Research Square

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Family processes and behavioral outcomes in Functional Family Therapy: Results from a treatment study

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Abstract

The family is recognized as an important context for the prevention of adolescent disruptive behavior problems, and Functional Family Therapy (FFT) is an intervention specifically targeting family functioning to reduce such problems. The research evidence for family functioning as a mediator in FFT is however limited. In this study, we analyzed data from 69 youths (M_{age} =14.8, *SD* = 1.47) and their families who received FFT in regular services in Norway. Using data collected at three time points as part of an intervention study and a within-participant analytic framework, we examined indirect effects to assess whether changes in family cohesion, conflict, social support, trust, communication and alienation mediated reductions in aggressive and rule-breaking behaviors over a 6- and 18-month timeframe. While significant improvements in disruptive behavior were observed, no significant indirect effects through family functioning were detected. Exploratory analyses suggested that changes in disruptive behavior may have preceded improvements in family functioning. Results did not support the hypothesized mediation through family functioning outcomes. Possible explanations related to the theory of change in FFT and the target group in regular services in Norway are discussed.

Highlights

• This study extends knowledge of FFT-treatment and how it works in regular service settings.

• Aggression and rule-breaking behavior were reduced after FFT-treatment, but changes in family functioning did not mediate outcomes.

• No significant average changes were found across eight family functioning measures during the initial 6 months.

• Exploratory analyses suggest that change in disruptive behavior may have preceded later improvements in family functioning.

• Results suggest it may be important to further examine whether and how family functioning is altered by FFT-treatment.

Introduction

The family is considered a particularly potent context for both the development and prevention of behavior problems in children and adolescents (Labella & Masten, 2018). Family systems theory (e.g., Cox & Paley, 1997), structural family therapy literature (e.g., Minuchin, 1974), and social learning theories (e.g., Social Interaction Learning model; Snyder et al., 2003) highlight the importance of relational and interactional patterns in families for adolescent development. Social control theory further emphasizes that attachment to and trust and involvement with parents reduce the likelihood of adolescent delinquency (Costello & Laub, 2020; Hirschi, 2002). In line with these theoretical perspectives, a large body of research identifies aspects of family functioning as both risk and protective factors for the development of problems in adolescence (see reviews by Hoeve et al., 2009; Hoeve et al., 2012; Labella & Masten, 2018; Loeber & Stouthamer-Loeber, 1986). For example, a family environment characterized by warmth, trust, support, and open communication, and by the absence of hostility and rejection in the interactions between family members, has been shown to be associated with a lower likelihood of problem behavior among adolescents (Hoeve et al., 2009).

Given this strong theoretical and empirical foundation, several family therapeutic interventions specifically target aspects of family functioning to reduce behavior problems among youth (Carr, 2024). Several of these interventions are among the most highly recommended for treatment of disruptive problems in adolescence (McCart et al., 2022). Functional Family Therapy (FFT; Alexander et al., 2013) is one such family therapeutic treatment model as it explicitly addresses family functioning to reduce or prevent adolescent disruptive behavior. FFT is a phase-based treatment model consisting of five phases: engagement, motivation, relational assessment, behavior change, and generalization. The treatment targets different aspects of family functioning in the different phases, starting with reducing negativity and blaming and creating a family-oriented shared understanding of the problems during the first two treatment phases (engagement and motivation; Alexander et al., 2013, pp. 77–112). During these initial phases, the therapist also observes the family and forms a picture of the problems with respect to family interactions and functioning that sustain or exacerbate the problem behavior. In the behavior change phase (Alexander et al., 2013, pp. 129–157), the focus is on altering family functioning through training specific skills such as communication and conflict resolution. The expectation is that these therapeutic changes act as a cascade, altering family interactions in a more functional direction. In the short term, the expectation is that reducing negativity, blaming, and creating a shared family-oriented focus is important to get the family to engage and take part in the therapy (Alexander et al., 2013). In the longer run, there are several other potential mechanisms that involve improvement of family functioning to reduce disruptive behavior problems. For instance, parents may have given up and disengaged from their youths when faced with challenging behavior over time and are therefore not in a position to support and guide their youths through adolescence (Dishion et al., 2004). Helping parents to re-engage with their adolescents may therefore be important in order for them to effectively guide and monitor the adolescents' behaviors. Conversely, for the youths to see their parents as a positive source of support may be important for them to share information about their life, in turn enabling parents to engage and offer guidance (Stattin & Kerr, 2000). Lasting changes in the family functioning is also expected to ensure that reductions in disruptive behavior are sustained over time and to generalize the behavior to contexts outside the family. The developers of FFT describe this cascading effect as "Change starts at the micro level in the family's response to specific interventions, then evolves through therapy and eventually is represented in outcomes following the completion of treatment – and for a long time afterwards" (Alexander et al., 2013, p. 7).

Though a substantial body of literature suggest that family functioning may have a central role in the prevention of disruptive problem behavior in adolescence, surprisingly few studies have directly examined whether change in family functioning in families who receive treatment, is related to the change in youth outcomes as expected. Taubner et al. (2024) conducted a comprehensive systematic review of treatment studies using randomized controlled design and examining mediation processes in adolescent psychotherapy for a wide range of outcomes. Their review included nine studies examining various aspects of family functioning for externalizing disorders, and in these studies significant results were found for 16 out of 23 family functioning mediators. Taubner et al. (2024) concluded that dimensions of family functioning were among the more promising mediators based on the

entirety of the literature reviewed, while also noting that the overall quality of the evidence was limited. With respect to FFT specifically, several studies have examined and found significant changes in family functioning following treatment (e.g. Celinska et al., 2019; Hollimon, 2004; Slesnick & Prestopnik, 2009; Vardanian et al., 2020), but a systematic review conducted by Fagan and Benedini (2016) pointed to a complete lack of studies examining mediation in FFT. To our knowledge, no studies examining this have been published after 2016.

The Current Study

The objective in this study was "to examine communication in the family, family cohesion, relations with parents, and social support as possible mediators of effects" registered as a secondary aim in ISRCTN (Ogden, 2013; study objectives section). Two previously published articles from this project have reported on the effects of FFT compared to treatment as usual (TAU) on disruptive behavior outcomes (Olseth et al., 2024) and family functioning outcomes (Olseth et al., in press) in Norway. Neither analysis revealed a significant between-group difference supporting the superiority of FFT over TAU. However, the absence of such effect may reflect the nature of the treatment that the control group received. A substantial proportion of the TAU group received family-based interventions, including Multisystemic Therapy (MST; 40.3%) and parent training or family counselling (34,7%), approaches known to, or likely to, target family functioning similarly to FFT. While the absence of a treatment effect on the outcomes does not preclude mediation analyses, the lack of differences on the mediators due to similarity of the treatment models compared, makes a traditional causal mediation model with a treatment condition as the independent variable less viable. For this reason, this study focuses on examining the within-participant indirect effects between changes in family functioning and disruptive behavior, which are central to the FFT theoretical model. In this study, we also moved from an intention-to-treat framework where the goal was to estimate the effectiveness of FFT under real-world conditions in Norway, to a more selected analytic sample of participants that received a minimum dose FFT within regular services. To estimate indirect effects, we used a two-condition within-participant path-analytic framework (Montoya & Hayes, 2017). In these models, we examined to what degree changes in disruptive behavior were mediated through change in family functioning, while adjusting for between-participant differences in average family functioning levels to separate out within-participant change. To strengthen the temporal ordering assumption, we also utilized the three timepoints we had and examined the mediation on short- (six months; concurrent mediation) and long-term (18 months) change in the outcomes. This study extends prior research on FFT's causal change model by explicitly modelling within-participant change processes and testing indirect effects in a longitudinal design and including both youth and parent perspective on family functioning.

Method

The Norwegian FFT-study

The Norwegian FFT-study has been extensively presented elsewhere (see Olseth et al., 2024) and will only be briefly described here. The study enrolled participants between 2013 and 2017 in the Norwegian Child Welfare Services (CWS) and the Family Counseling Services (FCS). Four services, located in the southern, eastern and central parts Norway, took part in the study. Participants were recruited from families referred to CWS for youth disruptive behavior. In line with the goal of testing effectiveness under regular conditions, the intake into the study mainly followed the regular intake criteria and procedures for receiving FFT in Norway. Inclusion criteria consisted of adolescents aged 11–18 who demonstrated serious behavioral problems and were at risk of offending or out-of-home placement. Eligible youth included those with criminal, aggressive or violent behavior, vandalism, substance abuse, or other severe rule violations at home, school, or in the community, including verbal threats or school-related problems (e.g., truancy) linked to behavioral problems. Exclusion criteria included youths living without a primary caregiver, those with psychiatric conditions (e.g., autism, acute psychosis, or imminent suicide risk), cases involving active CWS investigations into potential ongoing abuse or neglect, households posing safety risks to therapists, or cases in which other treatments had already been initiated, likely to interfere with FFT. Due to practical and economic constraints, families living more than one hour drive, or that needed interpreter for data collections were also excluded (see Ogden, 2013, eligibility section, for details about inclusion and exclusion criteria, and Olseth et al., 2024, for details on changes made to intake procedures and inclusion approximately one year into the study).

Inclusion and exclusion were assessed by leaders in the CWS based on the information they received as part of the referral process. Families assessed as eligible to receive FFT were randomly assigned to either FFT or TAU in the CWS or FCS. A total of 161 families was recruited into the study, and these were randomly assigned to either FFT (n = 87) or TAU (n = 73). Originally, the study was planned as a comparison between FFT in the CWS and the regular family treatment in the FCS. However, one year into the study, changes were made to the intake procedures and to allow the control group to receive treatments in both the CWS and FCS. The study ran into several challenges with respect to the recruitment of participants and was terminated before the planned sample size of 250 youths and families was reached (Olseth et al., 2024). Below follows a description of the subsample drawn from the FFT- study and the study procedures.

The Analytic Sample

In the current analyses, we used a subsample drawn from the FFT-group consisting of those who were recorded as having received a minimum of eight treatment sessions. The criteria of eight sessions were chosen in line with previous research by the developers of FFT using this as the minimum number of sessions needed for treatment completion (Robbins et al., 2003). The sample used consisted of 69 youths and their families. Youth mean age was 14.8 (SD = 1.47) years, and 43.5% (n = 30) were female. 17.4% (n = 12) of the youths had immigrant background (i.e., both their parents were born outside Norway). Parent respondents' mean age was 43.9 (SD = 7.10) years, and 47.1% (n = 32) had education at university or college level. 27.3% (n = 18) of the youths had parents who still lived together, while 69.7% (n = 46) had parents living apart. 3% (n = 2) of the youths were in long-term foster care or adopted, and FFT was given in the foster or adoptive family. For three youths, information on family situation was missing at intake. The primary reasons for referral, recorded by the CWS leader at intake, were verbal threats at home (n = 25, 37.7%), misdemeanors (e.g., truancy or running away; n = 12, 17.9%), violent behavior at home

(*n* = 11, 16.4%), youth at risk for endangering themself or others (*n* = 6, 9%), youth was described by school or others as having severe behavior problems (*n* = 6, 9%), committing crime (*n* = 3, 4.5%), and drug abuse (*n* = 1, 1.5%). For one case, referral reason was missing, and two youths (4.5%) had other reasons for referral. At intake, based on age and gender-adjusted cutoff values from the Achenbach System of Empirically Based Assessment's multicultural norms (Achenbach & Rescorla, 2007), 55.4% (*n* = 36) and 46.9% (*n* = 30) of the sample scored in clinical range, 9.2% (*n* = 6) and 28.1% (*n* = 18) in borderline range, 35.4 (*n* = 23) and 25% (*n* = 16) in normal range on aggressive and rule-breaking behavior, respectively.

Design and Research Procedures

Data collections were conducted at fixed intervals before treatment started (pretest), six months after treatment started (posttest), and 18 months after pretest (follow-up). Families met with staff from the Norwegian Center for Child Behavioral Development (NCCBD), who informed them about the study, collected written consent, and provided technical support. Questionnaires were completed using pen and paper or laptop computers. Family members responded separately and were instructed not to collaborate or discuss their responses. Data collection took about two hours, and the family received monetary compensation of 400 NOK (approx. 38 USD) per data collection. For some families, we had more than one parent responding to questionnaires. However, the majority had only one parent's response, and one primary parent respondent was chosen for each case in the study. The parent who had responded to the greatest number of data collections was chosen as the primary respondent, and in cases where both had the same number of responses, mother´s response was chosen.

Ethical approval

for the study was given by the Regional Committees for Medical and Health Research Ethics in Norway (reference 2010/497). The research questions and study design were registered in ISRCTN one month after recruitment started; see https://doi.org/10.1186/ISRCTN58861782.

FFT Treatment

At the time the study started, FFT had been a regular part of the Norwegian CWS and was offered as specialized services for youths showing disruptive problem behavior such as anti-social, violent, and aggressive behavior (Mørkrid & Christensen, 2007). The treatment was voluntary for both families and youths and was generally delivered in one hour treatment sessions at either the CWS or at the families' homes. Both parents and youths are expected to take part in the sessions together. The average number of hours in treatment for the subsample used in this study was 14.4 (*SD* = 1.47; range = 8–42) and spanned on average 23.1 (*SD* = 7.18; range = 6–42) weeks. FFT was given by a mix of experienced therapists and therapists recruited more recently due to turnover. All therapists had completed FFT-training before starting treatment with families in the study.

FFT therapists were organized in teams at different CWS sites, and quality assurance of FFT was conducted by NCCBD with the support from the developers through FFT limited liability company (LLC). As part of the standard quality assurance procedures required by FFT LLC, treatment specialists assessed clinical fidelity and dissemination adherence and gave guidance on specific cases throughout the study period in line with FFT's supervision manual (Robbins et al., 2011). Aggregated scores on clinical fidelity and dissemination adherence were computed quarterly and used to assess whether treatment delivery was acceptable (see Olseth et al., 2024, for more details). Throughout the study period, the average scores on treatment adherence and clinical fidelity were 4.7 (*SD* = 0.2) and 4.4 (*SD* = 0.2), respectively, and they were above the criteria set by the developers of FFT (M.S. Robbins, personal communication, March 31, 2023) as indicating acceptable implementation.

Assessments and Instruments

Child Behavior Checklist

Aggressive and rule-breaking behavior were assessed using parent reports on the Child Behavior Checklist (CBCL) for age 6–18 (Achenbach & Rescorla, 2001). CBCL has been standardized and validated in a Norwegian norming study (Jozefiak et al., 2012). In the current analyses, aggressive behavior (18 items) and rule-breaking behavior (17 items) subscales were used. These were scored on a 3-point scale (0 = *not true* – 2 = *very true or often true*), with higher scores on the subscales indicating higher levels of aggressive and rule-breaking behavior. Internal consistency estimates for the aggressive behavior subscale were α = .93 at pretest, α = .93 at posttest, and α = .94 at follow-up; and for rule-breaking behavior subscale α = .81 at pretest, α = .85 at posttest, and α = .85 at follow-up.

Family Environment Scale

Family cohesion and conflict were measured using the Family Environment Scale (FES; Moos & Moos, 2009). This FES instrument was translated and back-translated for use in the FFT-study. Parents and youth responded separately on the subscales for cohesion (9 items) and conflict (9 items). Items were scored dichotomously (0 = *false* or 1 = *true*). Higher scores on subscales indicate higher levels of cohesion and conflict. Cronbach's α values for pretest, posttest, and follow-up for the parent-reported cohesion subscale were .77, .71, and .71, and for youth reports were .71, .67, and .79. For the conflict subscale, α values were .72, .80, and .76 for parent reports and .73, .71, and .76 for youth reports.

Social Support

The level of youths' perceived social support in the family was assessed using a five-item scale developed by Ulriksen et al. (2014). The scale was developed based on the theoretical framework of Cohen and Wills (1985), and contains five statements about attachment, available social support, and mutual care in the family. Items were scored on a four-point Likert-type scale (1 = *completely disagree* to 4 = *completely agree)*. Higher scores on the subscale reflect that the youth perceive a higher degree of social support in their families. Cronbach's α values were .90, .95, and .95 for pretest, posttest, and follow-up, respectively.

Inventory of Parent and Peer Attachment

Youth's perceptions of trust (10 items), communication (9 items) and alienation (6 items) in their family were assessed using the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987). These three subscales measure distinct aspects of attachment between youths and their parents. Items were scored on a five-point scale (1 = *almost never or never true* to 5 = *almost always or always true*). Higher scores on the three subscales indicate that youths perceive a higher degree of trust, quality of communication, and degree of alienation. Youth responses regarding the parent who was identified as the primary parent respondent were used in the analyses. Cronbach's α values for pretest, posttest, and follow-up were .85, .91, and .83 for the trust subscale; .80, .88, and .85 for the communication subscale; and .74, .73, and .83 for the alienation scale; respectively. This instrument was originally translated for use in a Norwegian population study (Undheim & Sund, 2008), and this translated version was used in the current study.

Statistical Analyses

Mediation was examined in two-condition within-participant mediator models as described by Montoya and Hayes (2017). This approach was chosen in line with the within-subject nature of the therapy process examined (Montoya, 2023), and because a relevant between-group control condition was not available. This analytic framework estimates paths conceptually parallel to those in between-participant mediation, but based on within-participant change scores from experiments. In line with Montoya and Hayes (2017), a grand-mean–centered person-level mediator variable was included to separate within-participant mediator change from between-participant differences in average mediator level. The following paths were estimated in the model: an a-path ($\overline{\Delta M}$), representing the average change in the mediator; a b-path (ΔM → ΔY), representing the association between change in the mediator and change in the outcome, a d-path (grand-mean centered average mediator level → ΔY), representing the effect of between-participant differences in mediator levels on within-participant changes in the outcome, and the indirect effect (a*b-path) representing the portion of the within-participant change in the outcome that is statistically associated with the change in the mediator. In addition, total effect (c-path) and direct effect (c´-path) were estimated, and these represent the average within-participant change in the outcome, and the portion of the within-participant change that remains after controlling for the mediator change and the average mediator level respectively. In models with more than one mediator, total indirect effects and specific indirect effects may be estimated in this framework (Montoya & Hayes, 2017). This statistical approach also offered benefits in terms of statistical power which were important in light of our limited sample size (Montoya, 2023).

Primary analyses were first run separately for change in each mediator (single mediator models) and change in ultimate outcomes from pretest to posttest (Y_{T2}-Y_{T1}), and pretest to follow-up (Y_{T3}-Y_{T1}). Mediator change-variables were pretest to posttest changes (M_{T2}-M_{T1}) for all models. Second, a set of exploratory analyses were run with selected mediator variables in parallel. The parallel models were selected based on the patterns of b-paths (ΔM → ΔY) on specific outcomes. The rationale for focusing on specific combinations of mediators was that these mediators had been shown to be statistically related to outcome change in the single mediator models. In parallel mediation models, the specific indirect effect of each mediator was controlled for the other mediators included in the model and thus represents the unique contribution of that mediator. Parallel models also allow for a test of a total indirect effect of the combined mediator paths, and thus a situation where there may be additive effects of several mediators could be detected. Finally, we ran a second set of exploratory analyses examining potential reversed causality between mediators and outcomes. In these models, changes from pretest to posttest (short-term) in aggressive and rule-breaking behavior were used as mediators for changes in pretest to posttest (short-term) and pretest to follow-up (long-term) family functioning.

Two-condition within-family mediation models were run using the MEMORE macro version 3.0 (Montoya, 2025) in SPSS version 29, and the significance of the estimates for the mediation was assessed by examining percentile bootstrapped confidence intervals as recommended by Montoya and Hayes (2017). With respect to handling missing data in the mediation models, this approach did not offer the option of estimating or multiply imputing missing data, and models were run using complete cases. To assess the potential for bias due to missing data, we conducted independent samples *t*-tests and calculated standardized mean differences (Cohen's *d*) between those cases where outcome or mean change scores could not be calculated and thus cases could not be included in any single mediator model. These effect sizes were assessed in line with the recommendations by Enders (2022).

Results

Descriptive statistics for the sample on outcomes and mediators at the different timepoints, are presented in Table 1. Of the 69 pairs of youth and parent participants included in the subsample, 29% (*n* = 20) to 33.3% (*n* = 23) had missing data on the behavioral outcomes, which precluded calculation of change scores for either pretest to posttest or pretest to follow-up. With respect to change scores for the mediators in the primary analyses, missing data ranged from 31.9% (*n* = 22) to 37.7% (*n* = 26). Results of missing data analyses are available in table S1 in supplemental material. These analyses revealed one *d*-value exceeding the criterion of ± 0.20 suggested by Enders (2022). Participants who were not included in any of the models scored on average 0.23 standard deviations lower on perceived family support at pretest. This suggests that there may have been potential selective attrition related to the level of perceived family social support at intake.

Table 1

Descriptive statistics on behavioral outcomes and family functioning mediators

Variable (reporter)	Pretest		Posttest		Follow-up	
	M (*SD*)	*n*	*M* (*SD*)	*n*	*M* (*SD*)	*n*
Aggressive behavior (P)	14.18 (8.78)	65	9.86 (7.87)	49	8.27 (8.12)	51
Rule Breaking behavior (P)	9.47 (5.09)	64	7.49 (5.64)	49	6.10 (5.32)	50
Cohesion (Y)	4.88 (2.45)	66	5.48 (2.24)	44	6.49 (2.38)	45
Conflict(Y)	4.24 (2.47)	67	4.20 (2.43)	44	2.83 (2.44)	46
Cohesion (P)	6.03 (2.44)	65	6.49 (2.10)	47	6.90 (2.00)	50
Conflict (P)	3.95 (2.30)	65	3.38 (2.49)	47	2.94 (2.23)	50
Family Support (Y)	2.86 (0.78)	68	3.00 (0.89)	44	3.06 (0.90)	45
Trust (Y)	34.05 (8.19)	65	34.64 (10.32)	44	38.45 (7.62)	49
Communication (Y)	27.06 (7.34)	65	27.98 (8.85)	44	29.67 (8.61)	49
Alienation (Y)	15.08 (5.09)	66	14.18 (4.97)	44	13.45 (6.01)	49

Note. Y = youth-report; P = parent-report.

Single Mediator Model Results

Results from single mediator models are presented in Table 2. No significant indirect effects (a*b-paths) were found between these mediators and the aggressive or rule-breaking behavior outcomes in either models examining short- or long-term change in the outcomes. Direct effects (c' paths) were significant and in the expected direction in all models, indicating that there was a significant change in the outcomes controlling for the change in the mediators and the effects of the between-participant differences in the average mediator level.

Table 2

Single mediator model results

Outcome / Mediator (respondent)	*n*	a-path ($\overline{\Delta M}$)	*p*	b-path (ΔM→ΔY)	*p*	d-path (M_{avg}→ΔY)	*p*	a*b-path (Indirect effect)	Boot 95% CI [LL, UL]	c-path (Total effect)	*p*	c' -path (Direct effect)	*p*	R^2
Δ Aggressive behavior - short term (6-month)														
Cohesion (Y)	40	0.65	.137	-1.12	.016	-0.95	.158	-0.73	[-2.10, 0.19]	-4.58	< .001	-3.85	< .001	.17
Cohesion (P)	46	0.57	.170	-1.60	< .001	0.05	.923	-0.90	[-2.70, 0.26]	-4.20	< .001	-3.29	.001	.35
Conflict (Y)	40	-0.18	.650	0.71	.187	-0.13	.828	-0.12	[-1.11, 0.41]	-4.58	< .001	-4.45	.001	.05
Conflict (P)	46	-0.50	.133	1.87	< .001	-0.83	.062	-0.93	[-2.82, 0.13]	-4.20	< .001	-3.26	.001	.35
Social support (Y)	40	0.14	.192	0.76	.698	1.70	.324	0.11	[-0.82, 0.58]	-4.58	< .001	-4.68	< .001	.03
Trust (Y)	40	1.00	.534	0.10	.456	-0.13	.455	0.10	[-0.63, 0.55]	-4.58	< .001	-4.67	< .001	.03
Communication (Y)	40	1.08	.421	0.17	.261	-0.22	.238	0.19	[-0.45, 0.82]	-4.58	< .001	-4.76	< .001	.06
Alienation (Y)	40	-1.08	.236	0.04	.844	0.56	.100	-0.05	[-0.74, 0.50]	-4.58	< .001	-4.53	< .001	.07
Δ Aggressive behavior - long term (18-month)														
Cohesion (Y)	37	0.43	.339	-0.44	.344	0.34	.628	-0.19	[-1.30, 0.42]	-5.68	< .001	-5.48	< .001	.04
Cohesion (P)	42	0.76	.073	-0.98	.015	0.71	.186	-0.75	[-2.31, 0.05]	-5.64	< .001	-4.89	< .001	.22
Conflict (Y)	37	-0.22	.600	-0.41	.411	-0.62	.281	0.09	[-0.51, 0.48]	-5.68	< .001	-5.77	< .001	.05
Conflict (P)	42	-0.64	.070	0.82	.091	-0.69	.166	-0.53	[-2.03, 0.44]	-5.64	< .001	-5.11	< .001	.11
Social support (Y)	37	0.01	.399	0.82	.647	3.20	.070	0.08	[-0.44, 0.83]	-5.68	< .001	-5.76	< .001	.11
Trust (Y)	37	0.97	.582	0.29	.013	0.01	.935	0.28	[-0.83, 1.31]	-5.68	< .001	-5.96	< .001	.17
Communication (Y)	37	0.68	.650	0.40	.002	0.06	.720	0.27	[-1.14, 1.46]	-5.68	< .001	-5.95	< .001	.25
Alienation (Y)	37	-0.54	.589	-0.23	.277	0.29	.381	0.12	[-0.40, 0.95]	-5.68	< .001	-5.80	< .001	.06
ΔRule-breaking behavior - short term (6-month)														
Cohesion (Y)	40	0.65	.137	-0.70	.010	-0.82	.038	-0.45	[-1.23, 0.14]	-1.75	.025	-1.30	.072	.22
Cohesion (P)	45	0.56	.186	-0.82	< .001	-0.53	.103	-0.46	[-1.21, 0.17]	-1.87	.008	-1.41	.025	.26
Conflict (Y)	40	-0.18	.650	0.66	.035	0.22	.523	-0.12	[-0.68, 0.48]	-1.75	.025	-1.63	.030	.12
Conflict (P)	45	-0.49	.150	0.75	.013	-0.00	.996	-0.37	[-1.12, 0.07]	-1.87	.008	-1.50	.028	.14

Note. Unstandardized estimates. Y = youth report; P = parent report. ΔM = within-participant change in the mediator; ΔY = within-participant change in the outcome; M_{avg} = person-mean mediator level (grand-mean centered). a-path = the average within-participant change in the mediator ($\overline{\Delta M}$). b-path = association between change in the mediator (ΔM) and change in the outcome (ΔY), adjusting for the person-mean mediator level (M_{avg}); d-path = association between the person-level mediator (Mavg) and change in the outcome (ΔY), adjusting for ΔM. c-path = average within-participant change in the outcome. c'-path = remaining within-participant change in the outcome after adjusting for ΔM and M_{avg}. a*b-path = portion of within-participant outcome change statistically associated with mediator change (with 95% bootstrap confidence intervals). R^2 = proportion of variance explained in the ΔY model including ΔM and M_{avg}.

Outcome / Mediator (respondent)	*n*	a-path ($\overline{\Delta M}$)	*p*	b-path (ΔM→ΔY)	*p*	d-path (M_{avg}→ΔY)	*p*	a*b-path (Indirect effect)	Boot 95% CI [LL, UL]	c-path (Total effect)	*p*	c' -path (Direct effect)	*p*	R^2
Social support (Y)	40	0.14	.192	-1.06	.367	-0.25	.807	-0.15	[-0.96, 0.05]	-1.75	.025	-1.60	.046	.03
Trust (Y)	40	1.00	.534	-0.06	.438	-0.11	.302	-0.06	[-0.48, 0.21]	-1.75	.025	-1.69	.031	.05
Communication (Y)	40	1.08	.421	-0.08	.379	-0.18	.099	-0.09	[-0.60, 0.19]	-1.75	.025	-1.66	.030	.10
Alienation (Y)	40	-1.08	.236	0.05	.718	0.29	.148	-0.05	[-0.47, 0.21]	-1.75	.025	-1.70	.032	.06
Δ Rule-breaking behavior – long term (18-month)														
Cohesion (Y)	36	0.50	.278	-0.11	.684	0.47	.267	-0.06	[-0.48, 0.21]	-3.11	< .001	-3.05	< .001	.04
Cohesion (P)	40	0.78	.083	-0.37	.177	-0.17	.649	-0.29	[-1.23, 0.35]	-3.25	< .001	-2.96	< .001	.05
Conflict (Y)	36	-0.17	.692	-0.09	.765	0.18	.612	0.02	[-0.24, 0.45]	-3.11	< .001	-3.13	< .001	.01
Conflict (P)	40	-0.60	.105	0.13	.681	0.45	.175	-0.08	[-0.70, 0.61]	-3.25	< .001	-3.17	< .001	.05
Social support (Y)	36	0.09	.426	-2.10	.051	1.94	.065	-0.20	[-0.98, 0.23]	-3.11	< .001	-2.91	< .001	.16
Trust (Y)	36	1.28	.475	0.03	.718	0.13	.245	0.03	[-0.22, 0.33]	-3.11	< .001	-3.14	< .001	.05
Communication (Y)	36	0.81	.598	0.05	.552	0.10	.378	0.04	[-0.39, 0.26]	-3.11	< .001	-3.15	< .001	.04
Alienation (Y)	36	-0.36	.721	-0.04	.764	-0.11	.580	0.01	[-0.17, 0.28]	-3.11	< .001	-3.13	< .001	.01

Note. Unstandardized estimates. Y = youth report; P = parent report. ΔM = within-participant change in the mediator; ΔY = within-participant change in the outcome; M_{avg} = person-mean mediator level (grand-mean centered). a-path = the average within-participant change in the mediator ($\overline{\Delta M}$). b-path = association between change in the mediator (ΔM) and change in the outcome (ΔY), adjusting for the person-mean mediator level (M_{avg}); d-path = association between the person-level mediator (Mavg) and change in the outcome (ΔY), adjusting for ΔM. c-path = average within-participant change in the outcome. c'-path = remaining within-participant change in the outcome after adjusting for ΔM and M_{avg}. a*b-path = portion of within-participant outcome change statistically associated with mediator change (with 95% bootstrap confidence intervals). R^2 = proportion of variance explained in the ΔY model including ΔM and M_{avg}.

Further examination of the indirect paths revealed that none of the a-paths ($\overline{\Delta M}$) were significant (i.e., no significant average change in any of the family functioning mediators), while the b-paths (ΔM → ΔY) were significant in 10 models: Parent-reported change in cohesion significantly negatively predicted change in aggressive behavior short- and long-term, and rule-breaking behavior in short-term; parent-reported change in conflict significantly positively predicted change in aggressive and rule-breaking behavior in short-term; youth-reported change in cohesion negatively predicted short term change in aggressive and rule-breaking behavior; and youth-reported change in conflict positively predicted change in rule-breaking behavior in short-term. Thus, for these four mediators, change scores were associated as expected. Youth-reported change in trust and in communication did however positively predict change in aggressive behavior in long-term, and this was the opposite direction of what was expected. With respect to the d-paths (grand-mean centered average mediator level → ΔY), level of youth-reported cohesion significantly negatively predicted change in rule-breaking behavior short-term.

Parallel Mediator Models

Based on the results from the single mediator models, three separate parallel models were constructed to further explore the possibility that combinations of mediator paths could be related to outcome change (total indirect effect). Model 1 examined if change in aggressive behavior from pretest to posttest (short-term) was mediated through changes in youth-reported cohesion and parent-reported cohesion and conflict; model 2 examined if change in aggressive behavior from pretest to follow-up (long-term) was mediated through changes in youth-reported trust and communication; and in model 3 we examined if change in rule-breaking behavior from pretest to posttest (short-term) was mediated through changes in parent- and youth- reported conflict and cohesion. Results for these three models are presented in Table 3.

Table 3

Paralell mediator models results

Model/ Outcome	Mediator (resp.)/ Effect (path)	a-path $(\overline{\Delta M})$	*p*	b-path (ΔM -> ΔY)	*p*	d-path (Mavg -> ΔY)	*p*	Est.	*p*	a*b-path (specific indirect effect)	Boot 95% CI
1. Δ Aggressive behavior - short term (6-month)[a]											
	Cohesion (Y)	0.64	.152	-0.67	.080	-0.68	.308			-0.43	[-1.41, 0.22]
	Cohesion (P)	0.74	.109	-1.14	.019	-0.13	.862			-0.85	[-2.27, 0.15]
	Conflict (P)	-0.54	.161	0.89	.099	-0.90	.088			-0.48	[-1.88, 0.22]
	Total effect (c-path)							-4.64	< .001		
	Direct effect (c'-path)							-2.88	.007		
	Total indirect effect							-1.76			[-4.28, 0.06]
2. Δ Aggressive behavior - long term (18-month)[b]											
	Trust (Y)	0.97	.582	0.00	.995	-0.08	.760			0.00	[-0.82, 0.64]
	Communication (Y)	0.68	.650	0.41	.076	0.12	.649			0.27	[-1.10, 1.70]
	Total effect (c-path)							-5.68	< .001		
	Direct effect (c'-path)							-5.95	< .001		
	Total indirect effect							0.27			[-1.25, 1.43]
3. Δ Rule-breaking behavior - short term (6-month)[c]											
	Cohesion (Y)	0.64	.152	-0.46	.087	-0.31	.536			-0.29	[-0.94, 0.12]
	Conflict (Y)	-0.26	.507	0.45	.170	-0.13	.778			-0.11	[-0.63, 0.35]
	Cohesion (P)	0.74	.109	-0.74	.031	-0.65	.212			-0.55	[-1.79, 0.09]
	Conflict (P)	-0.54	.161	-0.02	.968	-0.22	.603			0.01	[-0.57, 0.72]
	Total effect (c-path)							-1.87	.018		
	Direct effect (c'-path)							-0.92	.194		
	Total indirect effect							-0.95			[-2.11, 0.08]

Note. Unstandardized estimates are reported. Y = youth report; P = parent report. ΔM = within-participant change in the mediator; ΔY = within-participant change in the outcome; Mavg = person-mean mediator level (grand-mean centered). a-path = the average within-participant change in the mediator ($\overline{\Delta M}$). b-path = association between change in the mediator (ΔM) and change in the outcome (ΔY), adjusting for the person-mean mediator level (Mavg); d-path = association between the person-level mediator (Mavg) and change in the outcome (ΔY), adjusting for ΔM. a*b-path = portion of within-participant outcome change statistically associated with each specific mediator change (with 95% bootstrap confidence intervals). c-path = total within-participant change in the outcome. c'-path = remaining within-participant change in the outcome after adjusting for multiple ΔM and Mavg. Total indirect effect = combined effect of multiple specific indirect effects with percentile bootstrap 95% CI.

a. *n* = 39. R^2 = .54. *b. n* = 37. R^2 = .25. c. *n* = 39. R^2 = .41.

Neither significant total indirect effects nor specific indirect effects (a*b-paths) were found in any of these three models. Further examination of the b-paths (ΔM → ΔY) showed that only two estimates, both involving parent-reported change in cohesion, were still significantly predicting change in aggressive behavior when controlling for other mediators (model 1: short-term change in aggressive behavior, and model 3: short-term change in rule-breaking behavior). In model 2, neither change in youth-reported trust nor change in communication significantly predicted long-term change in the aggressive behavior outcome when they were controlled for each other. This suggests that their unique relation to the outcome may be limited. Total effects (c-paths) were significant in all models, and direct effects (c'-paths) were significant in models 1 and 2. For short-term change in rule-breaking behavior (model 3),

direct effect was no longer significant when controlling for the mediators. With respect to d-paths (grand-mean centered average mediator level → ΔY, representing the effect of between-participant differences in mediator levels on within-participant changes in the outcome), no significant effects were found.

Exploratory Analyses

In the exploratory analyses, we examined potential reversed causality between mediators and outcomes (i.e., aggressive and rule-breaking behaviors as mediators and family functioning as outcome). In the models examining short-term changes in family functioning, no total (c-paths) or direct (c'-paths) effects on family functioning outcomes were significant. However, six significant indirect effects (a*b-path) were found. Improvements in youth-reported cohesion were mediated through reduction in aggressive behavior, a*b-path = 0.56, 95% CI [0.07, 1.08], and rule-breaking behavior, a*b-path = 0.35, 95% CI [0.01, 0.76]; improvements in parent-reported cohesion was also mediated through reduction in aggression, a*b-path = 0.93, 95% CI [0.31, 1.61], and rule-breaking behavior, a*b-path = 0.54, 95% CI [0.10, 1.22]; improvement (reduction) in conflict were mediated through reduction in aggression, a*b-path = -0.79, 95% CI [-1.47, -0.16], and rule-breaking behavior, a*b-path = -0.32, 95% CI [-0.87, -0.03].

In the models examining long-term changes in family functioning as outcomes, significant total effects (c-path) were found for parent- and youth-reported cohesion and conflict, and youth-reported trust both in the models with aggressive and rule-breaking behavior as mediators (10 models). Direct effects (c'-paths) were significant for youth-reported cohesion both in models with aggressive and rule-breaking behavior as the mediators, and parent-reported conflict and youth-reported trust in models with rule-breaking behavior as the mediator. A total of five significant indirect effects (a*b-path) were also found. Four of these indirect effects were involving reduction in aggressive behavior as the mediator, and in a direction indicating improvements: youth-reported cohesion, a*b-path = 0.72, 95% CI [0.12, 1.44]; parent-reported cohesion, a*b-path = 0.94, 95% CI [0.29, 1.66], parent-reported conflict, a*b-path = -0.85, 95% CI [-1.65, -0.11]; and youth-reported family social support, a*b-path = 0.28, 95% CI [0.05, 0.54]. One significant indirect effect involving reduction in rule-breaking behavior as the mediator, improvement in family social support was also found, a*b-path = 0.20, 95% CI [0.00, 0.56]. All parameter estimates from these models are available in supplemental materials table S2 and S3.

Discussion

The goal of this study was to examine one of the central change mechanisms in FFT. In line with FFT's theoretical model, we hypothesized that change in adolescents' disruptive behavior would be mediated through changes in family functioning. First, contrary to expectations, no significant indirect effects were found, neither on short- nor long-term changes in the outcome. Although aggressive and rule-breaking behaviors improved significantly over time, none of the eight family functioning mediators showed significant overall change. Second, the results from exploratory multiple mediator analyses examining potential additive effects of combinations of empirically selected mediators did not reveal any significant total indirect effects. Finally, further exploratory analyses suggested that the ordering of mediator and outcome may be reversed for several of the mediators and for the outcomes both in the short- and long-term. Taken together, the results did not offer support for the hypothesized mediation pathways in this Norwegian FFT-treatment subsample.

The lack of an overall change in the family functioning mediators (a-paths) in this study is unexpected given the emphasis put upon changing family functioning in FFT (Alexander et al., 2013). These results also contrast with previous findings with respect to positive changes on family functioning for example as found in a study conducted in Denmark (Vardanian et al., 2020), and several studies from the US (Celinska et al., 2019; Hollimon, 2004; Slesnick & Prestopnik, 2009). One potential explanation for this lack of change relates to intake practices and the CWS context in Norway. This study was conducted within regular services and therefore applied the usual intake criteria for FFT in the Norwegian context. While a substantial portion of families were referred primarily for difficulties at home (e.g., verbal threats and violence), poor family functioning was neither a requirement for receiving FFT nor directly assessed at intake. The absence of overall change in the mediators may therefore partly reflect that intake only focused on youth problem behavior and not family functioning. Some families may have entered treatment with relatively little room for improvement in the various family functioning factors, reducing the likelihood of a observing significant positive changes in this domain. Thus, this result may be a consequence of the intake procedures in the Norwegian CSW, and because this is an effectiveness study, its specific sample characteristics.

The findings from exploratory analyses examining potential reverse causal order also suggest that in this sample, change in aggressive and rule-breaking behavior may have acted as mediators for later family functioning outcomes. The results show a stronger pattern when examining long-term change where there were significant long-term changes in the family functioning outcomes. Though this result should be interpreted cautiously as we did not plan to test this indirect effect, one potential explanation for this pattern could be the manner in which FFT treatment was conducted in real-life practice. FFT therapists are trained to focus on family functioning in the initial phases, and the initiation of the behavior change phase should be guided by whether or not changes have been achieved in family functioning (Alexander et al., 2013, p. 131), however, they are also trained to tailor the intervention to the problems in the family, and thus they may have worked more directly on behavior problems throughout the treatment period regardless of how much change was observed in the family functioning.

Finally, though we did not find support for the proposed mediation model, the estimates of the relationships between change in family functioning and change in outcomes (b-paths, ΔM → ΔY) in the primary single mediator analyses warrant a brief mention. Overall, the findings did not show a consistent pattern across outcomes or time periods, and the results from the parallel mediator models suggested that the unique contributions of individual changes may be limited. Yet, some results from single mediator models aligned with expectations: parent- and youth-reported changes in cohesion and parent-reported conflict were related to short-term changes in both aggressive and rule-breaking behavior, and parent-reported cohesion was related to long term change in aggressive behavior. Youth-reported change in conflict also predicted short-term improvements in rule-breaking, but not in aggression. These results suggest that, when controlling for between-participant differences in the average mediator levels, associations between change in family functioning and outcome behavior were generally consistent with what was expected regarding mediator-outcome association. The magnitude of improvement in these

aspects of family functioning was associated with the magnitude of improvement in behavioral outcomes in the expected direction. Although these coefficients should not be interpreted causally, the results offer slight support for these family functioning factors as potential targets for intervention. For two youth-reported mediators, trust and communication, associations were however counterintuitive in the single mediator models: for youth who reported greater increases in trust and communication, the parents tended to report greater long-term increases in aggression, and conversely, for youth who reported greater reductions in these mediators, parents reported greater reductions in aggression. To our knowledge, this association has not been reported in any prior family treatment studies. One possible explanation for this finding, drawing on research indicating that parents may disengage in response to adolescents' developing behavior problems (Dishion et al., 2004), is that treatment-induced parental re-engagement may have complex effects. As youths experience improvements in trust and communication, parents—now more involved—may also perceive an increase in aggressive behavior during interactions with their youth in the long-term.

Limitations

This study has several limitations worth noting. First, the sample size was substantially lower than planned due to recruitment problems and attrition. As a result, statistical power was lower than planned, which limited our ability to detect potential indirect effects.

Second, because of the limited sample size, we primarily tested the dimensions of family functioning separately and chose a limited number of mediators for secondary analyses of potential additive effects of these mediators. This may have limited our ability to detect meaningful changes in the mediators if they operate combinedly in more complex ways. For example, FFT therapists were tasked with tailoring treatment to the unique needs of each family, identifying their specific deficits in family functioning. If these deficits vary substantially, and therapists concentrate on only certain aspects of functioning with each family (e.g., some families present with high cohesion and high conflict, while others with low conflict and low cohesion), the approach used in the current study would not be able to detect such effects.

Third, with respect to the external validity of the findings, the data used in this study is a selected sample drawn from an RCT in which we experienced several challenges with recruitment. We do not have any way of assessing how representative this group is for the population of families and youths receiving FFT in Norway. Attrition within the selected sample was also relatively high, and there were indications of systematic missingness on family social support. Missing data may therefore have biased estimates of change and mediation in ways we were unable to detect or counteract, limiting both the internal and external validity of the results.

Finally, with regards to internal validity, elements of the research design and analytic approach limit our ability to draw strong causal inferences. The lack of a control group means that we cannot separate the changes attributable to the intervention from those that may have occurred naturally over time or due to external influences. Although we included a grand-mean centered mediator variable to control for stable person-level confounders that influence average mediator levels, unmeasured time-varying confounders may still have influenced both family functioning and behavioral outcomes. Regarding the treatment, the study was conducted within routine service settings, and case selection for the analyses was based solely on the number of treatment sessions the families received. Although the participating sites demonstrated acceptable overall indices of clinical fidelity and adherence, we were unable to examine the treatment delivered in greater detail or to select cases based on more detailed data on treatment content or completion.

Conclusions and Future Directions

Despite this study's limitations, its findings constitute a compelling argument for the need to examine how, and for whom, treatment targeting family functioning leads to reductions in adolescent problem behavior. The strong theoretical and practical focus on this mechanism in the literature makes it important to examine if there are conditions that must be fulfilled for this hypothesized causal process to be effective within treatment. With respect to FFT specifically, a substantial portion of the treatment is devoted to improving family functioning. Thus, the results in this study, in addition to the lack of previous published empirical studies, suggest that this treatment process may not be well enough understood and should be examined more closely to ascertain the contribution to the ultimate treatment goal of reducing problem behavior. There may for example be conditions related to the treatment elements targeting family functioning, or to the selection of families that receive treatment that should be further examined.

With respect to future directions for research, we suggest that studies should focus on a wide range of family functioning mediators, reflecting the extensive literature pointing to multiple, distinct risk and protective factors and potential mechanisms of change. Future research should be conducted both in routine service contexts, such as the current study, to capture how treatment is delivered in regular practice, and in more controlled settings where therapeutic processes may be studied in detail. Collecting more detailed data on treatment delivery and treatment process may be particularly important to further extend our understanding of how treatment may alter family functioning, and in particular if interventions are tailored to the family or if there may be complex interactions among different aspects of family functioning. Furthermore, our findings indicate that associations between family functioning and behavioral outcomes to some degree differ depending on the reporting individual of family functioning, and it may therefore be particularly important to include both parents' and youths' perspectives in future studies.

Declarations

Competing interests: The authors of this article declare the following potential conflicts of interest: Asgeir Røyrhus Olseth and Kristine Amlund Hagen are currently employed at NCCBD, the organization that was responsible for the implementation of Functional Family Therapy in Norway between 2007 and 2024.

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Ethical approval: This study was performed in line with the principles of the Declaration of Helsinki and approved by the Regional Committee for Medical Research Ethics South and East Norway (reference 2010/497).

Consent to participate: Participation in the study was based on informed consent. Informed consent was obtained from legal guardians for participants under 16 years of age, while participants aged 16 years and older consented on their own behalf. All youths were informed about the study and their right to decline or withdraw from participation.

Availability of data and materials: Materials and analyses codes for this study are available upon request from the corresponding author. Data is not publicly available due to privacy and ethical restrictions.

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Authors' contributions: G.B. played a lead role, and A.R.O. a supporting role, in conception, design, and data acquisition. A.R.O. conducted the analyses and wrote the first draft of the manuscript. G.B. and S.K. played supporting role in data analyses. S.K. and K.A.H contributed to conception. G.B, S.K, and K.A.H contributed on interpretation and critically revised all versions of the manuscript. All authors read and approved the final manuscript.

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References

1. Achenbach TM, Rescorla L (2001) Manual for the ASEBA school-age forms & profiles: an integrated system of multi-informant assessment. University of Vermont, Department of Psychiatry
2. Achenbach TM, Rescorla L (2007) Multicultural supplement to the Manual for the ASEBA school-age forms & profiles. University of Vermont, Research Center for Children, Youth, & Families
3. Alexander JF, Waldron HB, Robbins MS, Neeb AA (2013) Functional family therapy for adolescent behavior problems. American Psychological Association
4. Armsden GC, Greenberg MT (1987) The inventory of parent and peer attachment: Individual differences and their relationship to psychological well-being in adolescence. J Youth Adolesc 16(5):427–454. https://doi.org/10.1007/BF02202939
5. Carr A (2024) Family therapy and systemic interventions for child-focussed problems: The evidence base. J Family Therapy 47(1). https://doi.org/10.1111/1467-6427.12476
6. Celinska K, Sung H-E, Kim C, Valdimarsdottir M (2019) An outcome evaluation of Functional Family Therapy for court-involved youth. J Family Therapy 41(2):251–276. https://doi.org/10.1111/1467-6427.12224
7. Cohen S, Wills TA (1985) Stress, social support, and the buffering hypothesis. Psychol Bull 98(2):310–357. https://doi.org/10.1037/0033-2909.98.2.310
8. Costello BJ, Laub JH (2020) Social control theory: The legacy of Travis Hirschi's Causes of Delinquency. Annual Rev Criminol 3(1):21–41. https://doi.org/10.1146/annurev-criminol-011419-041527
9. Cox MJ, Paley B (1997) Families as systems. Ann Rev Psychol 48:243–267. https://doi.org/10.1146/annurev.psych.48.1.243
10. Dishion TJ, Nelson SE, Bullock BM (2004) Premature adolescent autonomy: parent disengagement and deviant peer process in the amplification of problem behaviour. J Adolesc 27(5):515–530. https://doi.org/10.1016/j.adolescence.2004.06.005
11. Enders CK (2022) Applied missing data analysis, 2nd edn. Guilford Press
12. Fagan AA, Benedini KM (2016) How do family-focused prevention programs work? A review of mediating mechanisms associated with reductions in youth antisocial behaviors. Clin Child Fam Psychol Rev 19(4):285–309. https://doi.org/10.1007/s10567-016-0207-0
13. Hirschi T (2002) Causes of delinquency. Transaction
14. Hoeve M, Dubas JS, Eichelsheim VI, van der Laan PH, Smeenk W, Gerris JR (2009) The relationship between parenting and delinquency: a meta-analysis. J Abnorm Child Psychol 37(6):749–775. https://doi.org/10.1007/s10802-009-9310-8
15. Hoeve M, Stams GJ, van der Put CE, Dubas JS, van der Laan PH, Gerris JR (2012) A meta-analysis of attachment to parents and delinquency. J Abnorm Child Psychol 40(5):771–785. https://doi.org/10.1007/s10802-011-9608-1
16. Hollimon AS (2004) *The impact of functional family therapy on youth and parent functioning.* [Doctoral dissertation, Indiana University]. https://www.proquest.com/docview/305195458
17. Jozefiak T, Larsson B, Wichstrom L, Rimehaug T (2012) Competence and emotional/behavioural problems in 7-16-year-old Norwegian school children as reported by parents. Nord J Psychiatry 66(5):311–319. https://doi.org/10.3109/08039488.2011.638934
18. Labella MH, Masten AS (2018) Family influences on the development of aggression and violence. Curr Opin Psychol 19:11–16. https://doi.org/10.1016/j.copsyc.2017.03.028
19. Loeber R, Stouthamer-Loeber M (1986) Family factors as correlates and predictors of juvenile conduct problems and delinquency. Crime Justice 7:29–149. https://doi.org/10.1086/449112
20. McCart MR, Sheidow AJ, Jaramillo J (2022) Evidence base update of psychosocial treatments for adolescents with disruptive behavior. J Clin Child Adolesc Psychol 1–28. https://doi.org/10.1080/15374416.2022.2145566

21. Minuchin S (1974) Families and family therapy. Tavistock Publications Limited
22. Montoya AK (2023) Selecting a within- or between-subject design for mediation: Validity, causality, and statistical power. Multivar Behav Res 58(3):616–636. https://doi.org/10.1080/00273171.2022.2077287
23. Montoya AK (2023) *MEMORE (Version 3.0) [SPSS macro].* https://github.com/akmontoya/MEMORE
24. Montoya AK, Hayes AF (2017) Two-condition within-participant statistical mediation analysis: A path-analytic framework. Psychol Methods 22(1):6–27. https://doi.org/10.1037/met0000086
25. Moos RH, Moos BS (2009) Family environment scale manual: Development, applications, research, Fourth edn. Mind Garden, Inc
26. Mørkrid D, Christensen B (2007) Funksjonell familieterapi: en evidensbasert familieterapeutisk behandling for ungdom og familier med alvorlige atferdsvansker. [Functional Family Therapy: Evidence-based family therapy for adolescents and families with severe problem behavior]. Tidsskriftet Norges barnevern 83(3):15–23
27. Ogden T (2013) Evaluation of Functional Family Therapy (FFT) in Norway. *ISRCTN*. https://doi.org/10.1186/ISRCTN58861782
28. Olseth AR, Hagen KA, Keles S, Bjornebekk G (2024) Functional family therapy for adolescent disruptive behavior in Norway: Results from a randomized controlled trial. J Fam Psychol 38(4):548–558. https://doi.org/10.1037/fam0001213
29. Olseth AR, Bjornebekk G, Keles S, Hagen KA (In press). Results from a randomized controlled trial of Functional Family Therapy in Norway: Effects on family functioning outcomes. *Child and Adolescent Psychiatry and Mental Health.*
30. Robbins MS, Hollimon A, Alexander JF, Mason K, Armey K, Neeb AA (2011) The process of supervision in Functional Family Therapy. Functional Family Therapy (FFT LLC)
31. Robbins MS, Turner CW, Alexander JF, Perez GA (2003) Alliance and dropout in family therapy for adolescents with behavior problems: Individual and systemic effects. J Fam Psychol 17(4):534–544. https://doi.org/10.1037/0893-3200.17.4.534
32. Slesnick N, Prestopnik JL (2009) Comparison of family therapy outcome with alcohol-abusing, runaway adolescents. J Marital Fam Ther 35(3):255–277. https://doi.org/10.1111/j.1752-0606.2009.00121.x
33. Snyder J, Reid JB, Patterson GR (2003) A social learning model of child and adoescent antisocial behavior. In: Lahey BB, Moffitt TE, Caspi A (eds) Causes of conduct disorder and juvenile delinquency. Gilford, pp 27–48
34. Stattin H, Kerr M (2000) Parental monitoring: A reinterpretation. Child Dev 71(4):1072–1085. https://doi.org/10.1111/1467-8624.00210
35. Taubner S, Ioannou Y, Saliba A, Sales CMD, Volkert J, Protic S, Adler A, Barkauskiene R, Conejo-Ceron S, Di Giacomo D, Mestre JM, Moreno-Peral P, Vieira FM, Mota CP, Henriques M, Rossberg JI, Perdih TS, Schmidt SJ, Zettl M, Ulberg R, Heinonen E (2024) Mediators of outcome in adolescent psychotherapy and their implications for theories and mechanisms of change: A systematic review. Eur Child Adolesc Psychiatry 33(10):3321–3358. https://doi.org/10.1007/s00787-023-02186-9
36. Ulriksen R, Sagatun Å, Zachrisson HD, Waaktaar T, Lervåg AO (2014) Social support and socioeconomic status predict secondary students' grades and educational plans indifferently across immigrant group and gender. Scandinavian J Educational Res 59(3):357–376. https://doi.org/10.1080/00313831.2014.965792
37. Undheim AM, Sund AM (2008) Psychosocial factors and reading difficulties: Students with reading difficulties drawn from a representative population sample. Scand J Psychol 49(4):377–384. https://doi.org/10.1111/j.1467-9450.2008.00661.x
38. Vardanian MM, Scavenius C, Granski M, Chacko A (2020) An international examination of the effectiveness of Functional Family Therapy (FFT) in a Danish community sample. J Marital Fam Ther 46(2):289–303. https://doi.org/10.1111/jmft.12405

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