison, adolescents placed in open-based residential care institutions under the supervision of the Office for Children, Youth and Family Affairs (Bufetat) from January 2017 to August 2022 in Norway had a mean score of 21.1 ($SD = 4.5$; Kanestrøm et al., 2024). Based on the ASEBA multicultural, age- and gender-adjusted cut-off values for parent reports (Achenbach & Rescorla, 2007), 71.2% of the sample scored within the clinical (56%) or borderline (15.2%) range for aggressive behavior, and 70.2% scored within the clinical (46%) or borderline (24.2%) range for rule-breaking behavior. In summary, the sample appears to be at moderate risk and, on average, scores somewhat lower than youth placed in open residential institutions or those within the criminal justice system.

Missing data on parent and youth reported predictors ranged from 3.1% to 7.8%, and YLS score was missing for one case (0.8%). With respect to teacher responses, missing data ranged from 35.0% to 46.7% for those who were reported as attending school at pretest.

Predictors of criminal charges at 18 and 36 months

Results from the independent samples t-tests 18 months after treatment are reported in Table 2a and shows the differences between those with criminal charges ("Crime") and those with no criminal charges ("not crime") after 18months. Mean scores on six of thirteen predictors significantly predicted CC after 18 months. Significant differences were observed for parent reported rule breaking behavior (Crime = 11.61, Not crime = 8.44, p = .003), self-reported delinquency (Crime = 34.28, Not crime = 14.94, p = .023), Teacher reported rule breaking behavior (Crime = 11.42, Not crime = 5.95, p =.003), teacher reported Callous unemotional traits (Crime = 48.25, Not crime = 34.40 , p < .001), teacher reported social competence (Crime = 63.25, Not crime = 72.08, p =.010), and Oppositional-defiant behavior (Crime = 2.21, Not crime = 1.75, p =.018). No significant differences were found for aggressive behavior (both parent and teacher report), callous unemotional traits (both self and parent report), teacher reported hyperactive-impulsivity, and risk factors reported by intake team by YLS/CMI.

Table 2

Differences in criminal charges 18 months after treatment

				Total		**Crime**		**Not Crime**		**Welch t-test**		
	N	**No. of items**	**Response scale**	**M**	**SD**	M	SD	M	SD	t	Df2	p
1. Aggressive behavior (CBCL)	125	18	0-2	14.91	8.61	15.70	7.87	14.74	8.79	.267	35.49	.609
2. Rule breaking (CBCL)	124	17	0-2	9.02	5.11	11.61	4.09	8.44	5.15	**10.18**	**39.64**	**.003**
3. ICU_24 Parent Report	121	24	0-3	35.13	11.70	35.46	10.74	35.06	11.95	.023	33.59	.880
4. Social skills Parent	119	39	0-3	89.67	12.49	89.57	10.64	89.69	12.90	.002	33.90	.964
5. Delinquency (SRD)	124	40	0–9	18.84	25.99	34.28	38.69	14.94	20.13	**5.85**	**27.36**	**.023**
6. ICU_24 Self Report	124	24	0-3	29.20	11.09	30.32	12.48	28.92	10.75	.27	33.55	.610
7. Aggressive behavior (TRF)	73	20	0-2	9.88	8.44	12.75	6.57	9.31	8.70	2.45	19.48	.134
8. Rule breaking (TRF)	74	12	0-2	6.84	5.44	11.42	4.91	5.95	5.12	**12.29**	**15.99**	**.003**
9. ICU_24 Teacher	75	24	0-3	36.61	13.08	48.25	9.13	34.40	12.57	**20.31**	**19.93**	**‹.001**
10. Social Skills Teacher	64	30	0-3	70.42	12.30	63.25	9.12	72.08	12.41	**7.88**	**21.57**	**.010**
11. Hyperactive / impulsivity	77	9	0-3	1.66	.68	1.69	.64	1.63	.69	.08	20.23	.775
12. Oppositional-defiant (IOWA)	78	5	0-3	1.83	.63	2.21	.61	1.75	.61	**6.66**	**19.08**	**.018**
13. YLS/CMI	128	42	0-1	13.98	5.90	15.40	6.68	13.63	5.67	1.49	32.89	.231

Note. CBCL = Child Behavior Checklist; SRD = Self-Reported Delinquency; ICU = Inventory of Callous-Unemotional Traits; TRF = Teacher Report Form; YLS/CMI = Youth Level of Service/Case Management Inventory.

Results from the independent samples t-tests 36 months after treatment are reported in Table 2b, showing the differences between those with criminal charges ("Crime") and with no criminal charges ("Not crime") after 36months. Mean scores on four of thirteen predictors significantly predicted CC after 36 months. Significant differences were observed for parent reported Rule breaking behavior (Crime = 11.18, Not crime = 8.00, p < .001), self-reported delinquency (Crime = 28.19, Not crime = 14.04, p =.013), Teacher reported rule breaking behavior (Crime = 9.48, Not crime = 5.79, p =.010), and teacher reported Callous unemotional traits (Crime = 42.57, Not crime = 34.30, p < .021).

Table 3

Differences in criminal charges 36 months after treatment

				Total		**Crime**		**Not Crime**		**Welch t-test**		
	N	**No. of items**	**Response scale**	**M**	**SD**	M	SD	M	SD	t	Df2	p
1. Aggressive behavior (CBCL)	125	18	0-2	14.91	8.61	15.63	7.73	14.58	8.58	.40	75.28	.531
2. Rule breaking (CBCL)	124	17	0-2	9.02	5.11	11.18	4.73	8.00	4.98	**11.76**	**80.60**	**‹ .001**
3. ICU_24 Parent Report	121	24	0-9	35.13	11.70	36.47	13.17	34.52	10.98	.64	61.49	.429
4. Social Skills Parent report	119	39	0-3	89.67	12.49	91.24	12.88	88.94	12.31	.85	69.60	.361
5. Delinquency (SRD)	124	40	0 – 9	18.84	25.99	28.19	32.77	14.04	20.34	**6.53**	**57.65**	**.013**
6. ICU_24 Self Report	124	24	0-3	29.20	11.09	29.55	10.89	29.02	11.24	.063	85.11	.803
7. Aggressive behavior (TRF)	73	20	0-2	9.88	8.44	11.85	6.65	9.13	8.97	1.98	46.10	.166
8. Rule breaking (TRF)	74	12	0-2	6.84	5.44	9.48	5.25	5.79	5.20	**7.44**	**36.48**	**.010**
9. Social Skills Teacher	64	30	0-3	70.42	12.30	66.10	12.93	72.24	11.70	3.18	31.07	.084
10. ICU_24 Teacher	75	24	0-3	36.61	13.08	42.57	13.74	34.30	12.17	**5.84**	**32.91**	**.021**
11. Hyperactive / impulsivity	77	9	0-3	1.65	.70	1.67	.63	1.64	.70	.034	43.11	.854
12. Oppositional-defiant (IOWA)	78	5	0-3	1.83	.63	1.98	.63	1.77	.63	1.85	44.78	.181
13. YLS/CM	128	42	0-1	13.98	5.90	14.24	6.61	13.85	5.55	.108	70.06	.743

Note. CBCL = Child Behavior Checklist; SRD = Self-Reported Delinquency; ICU = Inventory of Callous-Unemotional Traits; TRF = Teacher Report Form; YLS/CMI = Youth Level of Service/Case Management Inventory.

In summary, rule breaking behavior/delinquency predicted criminal charges across informants at both 18 and 36 months among youths who entered treatment in the Norwegian CWS. Also, teacher-reported callous-unemotional traits predicted CC at both 18 and 36 months. Teacher-reported oppositional-defiant behavior and low social skills predicted CC at 18 months but not 36 months. The four predictors that showed significant effects at both 18 and 36 months (teacher-reported rule breaking, parent-reported rule breaking, self-reported delinquency, and teacher reported ICU were retained for further analysis.

Logistic regression models for criminal charges at 18 and 36 months

The next step was to examine the predictors in separate logistic regression models for the 18- and 36-month outcome, adjusted for treatment condition, age, sex, and parents' education and income, as well as interaction effect with treatment condition. Because some of the adolescents are not attending school and there was a substantial missing on teacher reported variables, we chose to present the logistic regression results in two tables: one that examines the extent to which teacher-reported difficulties predict charges, and another that examines self- and parent-reported predictors.

Rule breaking/delinquency at intake to treatment as predictor of criminal charges

Table 4a and 4b presents the results for parent reported rule breaking behavior and self-reported delinquency on charges after 18 and 36 months, respectively.

Parent report

The full models were statistically significant both at 18month ($\chi 2$ (7) = 21.25, p = .003) and at 36month ($\chi 2$ (7) = 18.02, p = .012), indicating that the models were able to distinguish between adolescents who were charged and those who were not. The models as a whole explained 25.6% and 19.0% of the variance, respectively (Nagelkerke R^2). Parent reported rule breaking behavior significantly increased the likelihood of being charged, explaining 8.8% (18months) and 11% (36months) of the variance in step 1 (Nagelkerke R^2), and was still associated with increased odds of CC after controlling for treatment condition, age, parental education, income, and sex (OR_{18m} = 1.18, 95% CI [1.06,1.31] p = .011 and OR_{36m} =1.16, 95% CI [1.06,1.26], p < .001). Because analytic samples varied slightly across models due to missing data, the observed base rate of criminal charges also varied slightly across models. Model-specific N and $p0$ values are reported in the tables and were used as reference probabilities when translating ORs per onestandard deviation increase into approximate probability changes. At 18 months a one SD increase in parent-reported rule-breaking behavior (SD = 5.11) was associated with an increase in the estimated probability of being charged from about 18.7% to 34.6% (OR per SD ≈ 2.30, corresponding to an increase of roughly 15.9 percentage points). At 36 months, a one SD increase in rule-breaking behavior was associated with an increase in the estimated probability of being charged from about 32.5% to 50.4% (OR per SD ≈ 2.11, corresponding to an increase of roughly 17.9 percentage points).

Self-report (delinquency)

Self-reported delinquency significantly increased the likelihood of being charged, explaining 10.3% (18months) and 8% (36months) of the variance in step 1 (Nagelkerke R^2), and was still associated with increased odds of CC after controlling for treatment condition, age, parental education, income, and sex (OR_{18m} = 1.02, 95% CI [1.02,1.04] p = .018 and OR_{36m} = 1.02, 95% CI [1.00,1.04], p = .028). At 18 months, a one SD increase in self-reported delinquency (SD = 25.99) was associated with an increase in the estimated probability of being charged from about 19.8% to 29.3% (OR per SD ≈ 1.67, an increase of roughly 9.4 percentage points). At 36 months, a one SD increase in self-reported delinquency was associated with an increase in the estimated probability of being charged from about 33.9% to 45.5% (OR per SD ≈ 1.63, an increase of roughly 11.6 percentage points).

Teacher report

Table 4a and 4b presents the results for teacher-reported rule-breaking behavior (and scores on callous unemotional traits on CC), for 18 and 36months respectively.

Teacher reported rule breaking behavior predicted a significantly increased likelihood of being charged, explaining 21% (18months) and 13% (36months) of the variance in step 1 (Nagelkerke R^2). The models for CC after 18 and 36 months indicates that teacher reported rule-breaking behavior were associated with increased odds of CC (*OR* = 1.47, 95% CI = [1.12 - 1.94]) and (*OR* = 1.39, 95% CI= [1.11 - 1.73]), respectively, after controlling for treatment condition, age, parental education, income, sex, and interaction between rule breaking and treatment. Accounting for this effect there was no difference between treatment conditions on CC. At 18 months, a one SD increase in teacher-reported rule-breaking behavior (SD = 5.44) was associated with an increase in the estimated probability of being charged from about 16.4% to 37.1% (OR per SD ≈ 3.00, an increase of roughly 20.7 percentage points). At 36 months, a one SD increase in teacher-reported rule-breaking behavior was associated with an increase in the estimated probability of being charged from about 28.8% to 45.2% (OR per SD ≈ 2.04, an increase of roughly 16.4 percentage points). There was also a significant interaction between treatment condition. The results for indicating that youths with higher scores on rule breaking in the FFT group had less CC both after 18 (Step 4: $\Delta\chi^2$ (df) = 4.477 (1), (OR = .720, 95% CI= [.52 – 1.00], p = .054) and 36 months (Step 4: $\Delta\chi^2$ (df) = 8.232 (1), (OR = .703, 95% CI= [.53 - .93], p = .012) compared to youth with higher scores on rule breaking in TAU.

Briefly summarized: When adolescents (self-report), their parents, or their teachers reported more rule-breaking behavior, the adolescents were more likely to receive a charge later on. This association was evident at both 18 and 36 months, even after accounting for age, sex, parental education, income, and type of treatment received.

Callous unemotional traits:

Also, for teacher reported callous unemotional traits higher scores predicted a significantly increased likelihood of being charged, explaining 25% (18months) and 11% (36months) of the variance in step 1 (Nagelkerke R2). The models for CC after 18 and 36 months indicates that teacher reported rule-breaking behavior were associated with increased odds of CC (OR = 1.14, 95% CI = [1.04,1.25]) and (OR=1.11, 95% CI= [1.04,1.25]), respectively, after controlling for treatment condition, age, parental education, income, sex, and interaction between rule breaking and treatment. At 18 months, a one SD increase in teacher-reported callous–unemotional traits (SD = 13.08) was associated with an increase in the estimated probability of being charged from about 16.2% to 52.1% (OR per SD ≈ 5.61, an increase of roughly 35.9 percentage points). At 36 months, a one SD increase in teacher-reported callous–unemotional traits was associated with an increase in the estimated probability of being charged from about 28.4% to 47.1% (OR per SD ≈ 2.25, an increase of roughly 18.8 percentage points. However, for the marginally significant interaction between CU and treatment, the treatment condition is marginally significant on step 4. As was the case for rule breaking, the interaction between level of CU and treatment indicates that the FFT group prevents charges among those who score high on CU better than the control group.

Table 4a. Logistic Regression Estimates of Criminal Charges at Timepoints 18month

Model	Step / Predictor	*B*	*SE*	*Wald*	*OR*	*95% CI for OR*	*p*	−2LL	Nagelkerke R^2	Δ χ^2 (df)
Model 1: Rule Breaking (CBCL)	Step 1									
	Rule Breaking (CBCL)	.119	.05	6.548	1.13	1.03 – 1.24	.011	111.669	.088	6.862 (1)**
	Step 2									
	Rule Breaking (CBCL)	.123	.05	6.851	1.13	1.03 – 1.24	.009	110.175	.106	1.494 (1)
	Treatment Condition	-.587	.48	1.473	.556	.22 – 1.43	.225			
	Step 3									
	Rule Breaking (CBCL)	.163	.05	9.125	1.18	1.06 – 1.31	.003	97.317	.256	12.859 (4)**
	Treatment Condition	-.678	.54	1.607	.508	.18 – 1.45	.205			
	Youth Age (years)	-.150	.20	.573	.86	.58 – 1.27	.449			
	Parent education	-.303	.23	1.817	.738	.48 – 1.15	.178			
	Income (Z-score)	.910	.32	8.290	2.485	1.34 – 4.62	.004			
	Sex	-1.118	.56	4.918	.327	.11 - .98	.045			
Model 2: Delinquency (SRD)	Step 1									
	Delinquency (SRD)	.022	.01	7.161	1.022	1.01 – 1.04	.007	112.407	.103	8.134**
	Step 2									
	Delinquency (SRD)	.022	.01	6.718	1.022	1.02 – 1.04	.010	112.166	.106	.241
	Treatment Condition	-.236	.48	.241	.790	.31 – 2.02	.623			
	Step 3									
	Delinquency (SRD)	.020	.01	5.610	1.020	1.00 – 1.04	.018	106.483	.174	5.683
	Treatment Condition	-.297	.51	.346	.743	.28 – 1.14	.557			
	Youth Age (years)	.080	.18	.194	1.084	.76 – 1.55	.660			
	Parent education	-.103	.21	.236	.902	.60 – 1.38	.627			
	Income (Z-score)	.423	.27	2.437	1.527	.90 – 2.60	.119			
	Sex	-.900	.53	2.936	.407	.15 – 1.14	.087			

Note. OR = odds ratio; CI = confidence interval. Age = participant age in years at intake. Due to missing data on some predictors, analytic sample size and base rate CC (*p*0) vary slightly between models. Model specific Ns and *p*0 were: Model 1, *N* = 123, *p*0 = 18.7%; Model 2, *N* = 121, *p*0 = 19.8%. * p < .05, ** p < .01, *** p < .001.

Table 4b. Logistic Regression Estimates of Criminal Charges at Timepoints 36month

Model	Step / Predictor	*B*	*SE*	*Wald*	*OR*	*95% CI for OR*	*p*	−2LL	Nagelkerke R^2	Δ χ^2 (df)
Model 1: Rule Breaking (CBCL)	Step 1									
	Rule Breaking (CBCL)	.125	.04	9.313	1.13	1.05 – 1.24	.012	145.025	.110	10.134 (1)***
	Step 2									
	Rule Breaking (CBCL)	.131	.04	9.978	1.14	1.05 – 1.24	.002	141.292	.149	3.733 (1)*
	Treatment Condition	-.787	.41	3.644	.455	.20 – 1.02	.056			
	Step 3									
	Rule Breaking (CBCL)	.146	.04	10.927	1.157	1.06 – 1.26	<.001	137.144	.256	4.148 (4)
	Treatment Condition	-.797	.43	3.468	.451	.45 – 1.04	.063			
	Youth Age (years)	-.011	.15	.006	.989	.73 – 1.33	.941			
	Parent education	-.134	.17	.587	.875	.62 – 1.23	.443			
	Income (Z-score)	.418	.24	2.941	1.519	.94 – 2.45	.086			
	Sex	-.459	.43	1.143	.632	.27 - 1.47	.285			
Model 2: Delinquency (SRD)	Step 1									
	Delinquency (SRD)	.021	.01	5.743	1.021	1.00 – 1.04	.017	147.731	.080	7.213(1)**
	Step 2									
	Delinquency (SRD)	.020	.01	5.159	1.020	1.00 – 1.04	.023	146.087	.098	1.644 (1)

Treatment Condition	-.511	.40	1.637	.600	.327 – 1.31	.201			
Step 3									
Delinquency (SRD)	.019	.01	4.827	1.019	1.00 – 1.04	.028	144.737	.112	1.351 (4)
Treatment Condition	-.576	.41	1.963	.562	.25 – 1.26	.161			
Youth Age (years)	.127	.15	.753	1.135	.85 – 1.51	.386			
Parent education	.037	.17	.048	1.038	.74 – 1.45	.827			
Income (Z-score)	.056	.23	.059	1.058	.67 – 1.66	.808			
Sex	-.267	.41	.424	.765	.34 – 1.71	.515			

Note. OR = odds ratio; CI = confidence interval. Age = participant age in years at intake. Due to missing data on some predictors, analytic sample size and base rate CC (*p*0) vary slightly between models. Model specific Ns and *p*0 were: Model 1, *N* = 123, *p*0 = 32.5%; Model 2, *N* = 121, *p*0 = 33.9%.

* p < .05, ** p < .01, *** p < .001.

Table 5a

Logistic Regression Estimates of Criminal Charges at Timepoints 18month

Model	**Step / Predictor**	***B***	***SE***	***Wald***	***OR***	***95% CI for OR***	***p***	**−2LL**	Nagelkerke R2	Δ χ^2 (df)
Model 1: Callous Unemotional Traits	Step 1									
	ICU T	.095	.03	9.163	1.100	1.03 – 1.17	.002	53.663	.253	11.963 (1)***
	Step 2									
	ICU (Teacher)	.092	.03	8.763	1.097	1.03 – 1.17	.003	51.627	.293	2.037
	Treatment Condition	-1.011	.72	1.952	.364	.09 – 1.50	.162			
	Step 3									
	ICU (Teacher)	.132	.04	8.173	1.141	1.04 – 1.25	.004	40.188	.494	11.439**
	Treatment Condition	-1.778	.99	3.194	.168	.02 – 1.19	.074			
	Youth Age (years)	-.639	.41	2.437	.528	.24 -1.18	.119			

	Parent education	.363	.38	.900	1.438	.68 – 3.05	.343			
	Income (Z-score)	1.190	.56	4.458	3.287	1.09 – 9.92	.035			
	Sex	-.953	1.07	.784	.358	.05 – 3.18	.376			
Model 2: Rule Breaking	Step 1									
	Rule Breaking (TRF)	.182	.06	8.453	1.200	1.06 – 1.36	.004	55.464	.212	9.778 (1)**
	Step 2									
	Rule Breaking (TRF)	.180	.06	7.987	1.197	1.06 – 1.36	.005	53.017	.261	2.447 (1)
	Treatment Condition	-1.097	.72	2.320	.334	.08 – 1.37	.128			
	Step 3									
	Rule Breaking (TRF)	.203	.07	7.975	1.224	1.06 – 1.41	.005	49.392	.330	3.626 (4)
	Treatment Condition	-1.272	.78	2.649	.280	.06 – 1.30	.104			
	Youth Age (years)	-.252	.32	.614	.777	.41 – 1.46	.433			
	Parent education	.095	.34	.080	1.099	.57 – 2.12	.777			
	Income (Z-score)	.519	.39	1.737	1.681	.78 – 3.64	.188			
	Sex	-.606	.76	.640	.546	.12 – 2.41	.424			
	Step 4									
	Rule Breaking (TRF)	.387	.14	7.493	1.472	1.12 – 1.94	.006	44.915	.411	4.477 (1)*
	Treatment Condition	1.896	1.861	1.038	6.658	.17 – 255.49	.308			
	Youth Age (years)	-.310	.35	.802	.734	.37 – 1.44	.370			
	Parent education	.236	.37	.409	1.266	.61 – 2.61	.523			
	Income (Z-score)	.379	.39	.953	1.461	.68 – 3.13	.329			
	Sex	-.155	.85	.034	.856	.16 – 4.49	.854			
	TC x Rule Breaking	-.328	.17	3.712	.720	.52 – 1.00	.054			

Note. OR = odds ratio; CI = confidence interval. Age = participant age in years at intake. Due to missing data on some predictors, analytic sample size and base rate CC (*p*0) vary slightly between models. Model specific Ns and *p*0 were: Model 1, *N* = 74, *p*0 = 16.2%; Model 2, *N* = 73, *p*0 = 16.4%;

Table 5b
Logistic Regression Estimates of Criminal Charges at Timepoint 36month

Model	**Step / Predictor**	***B***	***SE***	***Wald***	***OR***	***95% CI for OR***	***p***	**−2LL**	Nagelkerke R2	Δ χ^2 (df)
Model 1: Callous Unemotional Traits	Step 1									
	ICU (Teacher)	.051	.02	5.436	1.052	1.01 – 1.10	.020	82.306	.111	5.975 (1)**
	Step 2									
	ICU (Teacher)	.051	.02	5.348	1.052	1.01 – 1.10	.021	77.265	.199	5.041 (1)**
	Treatment Condition	-1.238	.57	4.761	.290	.08 - .88	.029			
	Step 3									
	ICU (Teacher)	.062	.03	6.036	1.064	1.01 – 1.12	.014	73.773	.256	3.492 (4)
	Treatment Condition	-1.391	.61	5.171	.249	.08 - .83	.023			
	Youth Age (years)	-.034	.21	.026	.966	.64 - 1.47	.872			
	Parent education	.341	.26	1.791	1.407	.85 – 2.32	.181			
	Income (Z-score)	.075	.35	.046	1.078	.54 – 2.15	.831			
	Sex	.473	.63	.565	1.605	.47 – 5.51	.452			
	Step 4									
	ICU (Teacher)	.105	.04	7.631	1.111	1.03 – 1.20	.006	70.243	.310	3.530 (1)
	Treatment Condition	-1.207	.63	3.668	.299	.09 – 1.03	.055			
	Youth Age (years)	-.035	.22	.026	.966	.63 - 1.48	.872			
	Parent education	.459	.28	2.664	1.582	.91 – 2.74	.103			
	Income (Z-score)	.027	.36	.006	1.027	.51 – 2.07	.940			
	Sex	.707	.66	1.134	2.029	.55 – 7.46	.287			
	TC x ICU	-.094	.05	3.348	.910	.82 – 1.01	.067			
Model 2: Rule Breaking	Step 1									
	Rule Breaking (TRF)	.126	.05	6.372	1.135	1.03 – 1.25	.012	80.691	.129	6.917 (1)**

Step 2									
Rule Breaking (TRF)	.124	.05	5.866	1.132	1.02 – 1.25	.015	75.052	.226	5.639 (1)*
Treatment Condition	-1.326	.58	5.318	.266	.09 - .82	.021			
Step 3									
Rule Breaking (TRF)	.131	.05	5.974	1.140	1.03 – 1.27	.015	73.638	.249	1.414 (4)
Treatment Condition	-1.413	.60	5.597	.243	.07 - .79	.018			
Youth Age (years)	.088	.23	.149	1.091	.70 – 1.70	.700			
Parent education	.251	.25	1.022	1.285	.79 – 2.09	.312			
Income (Z-score)	-.130	.33	.152	.878	.46 – 1.69	.696			
Sex	.222	.58	.147	1.248	.40 – 3.87	.701			
Step 4									
Rule Breaking (TRF)	.327	.11	8.565	1.387	1.11 – 1.73	.003	65.406	.375	8.232 (1)**
Treatment Condition	1.280	1.20	1.13	3.595	.34 – 38.02	.288			
Youth Age (years)	.023	.23	.001	1.023	.65 – 1.61	.921			
Parent education	.341	.28	1.496	1.406	.81 – 2.43	.221			
Income (Z-score)	-.123	.34	.128	.721	.45 – 1.73	.721			
Sex	.609	.65	.875	1.838	.51 – 6.58	.349			
TC x Rule Breaking	-.353	.14	6.320	.703	.53 - .93	.012			

Note. OR = odds ratio; CI = confidence interval. Age = participant age in years at intake. Due to missing data on some predictors, analytic sample size and base rate CC ($p0$) vary slightly between models. Model specific Ns and $p0$ were: Model 1, $N = 74$, $p0 = 28{,}4\%$; Model 2, $N = 73$, $p0 = 28.8\%$.

Area under the curve analysis

Receiver operating characteristic (ROC) analyses showed that parent-, teacher-, and self-reported rule-breaking and self-reported delinquency predicted criminal charges within 18 months with moderate to good accuracy. The AUCs ranged from .70 to .79 (95% CI = .59–.91; see Table 6), indicating a 70–79% probability that a randomly selected adolescent who later received a charge would have a higher score than a randomly selected adolescent who did not. For criminal charges within 36 months, the predictive accuracy was somewhat lower but remained in the moderate range, with AUCs between .68 and .71 (95% CI = .58–.84).

Table 6.

ROC Curve Analysis between predictors and Crime after 18 and 36month

	Crime 18month			Crime 36month		
Measures	AUC	SE	95% CI	AUC	SE	95% CI
1. Rule breaking (CBCL)	.701**	.05	.60 - .80	.684**	.05	.59 - .78
2. Delinquency (SDR)	.706**	.06	.59 - .82	.676**	.05	.58 - .78
3. Rule breaking (TRF)	.786**	.06	.66 - .91	.708**	.07	.58 - .84
4. ICU_24 Teacher	.814**	.05	.71 - .92	.683**	.07	.54 - .82

Teacher-reported callous–unemotional traits showed particularly strong discrimination for criminal charges within 18 months (AUC = .81, 95% CI = .71–.92), reflecting good accuracy. This corresponds to an 81% probability that a youth who later received a charge would have a higher CU score than a youth who did not. For charges within 36 months, the AUCs for ICU-T scores were lower but remained statistically significant (AUC ≈ .68, 95% CI = .54–.82), again indicating moderate predictive accuracy.

Treatment Condition (TC) and background variables as predictors of criminal charges

After 18 months TC was not significant related to CC. Among the adolescents we had teacher response for at T1, there are, however, significantly fewer of those who have received Functional Family Therapy (FFT) who have been charged after 36 months. In that context, it may appear that the significant association is explained by FFT working best for those who score high on rule-breaking behavior or ICU at treatment intake. This interaction also appears to carry through for OD and rule-breaking behavior in relation to charges (CC) after 18 months.

Of the background variables, only income appears to have any particular importance in predicting charges (CC) after 18 months. High family income at intake predicts charges. However, this does not appear to be the case to the same extent after 36 months.

Discussion

The findings from this study indicate that higher scores on rule-breaking or delinquent behavior, whether self-reported, parent-reported, or teacher-reported are associated with increased odds of future criminal charges at both 18 and 36 months. Teacher-reported oppositional defiant disorder (ODD) and lower social competence were significant predictors only at 18 months. Additionally, teacher-reported callous-unemotional traits predicted charges at both 18 and 36 months. Income predicted charges at 18 months but not at 36 months, possibly because adolescents from higher-income families may enter CWS treatment at a later stage. Functional Family Therapy was associated with reduced offending among school-attending youths compared to control treatment, particularly among those with high levels of callous-unemotional traits or rule-breaking. However, these associations should be interpreted with caution, as this is a subsample of those randomized, and the groups may not be randomly distributed among school attendees. Aggression, parent-reported difficulties (apart from rule-breaking behavior), YLS, and hyperactivity-impulsivity did not predict charges. One possible explanation is that intake in CWS does not provide sufficient information to reliably score the YLS. This is a group of young people who, in most cases and in various ways, are considered to be at risk of committing crime, and very few have engaged in criminal behavior to any great extent – only three were referred due to criminality. Since prior criminal behavior is one of the criminogenic factors in the YLS that has been shown to predict crime (see, for example, Kanestrøm, 2024), it is perhaps not surprising that it does not predict later criminality in this sample. Other factors such as substance use are also lower in this sample – it may also be the case that, at the point of intake into a family-therapeutic intervention, there is not enough information available to adequately assess attitudes and personality. The combination of ODD/reactive aggression is, in some studies, described as a group that lacks the "skills" required to become popular among criminal peers (which is a risk factor for life-course persistent criminality), and therefore is not drawn into a criminal career as a gang member (Dodge et al., 1997, Vitario et al., 1998). Instead, it appears that they often fail in criminal environments and more frequently develop internalizing difficulties (e.g. Boylan, et al. 2007). In our case this remains

speculative, but it may be a possible explanation for the significant association with crime after 18 months, but not after 36 months. Furthermore, aggression may have emerged as a predictor if only charges related to violent offences were examined. Additionally, in this context, where families are referred to treatment due to family problems, parent reports may not be entirely objective. For example, parent reports of CU can be assumed to be influenced by the conflicts that these families enter treatment to resolve, while scores on rule-breaking behavior may be easier to obtain a less subjective response from parents.

Strengths, Limitations and Future Directions

Samples from a treatment effectiveness study provide an opportunity to examine what predicts later criminal behavior in "real-world" treatment settings. In this context, the researchers neither administered tests, completed questionnaires, nor determined which therapists would provide the treatment. A major strength of the study is that it uses multiple informants, including parents, adolescents, teachers, and intake staff.

Although the sample is relatively large compared to most other similar studies, it is still small for examining group differences. Furthermore, not all of the adolescents attended school, some families did not allow us to contact teachers, and some teachers did not respond to the mailed questionnaires. The substantial amount of missing teacher responses poses a limitation both in terms of statistical power and potential selection effects, many of which may reduce the ability to detect true associations.

Conclusion

Rule breaking behavior and CU traits predicted later criminal charges. Higher levels of rule breaking and CU traits seemed to moderate the effect of treatment condition, where FFT was associated with reduced criminal charges (CC) for youth with elevated intake levels. Overall, we need validated, feasible measures tailored for CWS contexts that can reliably identify youth at heightened risk of later offending. Doing so would enable timely deployment of evidence-based preventive services within child welfare potentially reducing later justice contact and its profound consequences. Research that evaluates existing justice-derived instruments in CWS samples, adapts them as needed, and tests screening protocols that

synthesize multi-informant reports is therefore an urgent priority for both science and practice.

The present study is relevant for several reasons. First, examining the effects of different risk factors advances fundamental knowledge about the types of risk factors that contribute to criminal charges. Second, gaining more insight into how risk factors operate, and which treatments they interact with to influence future charges, can help improve current risk assessment practices. This multi-informant knowledge base could be translated into practical assessment strategies at CWS intake: integrating caregiver, youth, and teacher reports into structured screening could enhance predictive accuracy and help discriminate youth who are likely to benefit from early, targeted interventions. In summary, there is a pressing need for validated, feasible measures tailored to CWS contexts that can reliably identify youth at heightened risk of later offending. Such measures would enable the timely deployment of evidence based preventive services within child welfare, potentially reducing subsequent justice involvement and its profound consequences. Research that evaluates and adapts existing justice derived instruments for CWS samples, and tests screening protocols that integrate multi-informant reports, is therefore urgently needed. The present study addresses this gap by examining the predictive value of different risk factors and informant reports for later criminal charges among adolescents in CWS. By gaining insight into how these risk factors operate and interact with treatment, this research aims to inform and improve current risk assessment practices, ultimately supporting the development of practical assessment strategies at CWS intake.

References

Achenbach, T. M., & Rescorla, L. A. (2001). *Manual for the ASEBA school-age forms & profiles: Child behavior checklist for ages 6–18, teacher's report form, youth self-report: An integrated system of multi-informant assessment.* University of Vermont, Research Center for Children, Youth & Families.

Mason, W. A., Hitch, J. E., Kosterman, R., McCarty, C. A., Herrenkohl, T. I., & Hawkins, J. D. (2010). Growth in adolescent delinquency and alcohol use in relation to young adult crime, alcohol use disorders, and risky sex: A comparison of youth from low- versus middle-income backgrounds. *Journal of Child Psychology and Psychiatry, 51*(12), 1377–1385.

Andersen, L. H., Anker, A. S. T., & Andersen, S. H. (2016). A formal decomposition of declining youth crime in Denmark. *Demographic Research, 35*, 1303–1316.

Andrews, D. A., & Bonta, J. (2010). Rehabilitating criminal justice policy and practice. *Psychology, Public Policy, and Law, 16*(1), 39–55.

Ayano, G., Rooney, R., Pollard, C. M., Dantas, J. A., Lobo, R., Jeemi, Z., ... Alati, R. (2024). Risk and protective factors of youth crime: An umbrella review of systematic reviews and meta-analyses. *Clinical Psychology Review, 113*, 102479.

Babinski, L. M., Hartsough, C. S., & Lambert, N. M. (1999). Childhood conduct problems, hyperactivity-impulsivity, and inattention as predictors of adult criminal activity. *Journal of Child Psychology and Psychiatry, 40*, 347–355. https://doi.org/10.1111/1469-7610.00452

Baglivio, M. T., Jackowski, K., Greenwald, M. A., & Wolff, K. T. (2014). Comparison of multisystemic therapy and functional family therapy effectiveness: A multiyear statewide propensity score matching analysis of juvenile offenders. *Criminal Justice and Behavior, 41*(9), 1033–1056.

Baldwin, S. A., Christian, S., Berkeljon, A., & Shadish, W. R. (2012). The effects of family therapies for adolescent delinquency and substance abuse: A meta-analysis. *Journal of Marital and Family Therapy, 38*(1), 281–304.

Bennett, S., Farrington, D. P., & Huesmann, L. R. (2005). Explaining gender differences in crime and violence: The importance of social cognitive skills. *Aggression and Violent Behavior, 10*(3), 263–288.

Boylan, K., Vaillancourt, T., Boyle, M., Szatmari, P., & Fleming, J. (2007). Comorbidity of internalizing disorders in children with oppositional defiant disorder. *European Child & Adolescent Psychiatry, 16*, 484–494. https://doi.org/10.1007/s00787-007-0624-1

Brotman, M. A., Kircanski, K., Stringaris, A., Pine, D. S., & Leibenluft, E. (2017). Irritability in youths: A translational model. *American Journal of Psychiatry, 174*(6), 520–532. https://doi.org/10.1176/appi.ajp.2016.16070839

Burt, S. A., Carroll, S., Clark, S. L., Klump, K. L., & Hyde, L. W. (2025). Temporal change in the prevalence and etiology of youth antisocial behavior. *Journal of Psychopathology and Clinical Science.* Advance online publication.

Cohen, M. A., & Piquero, A. R. (2009). New evidence on the monetary value of saving a high risk youth. *Journal of Quantitative Criminology, 25*(1), 25–49.

Elliott, D. S., & Ageton, S. S. (1980). Reconciling race and class differences in self-reported and official estimates of delinquency. *American Sociological Review, 45*(1), 95–110.

Enell, S., Andersson Vogel, M., Henriksen, A. K. E., Pösö, T., Honkatukia, P., Mellin-Olsen, B., & Hydle, I. M. (2022). Confinement and restrictive measures against young people in the Nordic countries: A comparative analysis of Denmark, Finland, Norway, and Sweden. *Nordic Journal of Criminology, 23*(2), 174–191.

Fergusson, D. M., Horwood, L. J., & Ridder, E. M. (2005). Show me the child at seven: The consequences of conduct problems in childhood for psychosocial functioning in adulthood. *Journal of Child Psychology and Psychiatry, 46*(8), 837–849.

Forgatch, M. S., & Patterson, G. R. (2010). Parent Management Training—Oregon Model: An intervention for antisocial behavior in children and adolescents. In J. R. Weisz & A. E. Kazdin (Eds.), *Evidence-based psychotherapies for children and adolescents* (2nd ed., pp. 159–177). The Guilford Press.

Geerlings, Y., Asscher, J. J., Stams, G. J. J., & Assink, M. (2020). The association between psychopathy and delinquency in juveniles: A three-level meta-analysis. *Aggression and Violent Behavior, 50*, 101342.

Gresham, F. M., & Elliott, S. N. (1990). *Social skills rating system (SSRS).* American Guidance Service.

Gubbels, J., Assink, M., & van der Put, C. E. (2024). Protective factors for antisocial behavior in youth: What is the meta-analytic evidence? *Journal of Youth and Adolescence, 53*(2), 233–257.

Hagen, T. L., Tan, T. C., Thøgersen, D. M., & Bjørnebekk, G. (2025). Functional family therapy across the COVID-19 pandemic. *Frontiers in Psychology, 16*, 1531738.

Hartnett, D., Carr, A., Hamilton, E., & O'Reilly, G. (2017). The effectiveness of functional family therapy for adolescent behavioral and substance misuse problems: A meta-analysis. *Family Process, 56*(3), 607–619.

Hoge, R., & Andrews, D. A. (2010). *Evaluation for risk of violence in juveniles.* Oxford University Press.

Hunkin, H., Malvaso, C. G., Chittleborough, C. R., Gialamas, A., Montgomerie, A., Falster, K., ... Pilkington, R. M. (2025). Systematic review and meta-analysis: Multisystemic therapy and functional family therapy targeting antisocial behavior in adolescence. *Journal of the American Academy of Child & Adolescent Psychiatry, 64*(4), 427–446.

Høstmælingen, A., Bjørnebekk, G., Olseth, A. R., Ramer, N. E., Colder, C. R., & Sørlie, M. A. (2026). Externalizing problems and reward–punishment sensitivity: Testing within-person reciprocal associations in an elementary school sample—A replication of Ramer et al. (2024). *Developmental Psychology.* Advance online publication. https://doi.org/10.1037/dev0002158

Jozefiak, T., Larsson, B., Wichstrøm, L., & Rimehaug, T. (2011). Competence and emotional/behavioural problems in 7–16-year-old Norwegian school children as reported by parents. *Nordic Journal of Psychiatry, 65*(5), 288–295. https://doi.org/10.3109/08039488.2011.638934

Kanestrøm, H., Stallvik, M., Lydersen, S., Skokauskas, N., Hoftun, S., Nilsen, C. K., & Kaasbøll, J. (2024). Criminogenic risk assessment beyond juvenile justice: Exploring the predictive ability of the Youth Level of Service/Case Management Inventory (YLS/CMI) in Norway. *Criminal Justice and Behavior, 51*(7), 975–993. https://doi.org/10.1177/00938548241237181

Lee, V., Watson, S., Shlonsky, A., & Tarren-Sweeney, M. (2024). A scoping review of randomized controlled trials of parenting and family-based interventions for 10–

17 year-olds with severe and persistent conduct problems. *Journal of Evidence-Based Social Work, 21*(6), 720–748.

Leibenluft, E., Allen, L. E., Althoff, R. R., Brotman, M. A., Burke, J. D., Carlson, G. A., Dickstein, D. P., Dougherty, L. R., Evans, S. C., Kircanski, K., Klein, D. N., Malone, E. P., Mazefsky, C. A., Nigg, J., Perlman, S. B., Pine, D. S., Roy, A. K., Salum, G. A., Shakeshaft, A., ... Stringaris, A. (2024). Irritability in youths: A critical integrative review. *American Journal of Psychiatry, 181*(4), 275–290. https://doi.org/10.1176/appi.ajp.20230256

Leschied, A., Chiodo, D., Nowicki, E., & Rodger, S. (2008). Childhood predictors of adult criminality: A meta-analysis drawn from the prospective longitudinal literature. *Canadian Journal of Criminology and Criminal Justice, 50*(4), 435–467.

Littell, J. H., Pigott, T. D., Nilsen, K. H., Roberts, J., & Labrum, T. K. (2023). Functional family therapy for families of youth (age 11–18) with behaviour problems: A systematic review and meta-analysis. *Campbell Systematic Reviews , 19*(3), e1324.

Milich, R., Loney, J., & Landau, S. (1982). Independent dimensions of hyperactivity and aggression: A validation with playroom observation data. *Journal of Abnormal Psychology, 91*(3), 183–190.

Matlasz, T. M., Frick, P. J., Robertson, E. L., Ray, J. V., Thornton, L. C., Wall Myers, T. D., ... Cauffman, E. (2020). Does self-report of aggression after first arrest predict future offending and do the forms and functions of aggression matter? *Psychological Assessment, 32*(3), 265–276.

Mohr-Jensen, C., & Steinhausen, H. C. (2016). A meta-analysis and systematic review of the risks associated with childhood attention-deficit hyperactivity disorder on long-term outcome of arrests, convictions, and incarcerations. *Clinical Psychology Review, 48*, 32–42.

Oberwittler, D., & Svensson, R. (2025). The international youth crime drop: Evidence and explanations. *Crime and Justice, 54*(1), 153–216.

Ogden, T. (2003). The validity of teacher ratings of adolescents' social skills. *Scandinavian Journal of Educational Research, 47*(1), 63–76.

Olver, M. E., Stockdale, K. C., & Wormith, J. S. (2014). Thirty years of research on the Level of Service scales: A meta-analytic examination of predictive accuracy and sources of variability. *Psychological Assessment, 26*(1), 156–176.

Olseth, A. R., Bjørnebekk, G., Keles, S., & Hagen, K. A. (2026a). Results from a randomized controlled trial of functional family therapy in Norway: Effects on family functioning outcomes. *Child and Adolescent Psychiatry and Mental Health.* Advance online publication.

Olseth, A. R., Hagen, K. A., Keles, S., & Bjørnebekk, G. (2024). Functional family therapy for adolescent disruptive behavior in Norway: Results from a randomized controlled trial. *Journal of Family Psychology, 38*(4), 548–559.

Olseth, A. R., Høstmælingen, A., & Bjørnebekk, G. (2026b). Effects of functional family therapy for adolescents in child welfare services on subsequent criminal charges and out-of-home placements: A randomized effectiveness trial. *Journal of Experimental Criminology.* Advance online publication.

Pardini, D. A., & Fite, P. J. (2010). Symptoms of conduct disorder, oppositional defiant disorder, attention-deficit/hyperactivity disorder, and callous-unemotional traits as unique predictors of psychosocial maladjustment in boys: Advancing an evidence base for DSM-V. *Journal of the American Academy of Child & Adolescent Psychiatry, 49*(11), 1134–1144.

Patterson, G. R. (2016). Coercion theory: The study of change. In T. J. Dishion & J. Snyder (Eds.), *The Oxford handbook of coercive relationship dynamics* (pp. 7–22). Oxford University Press.

Pingault, J. B., Côté, S. M., Lacourse, E., Galéra, C., Vitaro, F., & Tremblay, R. E. (2013). Childhood hyperactivity, physical aggression and criminality: A 19-year prospective population-based study. *PLOS ONE, 8*(5), e62594.

Robbins, M. S., Alexander, J. F., Turner, C. W., & Hollimon, A. (2016). Evolution of functional family therapy as an evidence-based practice for adolescents with disruptive behavior problems. *Family Process, 55*(3), 543–557.

Sivertsson, F., Aaltonen, M., Bäckman, O., Martikainen, P., Estrada, F., Pitkänen, J., ... Suonpää, K. (2025). Two of a kind? A comparative multicohort study of juvenile

violence in Finland and Sweden. *European Journal of Criminology.* Advance online publication.

Wormith, S. J., & Bonta, J. (2018). The Level of Service (LS) instruments. In J. B. Wilson & E. L. Hoge (Eds.), *Handbook of recidivism risk/needs assessment tools* (pp. 117–145). Routledge.

Swanson, J. M., Kraemer, H. C., Hinshaw, S. P., Arnold, L. E., Conners, C. K., Abikoff, H. B., ... Wu, M. (2001). Clinical relevance of the primary findings of the MTA: Success rates based on severity of ADHD and ODD symptoms at the end of treatment. *Journal of the American Academy of Child & Adolescent Psychiatry, 40*(2), 168–179.

Thøgersen, D. M., Andersen, M. E., & Bjørnebekk, G. (2020). A multi-informant study of the validity of the Inventory of Callous-Unemotional Traits in a sample of Norwegian adolescents with behavior problems. *Journal of Psychopathology and Behavioral Assessment, 42*(3), 592–604.

Thøgersen, D. M., Bjørnebekk, G., Scavenius, C., & Elmose, M. (2021). Callous-unemotional traits do not predict functional family therapy outcomes for adolescents with behavior problems. *Frontiers in Psychology, 11*, 537706.

Thøgersen, D. M., Elmose, M., Viding, E., McCrory, E., & Bjørnebekk, G. (2022). Behavioral improvements but limited change in callous-unemotional traits in adolescents treated for conduct problems. *Journal of Child and Family Studies, 31*(12), 3342–3358.

Vidal-Ribas, P., Brotman, M. A., Valdivieso, I., Leibenluft, E., & Stringaris, A. (2016). The status of irritability in psychiatry: A conceptual and quantitative review. *Journal of the American Academy of Child and Adolescent Psychiatry, 55*(7), 556–570. https://doi.org/10.1016/j.jaac.2016.04.014

Vitaro, F., Gendreau, P. L., Tremblay, R. E., & Oligny, P. (1998). Reactive and proactive aggression differentially predict later conduct problems. *Journal of Child Psychology and Psychiatry, 39*(3), 377–385.

Wakschlag, L. S., Choi, S. W., Carter, A. S., Hullsiek, H., Burns, J., McCarthy, K., Leibenluft, E., & Briggs-Gowan, M. J. (2012). Defining the developmental parameters of temper loss in early childhood: Implications for developmental

psychopathology. *Journal of Child Psychology and Psychiatry, 53*(11), 1099–1108. https://doi.org/10.1111/j.1469-7610.2012.02595.x

Waschbusch, D. A., Baweja, R., Babinski, D. E., Mayes, S. D., & Waxmonsky, J. G. (2020). Irritability and limited prosocial emotions/callous-unemotional traits I n elementary-school-age children. *Behavior Therapy, 51*(2), 223–237. https://doi.org/10.1016/j.beth.2019.06.007

White, S. F., Frick, P. J., Lawing, K., & Bauer, D. (2013). Callous–unemotional traits and response to functional family therapy in adolescent offenders. *Behavioral Sciences & the Law, 31*(3), 271–285. https://doi.org/10.1002/bsl.2041

Wojciechowski, T. (2023). Examining interactive effects of PTSD and deviant peer association for predicting violent offending risk. *Crime & Delinquency, 69*(8), 1511–1533.