

**Parental Mental Distress and Adolescent Antisocial Behavior:
The Mediating Role of Family Conflict and Cohesion**

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Abstract

Parental mental distress can have a significant impact on adolescents' antisocial behavior (ASB), and this relationship can be exacerbated or alleviated by family dynamics such as conflict and cohesion. By analyzing responses to clinical questionnaires from 157 Norwegian adolescents and their primary caregivers, this study found a significant mediating role family conflict played in strengthening the relationship between parental mental distress and adolescents' ASB. Family cohesion, on the other hand, provided insufficient protective effect. Both results are consistent with the family stress model, and highlight the importance of addressing not only individuals' mental health but also family-level factors in preventing and treating adolescent ASB. This insight is robust against measurement errors through the use of Bayesian structural equation models.

Keywords: adolescent antisocial behavior, parental mental distress, family conflict, family cohesion, mediation effect, family stress model, Bayesian structural equation model

Highlights:

- Parental mental distress has a significant direct effect on adolescent ASB, family conflict and cohesion.
- Family conflict has a significant mediating role in strengthening the relationship between parental mental distress and adolescent ASB.
- Family cohesion shows no mediating effect between parental mental distress and adolescent ASB.

Parental Mental Distress and Adolescent Antisocial Behavior: The Mediating Role of Family Conflict and Cohesion

Adolescence is a time known for change in relationships and family structure. Normative for this period is increased family conflict and reduced family cohesion. However, in families with parental psychopathology and adolescent antisocial behaviors, these changes may be more severe. Interpersonal relationships and interactions between family members are highlighted as certain aspects that may exacerbate this influence, and are important to consider as underlying factors and triggers for adolescent outcomes (Van Loon et al., 2014; Xu et al., 2017).

Adolescent Antisocial Behavior

Antisocial behavior (ASB) is characterized as behaviors that violate norms and rules about how persons and property should be treated (Scott, 2015). These behaviors are destructive and insensitive to other people's rights, it can be criminal and noncriminal, overt and covert, and may include aggression, substance use, bullying, sexual precocity, vandalism, and delinquency (Dishion & Patterson, 2006). Persistent ASB may have major long-term consequences, both for the individual and society (e.g., academic failure, drug abuse, violence, and economic struggle) (LoBraico et al., 2020; Moffitt, 2018). Exhibition of ASB is both a common and heterogeneous form of problem behavior among youth (Frick & Viding, 2009). Early emerging ASB have a higher chance of persisting into adulthood, due to more severe individual and environmental risk factors. Research indicates that maternal psychopathology, harsh and neglectful parenting, and elevated family conflict are some of such risk factors (Dishion & Patterson, 2006; Moffitt, 2015).

Growing research advocates for distinguishing between different subtypes for adolescent ASB (Burt, 2012; Burt et al., 2009; Kornienko et al., 2019). The main distinction is between aggressive (e.g., threats, physical aggression and violence) and non-aggressive behaviors (e.g., theft, vandalism, and relational aggression) (Burt et al., 2016; Kornienko et al., 2019; T. D. Little et al., 2003). Some also include risk-taking behaviors (Mishra & Lalumière, 2008), defined as engagement in actions that are associated with potentially adverse consequences (Boyer, 2006). Risk-taking behaviors are thought of as more normative in adolescence (Moffitt, 2018; Sundell et al., 2019), they are not necessarily illegal or dangerous, but include actions where the outcome is uncertain (Ciranka & van den Bos, 2021). Steinberg

(2004) points out that adolescents are susceptible to peer pressure, making them more likely to engage in similar activities and behaviors as their peers (Ciranka & van den Bos, 2021).

Parental Mental Distress

The connection between parental mental distress, symptoms of depression and anxiety, are well established risk factors for negative child and adolescent outcomes (e.g., Cummings & Davies, 1994; Goodman & Tully, 2006; Hails et al., 2018; Hawes & Dadds, 2005), indicating that mental distress may reduce parents' ability to engage in proactive and positive parenting (Elgar et al., 2007; Joyner & Beaver, 2021). Family environments with depressed caregivers are characterized by negative patterns of interpersonal interactions, lax monitoring, and inconsistent discipline and display of affection (Elgar et al., 2007; Korhonen et al., 2014). However, for anxious parents, they tend to be more controlling and overprotective, parenting their offspring closely, expecting disclosure of information, and allowing less autonomy (Jones et al., 2021; Vera et al., 2012).

Cummings and colleagues (2005) found that parental depressive symptoms were linked to poor child adjustment, both internalizing and externalizing problems, peer rejection, and lack of prosocial behavior. Greater parental symptoms were associated with intrusiveness, control through guilt, and less parental warmth. Parental rejection and overprotection has been found to mediate the association between parental psychopathology and offspring ASB (Vera et al., 2012). Korhonen et al. (2014) investigated whether it is the timing, recurrence or chronicity of maternal depression that puts offspring's wellbeing at risk. Findings indicate that recurrent depressive symptoms were significantly associated with adolescents' poorer psychosocial health, including self-reported externalizing behaviors. Anxiety symptoms in mothers are associated with negative criticism (Hirshfeld et al., 1997), and lower levels of affirmation towards their adolescent, which in turn predict higher levels of externalizing behaviors (Bellina et al., 2020). Parental rejection and overprotection was found to mediate the association between parental psychopathology and offspring ASB (Vera et al., 2012).

Research is somewhat conflicted on mothers and fathers separate influence on offspring maladjustment (Cummings et al., 2005; Sweeney & MacBeth, 2016). Both Marmorstein and Iacono (2004) and Vera and colleagues (2012) found that maternal psychopathology had greater influence and predicted higher levels of maladjustment, compared to fathers. Conversely, a meta-analysis by Connell and Goodman (2002) did not find differences in

mothers and fathers psychopathology on externalizing behavior. However, they found that parents' gender may predict internalizing behavior, with mothers having greater influence.

Family Conflict and Cohesion as Mediators

PMD may function as a risk factor for increased conflict levels and lower levels of cohesion within families. Family conflict involves frequent expression of anger, hostility, and resentment (LoBraico et al., 2020). Adolescents' desire for autonomy and liberation from parental control may be a source for frustration, friction, and conflict (Buehler, 2006; Saxbe et al., 2014), as they attempt to adjust boundaries, renegotiate parental authority, and increase their independence (Weymouth et al., 2016). High family conflict is associated with emotional and behavioral problems (e.g. mental distress, aggression, delinquency, and school problems) (Fosco & Lydon-Staley, 2020; Sun et al., 2021; Xu et al., 2017). Similarly, a meta-analysis by Weymouth and colleagues (2016) found positive associations between parent-adolescent conflict and youth maladjustment. Family conflict is also connected to heightened engagement in risky behavior (Skinner & McHale, 2016). Elevated levels of conflict may increase the use of coercive strategies in parent-adolescent interactions (LoBraico et al., 2020), where ASB emerges and stabilizes over time (Granic & Patterson, 2006).

Family cohesion is characterized by warmth, openness, emotional connection, and flexibility. Offspring in such families are found to have better psychological and behavioral adjustment (Coe et al., 2018; Richmond & Stocker, 2006; Sun et al., 2021). High and stable levels of cohesion make family members less adversely affected by PMD, adolescent ASB, or other life challenges (Coe et al., 2018). Adolescents who feel connected to their family, are more likely to seek guidance, disclose information, and spend time with their families, leaving them with less opportunity to affiliate with delinquent and deviant peers (Fosco & LoBraico, 2019; Vieno et al., 2009). Family cohesion tends to decrease through adolescent development and liberation process (Baer, 2002; Deković et al., 2003). Decrease in family cohesion was lower and had less impact on youth who initially reported high connectedness to their family, while low levels in early adolescence predicted more delinquent behavior in later adolescence (Lin & Yi, 2019). Other studies also found that low family cohesion predicted externalizing behavior as Conduct Disorder, Oppositional Defiant Disorder and hostility (Coe et al., 2018; Richmond & Stocker, 2006).

Depressed mothers report that their family environments more often are less cohesive

and more conflict-filled, compared to non-affected mothers (Slee, 1996). Higher levels of maternal depression is associated with lower levels of family cohesion, reported by both mothers and adolescents (Pérez et al., 2018). Fosco and Lydon-Staley (2020) found that adolescents within families with high levels of cohesion, reported feeling more positive, more satisfied with life, and less angry, depressed, and anxious. Reflecting that family cohesion can function as a protective factor against life difficulties.

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The Current Study

The current study aims to investigate whether family conflict and cohesion mediate the effect of PMD on ASB. We hypothesize that higher symptoms of PMD will increase family conflict, and decrease family cohesion. Further, we expect that elevated levels of family conflict is related to increased adolescent ASB, while elevated levels of cohesion is associated with lower adolescent ASB. We also expect the mediators to covary, with high levels in one resulting in low levels in the other.

Methods

Participants

The current study utilized clinical data from Norway's Functional Family Therapy (FFT) initiative (Bjørnebekk, 2013). Adolescents and caregivers from 159 families participated in the combined randomized control- and process-outcome-design which sought to treat moderate to severe antisocial behavior. We included in our sample (a) adolescents that were aged between 11 and 19, with (b) manifested or being at risk of developing at least one of the following behavioral problems: aggressive (both verbal and physical) and violent behavior, delinquency with severe risk of future offences, vandalism, severe rule-breaking behavior at home, school or in the local community, and substance use. Exclusion criteria applied to (a) adolescents with autism spectrum disorder, (b) who possessed imminent risk of suicide or had recently experienced an acute psychotic episode. Additionally, (c) home environments that were unsafe for the therapist, (d) cases with ongoing investigation by the local child welfare service, and (e) cases that already participated in interventions or treatments incompatible with FFT were also excluded.

Two observations were removed due to complete missings, leading to a sample size of

157 adolescents (age $M = 14.74$, $SD = 1.47$, range = [10.80, 17.88]) and their primary caregivers (age $M = 43.93$, $SD = 6.90$, range = [29, 78]). There was a slightly higher proportion of male adolescents ($n = 85$, 52.1%) than females ($n = 72$, 45.9%) while proportions were in reverse for caregivers, with 89.8% mothers and 10.2% fathers ($n = 141$, $n = 16$) respectively. Most adolescents lived with single parents ($n = 59$, 37.6%), while the remaining lived with both parents, adoptive parents, or in foster care (see [Table 1](#)).

Procedures

Participants were surveyed at three time points: before being assigned to different groups (T1), after intervention/treatment (T2), and at a follow-up session one year later (T3). This paper studies retrospectively the pre-treatment data at T1. This archival cross-sectional design implies that relationships revealed by this study did not interact with subsequent intervention/treatment.

Parents and adolescents completed their respective questionnaires on portable computers installed with Ci3 software (Sawtooth Software, [2013](#)). The participants completed the questionnaires in their homes, or at a municipality office. A research assistant was available for questions and gave general instructions on how to use the Ci3 system. Families received a minor compensation for participation equivalent to 50 US dollars (Thøgersen et al., [2020](#)).

Measures

Parental Mental Distress

The Norwegian translation of the 8-item version of *Hopkins Symptom Checklist* (SCL-90, Derogatis et al., [1974](#)) was used to measure parental mental distress (SCL-8, Fink, Ørnbøl, Hansen, et al., [2004](#)) based on its brevity and high reliability (Siqueland et al., [2016](#)). Parents answer eight items about the presence and intensity related to symptoms of anxiety and depression over the past 14 days (e.g., “Sudden fear without any clear reason”) on a 4-point Likert scale: 1 (Not bothered), 2 (Somewhat bothered), 3 (Very bothered) and 4 (Very much bothered). The SCL-8 scale contains only emotional symptoms, and is suggested to be a valid and robust screening tool ($\alpha = .91$, Fink, Ørnbøl, Hansen, et al., [2004](#); Fink, Ørnbøl, Huyse, et al., [2004](#)). This study uses both the sum-score (Line 5 of [Table 3](#)) and the measurement model of PMH (see ??).

Results

Discussion

The purpose of this current study was to investigate whether family conflict and cohesion have a mediating role on the relationship between parental mental distress (PMD) and adolescent antisocial behavior (ASB). Results revealed a direct association between PMD and adolescent ASB, and is consistent with previous research. Indicating that PMD with all the possible behaviors or attitudes this measure includes, directly affects adolescents development and exhibition of ASB. Some mechanisms that might influence, but are not controlled for in the current study include parenting styles (Hautmann et al., 2015; Vera et al., 2012), parental hostility and overprotection (Sellers et al., 2014), and coping strategies (Francisco et al., 2015), as well as environmental factors outside the family (KILDE). Further, our overall results indicate that family conflict has a mediating effect on adolescent ASB, while cohesion does not. Unsurprisingly, elevated and chronic patterns of family conflict, and within specific dyads, e.g. parent-adolescent, results in deteriorated family cohesion.

As to our first hypothesis, results indicate that elevated levels of PMD is associated with increased levels of family conflict, and reduction in family cohesion. These results are consistent with previous findings (e.g., Garber, 2005; Pérez et al., 2018; Xu et al., 2017). We assume that PMD negatively affects their ability to choose proactive and effective parenting strategies, as previous research has found that depressed caregivers use inconsistent discipline, initiate negative patterns of interactions, and lack monitoring (Korhonen et al., 2014; Pérez et al., 2018). Factors like these are possible explanations for why family environments with distressed caregivers may function as catalysts for adverse interaction patterns, resulting in chronic conflict-filled communication between family members (Garber, 2005). Hostile and conflict-filled interpersonal relationships can result in withdrawal by family members (Romm & Alvis, 2022). Hence, explaining the reduction in family cohesion when PMD is high. These results are also in line with previous research (Li et al., 2021; Van Loon et al., 2014). It is reasonable to assume that within a clinical sample, with interactions characterized by higher conflict and PMD, any deterioration in family cohesion will escalate the situation.

As expected, results indicate that family conflict has a mediating role on the relationship between PMD and adolescent ASB, while cohesion does not. There are several explanations for why and how family conflict has an impact on the path to adolescent ASB.

Parents with increased mental distress usually have reduced capacity and ability to engage in positive and favorable parenting (Joyner & Beaver, 2021). As depression and anxiety influence parenting styles characterized by control through guilt and overprotection, hostility, criticism, and inconsistent discipline (Cummings et al., 2005; Korhonen et al., 2014). This may result in family environments characterized by coercive and hostile attitudes and behaviors. LoBraico et al. (2020) found that adolescents in coercive families experienced the most robust risk across ASB outcomes. Families that engage in more hostile behaviors, in the form of fighting and aggression, may damage both trust and secure attachments between parent and adolescent (Buehler, 2006; Weymouth et al., 2016). When this pattern of communication becomes normative within the family, offsprings may adopt and stabilize these attitudes to other social relations, encouraging affiliation with antisocial groups and peers (Carroll et al., 2009; Ciranka & van den Bos, 2021; Moffitt, 2015). Conversely, research shows that living with antisocial or delinquent adolescents have transactional adverse consequences on PMD and family conflict (Gross et al., 2009). For instance, having a teen not complying to rules, expressing hostile and aggressive behaviors, and parents' awareness that they engage in antisocial activities may create significant stress (Allen et al., 2010).

Adolescence brings normative shifts in family relations, resulting in increased conflict and reduced cohesion between parent and youth, as they attempt to adjust boundaries, renegotiate parental authority, and increase their autonomy and independence (Baer, 2002; Lin & Yi, 2019; Weymouth et al., 2016). Youth also tend to become more oppositional during adolescence (Steinberg, 2011), which may exacerbate adverse patterns of communication and interaction. Also, parents modeling role on behaviors and attitudes are gradually replaced by peers. Developmental trends like these become more problematic for mentally distressed parents, compared to non-distressed. We assume that PMD might exacerbate their ability to meet and adjust to adolescent autonomy seeking, resulting in even more friction and conflict. Connectedness and youth self-disclosure are found to significantly enhance youths' prosperity to seek guidance when navigating difficulties, value parental input, and spend time with their families. Hence, leaving them with less opportunity to engage in ASB (Ackard et al., 2006; Crawford & Novak, 2008; Vieno et al., 2009). Therefore, we assume that high conflict and lack of cohesion in our sample, contribute to the youth seeking affiliation with deviant peers and not their parents. Especially among mentally distressed parents, where rejection and love

withdrawal are prominent. This may exacerbate the distance between parent and adolescent.

When controlling for economic hardship, we found that this had an influence on PMD and family conflict, but not on adolescent ASB. These findings suggest that economic hardship directly impacts parents. Previous research has found socioeconomic disadvantage to be a strong indicator of depressive symptoms in parents (Conger et al., 2010; Sturge-Apple et al., 2014; Vreeland et al., 2019). Therefore, we assume that living in economic disadvantage might place the parents under elevated stress, which further impair their parental practices and family climate. Further, PMD may also be a contributing factor to poorer employability, therefore more economic hardship. Resultantly, this stressor may be a reason for increased levels of family conflict within the family system, and have an indirect influence on adolescent ASB.

Limitations

This study has several limitations. Firstly, a consequence of small sample size is lack of power to detect statistical significance for the observed associations. Secondly, we only used parent-reported measures. This is problematic due to well documented discrepancies between parental and adolescents' reports on family environment and ASB (e.g., De Los Reyes, 2011; Robinson et al., 2019), introducing a potential reporting bias (Allen et al., 2010). Parents and adolescents may interpret and observe each other's behaviors differently, therefore, research should attempt to include the offspring's perspectives. Further, cross-sectional data prevents us from drawing any causal conclusions. Our findings are an artifact of our modelling choices, reflecting that results could be different using other methods and samples. For example, compared to the general population, a clinical sample usually has higher levels of symptoms, with in turn affects the generalization of our findings. The current study provides a small "snapshot" of a bigger picture. However, this still contributes to research, as many small "snapshots" jointly inform the full picture.

Implications and Future Research

Findings from the current study have various practical implications. This study provides insight and confirmation of previous research on the association between family mechanisms, PMD and adolescent ASB. This is important when establishing holistic interventions, targeting environmental factors and parents' psychopathology. Results suggest that family interaction patterns, such as conflict and cohesion, have significant and distinct

influences on interpersonal relationships, feelings and behaviors among family members.

Further research should seek to use multi-informants, youths' perspectives, and differentiate by gender when examining relations between interpersonal and environmental constructs.

Data Availability**Acknowledgments****Author Contributions****Ethical Considerations**

To ensure acceptable principles of ethical and professional conduct, the current study received approval from Regional Committees for Medical and Health Research Ethics (REK) to utilize data gathered by the study of Evaluation of Functional Family Therapy in Norway (Bjørnebekk, 2013). All participants, both parents and adolescents gave written informed consent. Consent forms included information about participants' right to withdraw from the study at any given time, and ensured participants confidentiality. Participants consent forms were presented for Norwegian Center for Research Data (NSD) and Norwegian Data Protection Authority [Datatilsynet] (Bjørnebekk, 2013). All data were collected, stored, and processed within a certified secure IT environment (TSD, University of Oslo, 2020).

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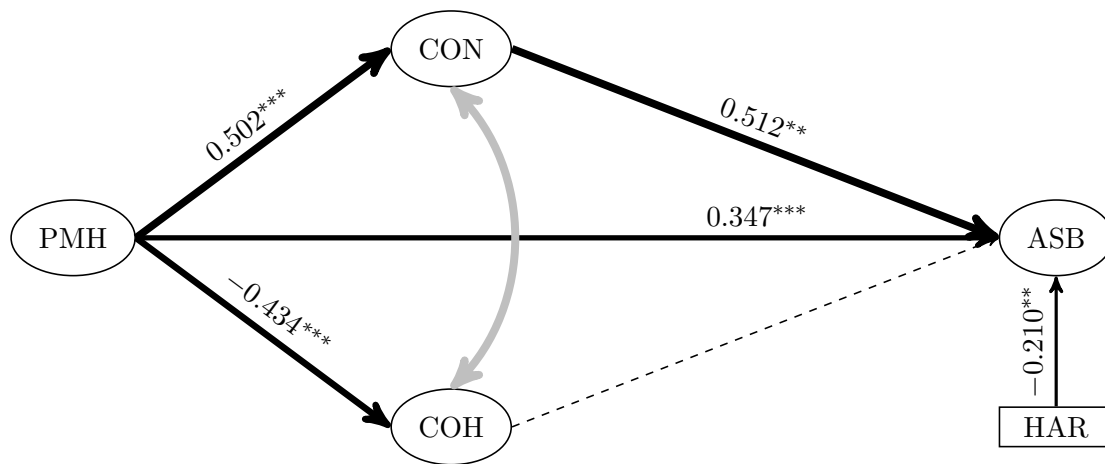
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Figure 1*Structural Equation Model Predicting Youth's Antisocial Behavior*

Note. This structural equation model predicts youth's antisocial/externalizing behavior (ASB) from parental mental health (PMH), with mediating effects from family conflict (CON) and family cohesion (COH). Variables in ellipses are latent constructs (see [Appendix B](#)).

Standardized regression coefficients are computed using Bayes estimator (Depaoli, 2021) and averaged over ten imputed datasets (R. J. A. Little & Rubin, 2020; van Buuren, 2018). Solid lines are visualized in proportion to their estimates while dashed lines represent nonsignificant relations at $\alpha = .05$ level. Parental perception of economic hardship (HAR) is only significantly related to the outcome variable ASB. All control variables are nonsignificant and are omitted from the diagram.

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

Table 1*Socio-demographic Characteristics of Participants*

Sample Characteristics	<i>n</i>	<i>M (SD)</i>	Missing
Adolescents' Age	157	14.74 (1.47)	
Adolescents' Gender	157		
Female	72		
Male	85		
Adolescents' Living Condition	153		2.50%
Category 1: Living at home with their parents	40		
Category 2: Living partly with both parents	8		
Category 3: Living mainly with one parent who have no new partner	59		
Category 4: Living mainly with one parent who has a new partner	36		
Category 5: Being adopted or living in foster care	10		
Parental Age	157	43.9 (6.90)	
Parental Gender	157		
Mother	141		
Father	16		
Parental Education Level	156		0.60%
Level 1: Primary and secondary school (< 10 years)	23		
Level 2: Upper secondary school (11–14 years)	67		
Level 3: Higher education (> 14 year)	66		
Perceived Economic Hardship	156		0.60%
Level 1: Living comfortably	12		
Level 2: Doing alright	43		
Level 3: Just about getting it	76		
Level 4: Finding it quite difficult	15		
Level 5: Finding it very difficult	10		
Additional Children in the Family	157	1.25 (0.99)	

Note. Categorical variables are coded using their category/level numbers. The means (*M*) and standard deviations (*SD*) of non-categorical variables are measured in their natural units (e.g., years of age).

Table 2*Descriptive Statistics of Key Variables*

Seq	Variable Description	Variable Name	<i>n</i>	<i>M</i>	Median	<i>SD</i>	min	max	Skewness	Kurtosis
1	Adolescent's age	YAGE	157	14.737	14.782	1.467	10.801	17.881	−0.151	−0.377
2	Parent's age	PAGE	157	43.930	44	6.882	29	78	0.777	2.963
3	Number of siblings	SIB	157	1.255	1	0.996	0	5	0.788	0.596
4	Household income	INC	156	419.819	387.500	224.650	0.000	1,300.000	1.092	2.228
5	Parental mental health	PMH_SUM	156	14.609	14	5.171	8	32	1.010	0.878
6	Family conflict	CON_SUM	152	3.843	4	2.387	0	9	0.277	−1.085
7	Family cohesion	COH_SUM	152	5.977	6	2.317	1	9	−0.435	−0.912
8	Adolescent's antisocial behavior	ASB_SUM	153	22.768	22	12.442	1	52	0.219	−0.784
9	Perceived economic hardship	HAR	156	2.799	3	0.948	1	5	0.327	0.289

Note. Adolescents' ages (YAGE) are converted from birth months to years while parents' ages (PAGE) are measured in years.

Household income (INC) is measured in thousands of Norwegian Kroner (NOK). Parental mental health (PMH), family conflict (CON), cohesion (COH), and adolescents' antisocial behavior (ASB) are sum scores (_SUM) derived from corresponding questionnaires.

Perceived economic hardship (HAR) is a categorical variable whose codebook is available in [Table 1](#).

Valid number of entries for each variable is recorded in *n* column out of total sample size ($N = 157$). Kurtosis is measured in excess. All statistics are averages across ten imputed datasets.

Table 3*Variance-covariance Matrix and Correlation Table of Key Variables*

Seq	Variable	1	2	3	4	5	6	7	8	9
1	YAGE	2.152	0.257	-0.146	0.101	-0.013	-0.091	0.140	0.038	-0.003
2	PAGE	2.599	47.365	-0.310	0.226	-0.101	0.054	0.083	-0.079	-0.050
3	SIB	-0.214	-2.122	0.992	-0.052	0.009	0.005	-0.002	0.105	-0.004
4	INC	33.367	348.795	-11.532	50,467.613	-0.065	0.010	-0.083	0.030	-0.411
5	PMH_SUM	-0.095	-3.593	0.046	-75.449	26.738	0.414	-0.302	0.403	0.171
6	CON_SUM	-0.319	0.886	0.011	5.111	5.110	5.697	-0.455	0.396	0.199
7	COH_SUM	0.476	1.322	-0.004	-43.410	-3.614	-2.515	5.367	-0.258	-0.062
8	ASB_SUM	0.698	-6.793	1.307	84.089	25.908	11.768	-7.447	154.805	-0.041
9	HAR	-0.004	-0.327	-0.003	-87.556	0.839	0.449	-0.135	-0.481	0.898

Note. This table summarizes variables' variances (diagonal elements, bold), their covariances (lower triangle) and correlations (upper triangle, with heat map).

Table 4*Structural Equation Model Parameters and Fit Indices*

Variable	Model 1		Model 2		Model 3	
	MLR	Bayes	MLR	Bayes	MLR	Bayes
FIXED EFFECTS						
Intercept						
of antisocial behavior (ASB)	0.054		−0.024		0.410	
of family conflict (CON)			0.436		0.108	
of family cohesion (COH)			3.438***		3.465***	
of parental mental health (PHM)					2.320***	
Direct effect						
PMH → ASB	0.402***	0.566**	0.268***	0.260*	0.280***	0.280*
Mediating effect						
PMH → CON → ASB						
PMH → CON			0.413***	0.485***	0.392***	0.448***
CON → ASB			0.270***	0.553**	0.298***	0.590**
PMH → COH → ASB						
PMH → COH			−0.301***	−0.416***	−0.299***	−0.417***
COH → ASB			−0.056	0.097	−0.060	0.100
Serial mediating effect						
Socioeconomic status (SES)						
SES → ASB					−0.160*	−0.214*
SES → CON					0.132*	0.171*
SES → COH					−0.011	0.004
SES → PMH					0.171*	0.193*
Control variables						
Adolescent's age (YAGE)	0.063	0.090	0.102	−0.015	0.109	−0.004
Parents' age (PAGE)	−0.037	−0.015	−0.068	0.039	−0.064	0.033
Number of siblings (SIB)	0.102	0.148	0.097	0.195*	0.095	0.181
Household income (INC)	0.062	0.038	0.048	0.077	−0.018	0.002
Covariance						
RRB ↔ AGG		0.610*		0.638*		0.620
CON ↔ COH			−0.377***	−0.484***	−0.378***	−0.491***

Variable	Model 1		Model 2		Model 3	
	MLR	Bayes	MLR	Bayes	MLR	Bayes
RANDOM EFFECTS						
Residual variance						
of ASB	0.821***	0.548***	0.743***	0.458***	0.722***	0.440***
of RRB		0.638***		0.682***		0.639***
of AGG		0.548***		0.368***		0.353***
of CON			0.829***	0.765***	0.811***	0.735***
of COH			0.910***	0.827***	0.909***	0.820***
of PMH					0.971***	0.963***
MODEL FIT INDICES						
Log-likelihood	−10,113.419		−10,072.121		−10,333.277	
Number of free parameters	135	183	140	206	144	208
AIC	20,496.838		20,424.242		20,954.554	
BIC	20,909.431		20,852.117		21,394.653	
SRMR	0.230		0.229		0.229	
R^2						
of ASB	0.179**	0.452***	0.257***	0.542***	0.278***	0.560***
of RBB		0.365***		0.318***		0.361***
of AGG		0.362***		0.632***		0.647***
of CON			0.171**	0.235***	0.189**	0.265***
of COH			0.090*	0.173***	0.091*	0.180***
of PMH					0.029	0.037***

Note. This table summarizes the model building process. Model 1 only proposes a direct relationship between parental mental health (PMH) and adolescent's antisocial behavior (ASB). Mediators are then introduced in Model 2 to account for the effects of family conflict (CON) and family cohesion (COH) on ASB. Finally, socioeconomic status (SES) is hypothesised to influence every existing variable in Model 3. All statistics are pooled results over ten imputed datasets. Significance tests are two-tailed.

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

Appendix A

Ethics Approval

This study was approved by the Regional Committee for Medical and Health Research Ethics (REK Sør-Øst, Norway) (REK reference number 2019/1589). All participants gave written informed consent. The study was conducted in accordance with the *Declaration of Helsinki*.

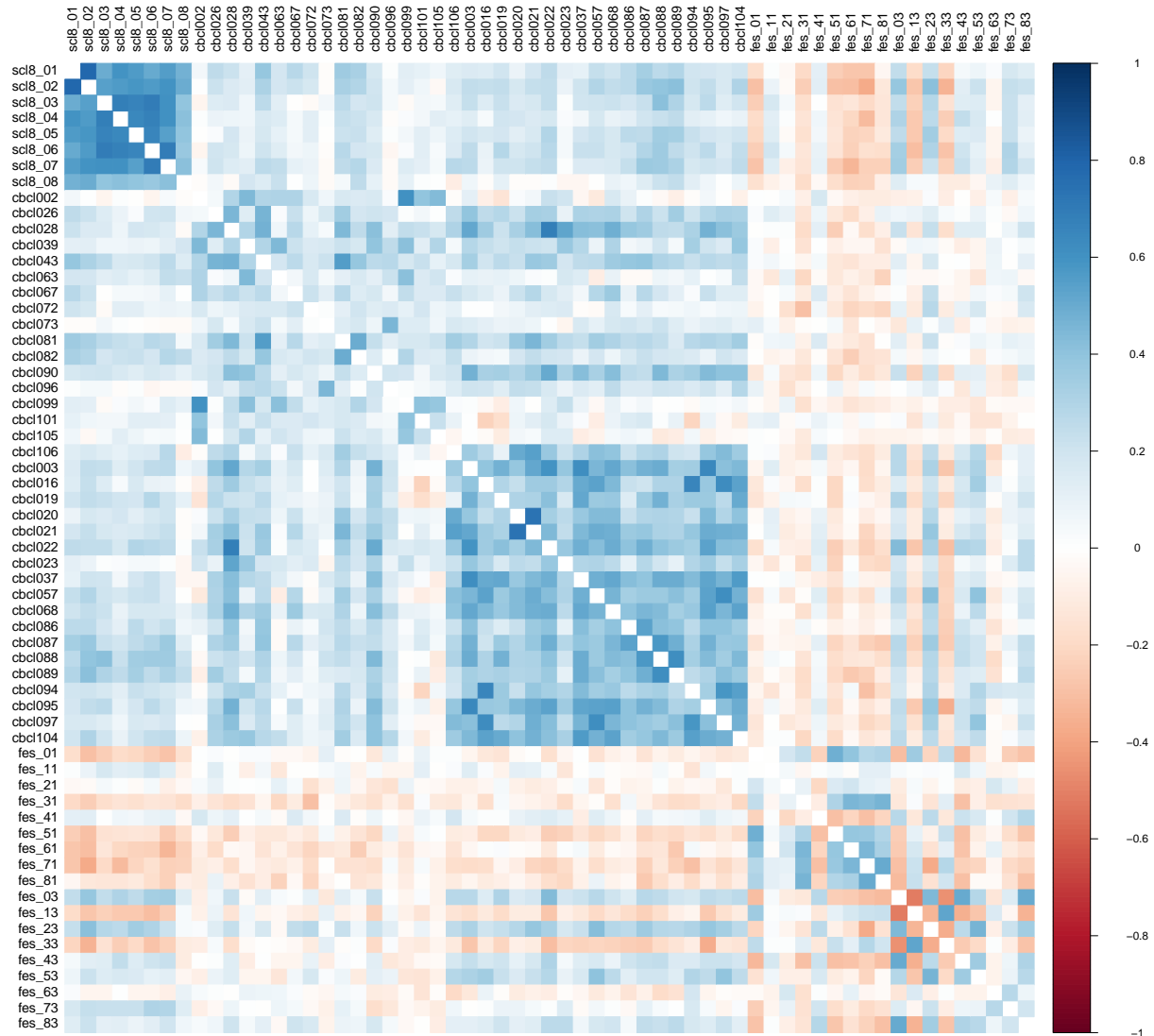
Appendix B

Latent Variables

Overview of the Measurement Models

Figure B1

Correlogram of the Questionnaire Items



Measurement Models of Parental Mental Health (PMH)

Measurement Models of Family Conflict (CON)

Measurement Models of Family Cohesion (COH)

Measurement Models of Adolescent Antisocial Behavior (ASB)

Rule-breaking Behavior (RBB)

Aggression (AGG)