Family processes and child psychopathology: A between- and within-family/child analysis

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Declarations

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Ethics approval: ABCD research sites obtained ethical approvals through a central Institutional Review Board (cIRB) at the University of California, San Diego, except that the site at Washington University in St. Louis utilized their local IRB approval. NIH-recognized research institutions can access the de-identified ABCD data with federal-wide assurance. According to the IRB of Stony Brook University, the current use of the ABCD data for secondary analysis is exempt from IRB review.

Consent to participate: Informed consent and assent of parents and children were obtained before the baseline assessment.

Consent for publication: Informed consent and assent of parents and children were obtained before the baseline assessment. NIH-recognized research institutions can access the de-identified ABCD data with federal-wide assurance.

Code availability. The current analyses were conducted based on open-source R packages.

Abstract

A vast array of family processes is linked to child mental development, among which (1) low parental acceptance and (2) high family conflict are known as transdiagnostic risk factors for child internalizing and externalizing psychopathology. In contrast to most prior research adopting cross-sectional or lagged designs, the current study applied fine-grained multilevel modeling to elucidate the complex relationships among parental acceptance, family conflict, and child psychopathology, considering the nesting structure of children within families and longitudinal changes within children. We focused on preadolescents from the two-wave Adolescent Brain Cognitive Development Study ($N = 4,953$; aged 9-12) and accounted for parental psychopathology and sex differences. Our findings suggest that consistent between-family and between-child differences in parental acceptance play a transdiagnostic role for both child internalizing and externalizing psychopathology, whereas family conflict is only significantly associated with externalizing psychopathology. Additionally, short-term within-family and within-child improvements in parental acceptance and family conflict across one year were associated with decreased externalizing, but not internalizing, psychopathology. These findings support the potential importance and feasibility of targeting these family process factors for child externalizing problems outside of an intensive treatment setting. We further discussed how such findings serve as a foundation for future research on family processes and child internalizing problems. The varying results across different grouping levels highlight the importance of decomposing within- from between-family/child effects in future studies on family processes and child psychopathology.

Keywords: family process, parenting, preadolescent, internalizing psychopathology, externalizing psychopathology

FAMILY PROCESSES AND CHILD PSYCHOPATHOLOGY

Family Processes and child psychopathology: A between- and within-family/child analysis

Family is the first social context where children learn to understand, express, and regulate emotions; thus, family characteristics and interactions (i.e., family processes) are pivotal to children's emotional development and mental wellbeing (Conger, Conger, & Martin, 2010; Samania, 2011; Sheeber, Hops, & Davis, 2001). To capture the multifaceted nature of family processes, Schleider and Weisz (2017) proposed a triadic model dividing family processes into the parent, dyad, and family levels. Parent-level factors include parental characteristics (e.g., parental psychopathology) and inter-parental interactions (e.g., intimate partner violence). Dyad-level factors encompass parent-child interactions (e.g., parental acceptance) and inter-sibling interactions (sibling relationship quality). Family-level factors involve family characteristics (e.g., family stability) and family dynamics (e.g., family emotion expression).

Numerous questions remain concerning the *longitudinal* unfolding of various family process factors in relation to child psychopathology at the *individual* level. The current study examined the longitudinal importance of specific factors of family processes in child psychopathology, with a focus on preadolescence: a sensitive period for emotional development in the family context (Halberstadt & Eaton, 2002) and a preceding phase to the typical onset of mood disorders (Avenevoli, Knight, Kessler, & Merikangas, 2008). To accomplish this objective, we selected two well-studied factors—(1) parental acceptance and (2) family conflict—as potentially important dyad- and family-level factors of family processes, focusing on their relations with child psychopathology across a 1-year period.

Family Processes as Transdiagnostic Risk Factors

Family processes include miscellaneous parent-, dyad- and family-level factors. Among all, (1) low parental acceptance and (2) high family conflict are commonly suggested as

FAMILY PROCESSES AND CHILD PSYCHOPATHOLOGY

transdiagnostic risk factors for a broad range of psychiatric disorders classified into the *internalizing* and *externalizing* spectra of psychopathology (Achenbach, 1985; Eaton, 2015; Krueger et al., 2018; Olino, Bufferd, et al., 2018). Parental acceptance is defined as parental affection and compassionate responses towards children and their emotional needs (Rohner, Khaleque, & Cournoyer, 2003). The absence of parental acceptance is shown to predict later externalizing, but not internalizing, problems in middle childhood (aged 6 to 8; Eisenberg et al., 1999; McCarty, Zimmerman, Diguseppe, & Christakis, 2005), predict both internalizing and externalizing problems in preadolescence (aged 8-12; Eisenberg et al., 1999; Rothenberg et al., 2020), and are associated with both problems in adolescents (aged 12 to 18; Buckholdt, Parra, & Jobe-Shields, 2014).

Family conflict refers to active opposition, criticism, and hostility among family members. Highly conflictual family environments are hypothesized to impact a child's emotion expression and regulation through social learning (see Bariola, Gullone, & Hughes, 2011). Cross-sectional studies suggest that family conflict is associated with children's (aged 7-10) and adolescents' (aged 13-17) internalizing (Jouriles, Rosenfield, McDonald, & Mueller, 2014; Timmons & Margolin, 2015) as well as externalizing problems (Richmond & Stocker, 2006; Timmons & Margolin, 2015). Contrary to the causal direction proposed by social learning theory, some longitudinal studies suggest child behavioral problems lead to elevated parental hostility/criticism and not vice versa (Cartwright et al., 2011; Hale et al., 2011). In sum, parental acceptance and family conflict are crucial dyad- and family-level factors of family processes associated with elevated transdiagnostic risk for internalizing and externalizing psychopathology in children and adolescents.

Critical Moderators and Confounders

FAMILY PROCESSES AND CHILD PSYCHOPATHOLOGY

The sex of a child, sibling relationships, and parental psychopathology are known moderators and/or confounders in the relationships of the dyad- and family-level factors with child psychopathology. Children of different sexes are subject to differential parental attention and reinforcement (Chaplin, Cole, & Zahn-Waxler, 2005), hypothetically leading to more internalizing emotions (e.g., sadness, anxiety) in girls and more externalizing emotions (e.g., anger) in boys (Aldao & Chaplin, 2013). Children also show sex-related differential neuroendocrine reactivity to adverse family environments (Doom, Cicchetti, Rogosch, & Dackis, 2013). Additionally, sibling relationships can directly influence dyad- and family-level factors, and in turn, children's developmental trajectories (McHale, Updegraff, & Whiteman, 2012). On the one hand, sibling modeling and interactions create a shared developmental environment and increase sibling similarity (McGuire, Palaniappan, & Larribas, 2015). On the other hand, nonshared sibling experiences (e.g., differential parental treatment) can further amplify the variability of symptom endorsement associated with individual vulnerability to psychopathology (Jenkins & Bisceglia, 2011; McHale et al., 2012).

Similarly, parental psychopathology (including maternal/parental depression and substance use) can play multiple roles in the association of the dyad- and family-level factors with child psychopathology. Parental psychopathology affects not only parenting behaviors and family environments but also the child's inherited characteristics (e.g., melancholic or choleric temperaments, impulsivity, vulnerability to psychopathology), which may further reinforce the maladaptive parent-child dyad and family environment (Belsky & Jaffee, 2006; Zahn-Waxler, Duggal, & Gruber, 2002). Thus, accounting for the complexity of family composition such as the sex of a child, sibling relationships, and parental psychopathology can better elucidate the relationship among parental acceptance, family conflict, and child psychopathology.

FAMILY PROCESSES AND CHILD PSYCHOPATHOLOGY

Limitations in Previous Research

Despite the burgeoning body of research on the relationship of parental acceptance and family conflict with child psychopathology, several limitations persist in the literature. The literature rests on theoretical models that posit these family processes as the *causal* factors in the development and maintenance of child psychopathology (McLeod, Weisz, & Wood, 2007). Common theoretical models include parental acceptance-rejection theory (Rohner et al., 2003) and social learning theory (Dishion, Patterson, & Griesler, 1994). Parental acceptance-rejection theory proposes that the absence of parental acceptance results in an insecure child with low self-esteem and negative self-schema, contributing to later psychosocial impairment. Social learning theory postulates that children learn emotion regulation and expression skills through modeling of parents' behaviors. The absence of proper role models leads to children's emotional and behavioral difficulties.

However, most studies on these family process factors and child psychopathology are cross-sectional (see Schleider & Weisz, 2017; Sheeber et al., 2001; van Eldik et al., 2020). Even among a handful of longitudinal studies, few of them disaggregate within-person from between-person effects, despite research showing that most group-level findings cannot be directly applied to individuals (Curran & Bauer, 2011). A few longitudinal studies focused on parental expressed emotion on the ADHD population have demonstrated the importance of a multilevel approach to tease apart the cross-sectional and longitudinal effects at different grouping levels (e.g., population, family, vs. child levels; Cartwright et al., 2011; Richards et al., 2014; see also Hale, Raaijmakers, Van Hoof, & Meeus, 2011 for a non-clinical community sample). The *longitudinal* relationships among parental acceptance, family conflict, and child

FAMILY PROCESSES AND CHILD PSYCHOPATHOLOGY

psychopathology at *different grouping levels* are critical to understanding family processes and child psychopathology.

The Present Study

The current study investigated the relationships of the two well-studied dyad- and family-level family process factors—(1) parental acceptance and (2) family conflict—with child internalizing and externalizing psychopathology. This study used a large longitudinal sample of preadolescents to obtain greater power and generalizability and unfold the relationships at the individual level. Additionally, we accounted for child sex differences, sibling constellations, and parental psychopathology in the models. Critically, we disaggregated the sources of variance in the two family process factors in relation to child psychopathology. Five different sources of such variance were identified: (1) consistent between-family and (2) between-child differences averaged across time, (3) within-family and (4) within-child changes over time, and (5) within-family sibling differences.

We hypothesized that: ($H_{1..}$) between-family, ($H_{2..}$) between-child, ($H_{3..}$) within-family, and ($H_{4..}$) within-child variance of ($H_{PA..}$) *greater* parental acceptance and ($H_{FC..}$) *less* family conflict would be associated with ($H_{INT..}$) *less* preadolescent internalizing and ($H_{EXT..}$) *less* externalizing psychopathology. With limited previous findings, we took an exploratory approach to sex differences and the relationship of within-family sibling differences in perceived family process factors with child psychopathology. With precise disaggregation of sources of variance in parental acceptance and family conflict using longitudinal data of a nested family structure, results may further clarify the complex relation of the two family process factors with psychopathology in preadolescents.

Method

FAMILY PROCESSES AND CHILD PSYCHOPATHOLOGY

Participants

This study utilized data from participants who completed the first two waves of the Adolescent Brain and Cognitive Development (ABCD) Study, Curated Annual Release 2.0. The ABCD Study is designed to follow youths recruited at ages 9 and 10 into their young adulthood. The first wave was fielded in 2016-2017. The second wave was fielded in the following year, and additional children were recruited as an expanded sample, resulting in an overall sample size of 11,875 children. Since the second wave of the expanded sample was not completed at the time of this study, we included only those participants for whom both waves of data were available ($N = 4,951$). The ABCD Study collected a wide variety of participant data, including brain imaging, biomarkers, cognitive functioning, mental and physical health, family history, and environmental factors. For details regarding data collection, please see Barch et al. (2018).

Girls composed 47.88% of the current sample, and 15.54% of families had multiple children participate ($M = 2.05$, $SD = 0.28$), within which 51.21% were female children, 39.66% were brother siblings, 40.83% were sister siblings, and 19.51% were brother-sister siblings. The racial/ethnic composition was as follows: White: 81.22%; Hispanic: 19.01%; Black or African American: 14.74%; Asian: 6.42%; American Indian or Alaskan Native: 3.31%; Pacific Islander: 0.61%; others: 0.91%; unknown: 1.13%; 27.13% endorsed multiple racial/ethnic identities. The family annual income composition was as follows: less than \$25,000: 10.10%, \$25,000-\$49,000: 11.98%; \$50,000 - \$99,999: 28.12%; \$100,000 and greater: 41.61%; unknown 7.39%. The composition of the highest parental education degree was as follows: below high school: 3.82%; high school graduate or equivalent: 7.97%; some college or associated degree: 24.92%; Bachelor's degree: 22.86%; Master's degree 25.73%; professional school (e.g., MD) or PhD Degree: 11.82%. The average day between assessment was 369 days.

FAMILY PROCESSES AND CHILD PSYCHOPATHOLOGY

ABCD research sites obtained ethical approvals through a central Institutional Review Board (cIRB) at the University of California, San Diego, except that the site at Washington University in St. Louis utilized their local IRB approval. Informed consent and assent of parents and children were obtained before the baseline assessment. Guardians and children are reimbursed with \$200 to the guardian and \$100 worth of gifts or gift cards to the child. Please see Barch et al. (2018) and Garavan et al. (2018) for details regarding the data collection process. All sites have complied with the ethical regulations during data collection, release, and analysis (Auchter et al., 2018). NIH-recognized research institutions can access the de-identified ABCD data with federal-wide assurance. According to the IRB of Stony Brook University, the current use of the ABCD data for secondary analysis is exempt from IRB review.

Assessment

Parental acceptance. The shortened Acceptance Subscale from the Children's Reports of Parental Behavior Inventory (CRPBI; Schaefer, 1965) was used to assess child-perceived parental acceptance in both waves. Children responded to items describing caregivers' acceptance behaviors (e.g., "makes me feel better after talking over my worries with him/her") using five items scored on a three-point scale (Zucker et al., 2018). The scale had Cronbach's alphas of .77 for both waves. Children reported on both their primary and secondary (if they had one) caregivers. Over 92% of children reported parenting behaviors for both a primary and secondary caregiver. Children only specified their relationships with the primary, but not secondary, caregiver. The mean value of the two caregivers (when appropriate) in each wave was used in the following analyses. Children's perceptions of their primary and secondary caregivers' levels of acceptance were correlated $r = .38$ at Wave 1 and $r = .43$ at wave 2.

FAMILY PROCESSES AND CHILD PSYCHOPATHOLOGY

The correlations of perceived parental acceptance between the two caregivers were .38 and .43 in the first and second waves.

Family conflict. The Family Conflict subscale of the Moos Family Environment Scales (FES; Moos & Moos, 1994) was used to measure youth-perceived negative-dominance family emotion expression in both waves, with Cronbach's alphas of .68 and .66 for the first and second wave. The measure contained nine binary true/false items assigned with a value of 0 or 1 (e.g., "family members often criticize each other") based on appropriate reverse coding rules (Zucker et al., 2018). The sum of each wave was used in subsequent analyses, where higher scores indicate a more conflictual family environment.

Dimensional parent and child psychopathology. Achenbach Adult Self Report (ASR) Questionnaire and Child Behavior Checklist (CBCL) were used to assess dimensional parental and child psychopathology, respectively. The ASR and CBCL are widely used clinical questionnaires normed by demographic factors, including sex, age, ethnicity, and informant. The ASR is a self-report measure designed for adults aged 18- to 59-years-old. Cronbach's alphas of .93 and .89 for internalizing and externalizing adult psychopathology (Achenbach & Rescorla, 2003). CBCL is a parent-report measure designed for children aged 6- to 18-year-olds. Cronbach's alphas of .90 and .94 for internalizing and externalizing child psychopathology (Achenbach & Rescorla, 2001). (No youth-report dimensional psychopathology was assessed in the ABCD data. See the discussion section for debates on child psychopathology informants). Parental psychopathology was only assessed in the first wave, whereas child psychopathology was measured in both waves. The *T*-scores of the internalizing and externalizing spectra of parental and child psychopathology were used in the following analyses. Five and three percent of parents reported clinically elevated (*T*-score > 65) internalizing and externalizing

FAMILY PROCESSES AND CHILD PSYCHOPATHOLOGY

psychopathology. Seven and three percent of children were reported with clinically-elevated (T -score > 65) internalizing and externalizing psychopathology. Clinically elevated T -scores were not excluded from the sample.

Statistical Analyses

Multilevel modeling (MLM; Hoffman, 2007, 2015) was used to account for the hierarchical nature of this data set. We conducted models using child internalizing and externalizing psychopathology as two separate outcome variables, explained by parent acceptance, family conflict, parental psychopathology, and child sex differences. The first level of these models represented individual (personal-level) scores of the constructs noted above (i.e., parent acceptance, family conflict, and child psychopathology) in each wave. The second level pertained to mean scores of longitudinal assessment averaged across waves for each child and the sex of a child. The third level regarded mean scores of longitudinal assessment averaged across waves and across siblings for each family and baseline parental psychopathology.

MLM was conducted using *nlme 3.1-148* (Pinheiro, Bates, DebRoy, Sarkar, & R Core Team, 2020) in *R*, estimated with maximum-likelihood function and unstructured covariance matrices. We examined the normality of error distributions for all models to ensure the underlying assumption of maximum-likelihood function was met (Maas & Hox, 2004). Random intercepts of children nested within families were allowed in all models. We first estimated empty (M0) and unconditional growth models (M1) for child internalizing and externalizing psychopathology as baseline models and calculated their intraclass correlation coefficients (ICCs; the proportion of variance in the outcome variable that is explained by the grouping structure [here, children nested below families]). Subsequently, we estimated a series of

FAMILY PROCESSES AND CHILD PSYCHOPATHOLOGY

conditional growth models to investigate the relationships between family process factors and child psychopathology over time.

In the conditional growth models, child internalizing and externalizing psychopathology (*level 1*) were the outcome variables of two different sets of models. We modeled these two outcome variables as a function of time (*level 1*), parental acceptance (*level 1*), and family conflict (*level 1*) while accounting for parental psychopathology (*level 3*). To differentiate the sources of variance in parental acceptance and family conflict, we centered them in three different ways.

In the first conditional growth model (M2), we mixed all sources of variance using raw parental acceptance and family conflict scores. In the second model (M3), we centered individual scores (at each wave, individually) of parental acceptance and family conflict around their personal means (across waves). Personal-mean-centered individual scores (*level 1*: within-child differences) were added into the model along with their personal means (*level 2*: between-child differences). In the third model (M4), we centered individual scores around their personal means, and personal means around their grand family means. Personal-mean-centered individual scores (*level 1*: within-child differences), grand-family-mean-centered personal means (*level 2*: within-family sibling differences averaged across waves), and grand family means (*level 3*: between-family differences) were introduced to the model. In the fourth one (M5), we centered individual scores around their family means in each wave, and family means around their grand family means across waves. Family-mean-centered individual scores (*level 1*: within-family sibling differences in each wave), grand-family-mean-centered family means (*level 2*: within-family differences), and grand family means (*level 3*: between-family differences) were added to the model. Additionally, we examined the main effects of sex and interaction effects between sex

FAMILY PROCESSES AND CHILD PSYCHOPATHOLOGY

and each of the family process factors on child psychopathology at different grouping levels. We also examined if sex effects varied by sibling constellations (i.e., all brothers, all sisters, and brother-sister relationships).

We reported standardized model coefficients for all variables, except wave, because the unit of the wave variable has a practical meaning (0 = baseline wave; 1 = follow-up wave). Conditional growth models were compared to the baseline models using log-likelihood ratio tests and compared to each other using the Bayesian Information Criterion (BIC). The BIC is commonly used in non-nested model comparisons, and a lower BIC score indicates a parsimonious model of better fit (Raftery, 1995). Finally, we calculated the pseudo-*R*-squared for fixed effects (i.e., family processes and parental psychopathology) on child internalizing and externalizing psychopathology (Rights & Cole, 2018). Pseudo-*R*-squared reflects the proportion of variance in child psychopathology that can be further explained by family processes and parental psychopathology compared to the M0 baseline models (i.e., the models that accounted for the hierarchical structure [here, children within families and longitudinal changes within children] and allowed for random intercepts).

Results

Descriptive Statistics, Intraclass Correlation Coefficients, and Pairwise Correlations

Table 1 shows the descriptive statistics, intraclass correlation coefficients (ICCs) of the time-variant variables, and pairwise between-person correlations among all the variables. ICC at the child level indicates the proportion of variance explained by between-child differences and is equivalent to correlation over time across the two waves. Between-child differences can be further partitioned into between-family (i.e., ICC at the family level) and between-sibling differences (i.e., the difference between ICCs at the child and family levels). Between-child

FAMILY PROCESSES AND CHILD PSYCHOPATHOLOGY

differences explained half of the variance across children in reports of parental acceptance and family conflict; between-child differences also explained around 70% of the variance across children in internalizing and externalizing psychopathology. Between-child differences in parental acceptance and child psychopathology were mainly due to between-family differences instead of within-family sibling differences. However, siblings tended to report different levels of family conflict within the same household. Further, time-variant variables were averaged across waves to compute between-child correlations among personal means. All variables, other than parental acceptance, were positively associated with each other. Parental acceptance ($p = .017$) and family conflict ($p = .002$) showed larger associations with child externalizing than internalizing psychopathology.

Multilevel Modeling

The results of fixed effects of multilevel models are displayed in Table 2. The effective sample size (excluding missing values) was 4,922. The degrees of freedom for fixed effects (Table S1), random effects and model indices (Table S2) and correlations among model coefficients (Table S3-S7) are shown in the Supplementary Materials. In the unconditional growth model (M1), child internalizing psychopathology showed nonsignificant change over time, whereas child externalizing psychopathology significantly decreased over time. In the model of mixed sources of variance (M2, resembling a cross-sectional analysis), *greater* parental acceptance and *less* family conflict were associated with *less* child internalizing and externalizing psychopathology.

In the conditional growth models (M3-M5) where we disaggregated different sources of variances, ($H_{1.PA}$) children in families of *consistently greater* parental acceptance (averaged across siblings and waves; i.e., between-family differences) and ($H_{2.PA}$) children personally

FAMILY PROCESSES AND CHILD PSYCHOPATHOLOGY

reporting *consistently greater* parental acceptance (averaged across waves; i.e., between-child differences) exhibited *less* internalizing and externalizing psychopathology. Contrarily, ($H_{1.FC}$) between-family and ($H_{2.FC}$) between-child differences in family conflict were associated with child externalizing, but not internalizing, psychopathology, where *less* family conflict was associated with *less* externalizing psychopathology.

Short-term improvements in parental acceptance and family conflict over time ($H_{3..}$) in the families (averaged across siblings; i.e., within-family differences) and ($H_{4..}$) of personal experiences (i.e., within-child differences) were associated with *less* child externalizing, but not internalizing, psychopathology.

No significant associations between within-family sibling differences in family process factors and child psychopathology were reported. We examined the main effects of sex and interaction effects between sex and each of the two family process factors in M2-M5. The only significant sex effect was the interaction term between sex and within-family sibling differences in each wave with child externalizing psychopathology. The relationship between *greater* parental acceptance and *less* externalizing psychopathology was stronger when male children reported higher levels of parental acceptance than their siblings ($\beta = -0.03$, $SE = 0.01$, $p = .045$). This interaction effect only occurred in single-wave comparisons (i.e., using family means of each wave) and did not occur as a long-lasting effect across waves (i.e., using grand family means averaged across waves). No sex-effects significantly varied by sibling constellations (i.e., all brothers, all sisters, brother-sister). The pseudo- R -squared values of fixed effects in the conditional growth models (i.e., the proportion of variance in the outcome variable explained by the independent variables, compared to the M0 baseline model) were .24-.25, suggesting a

FAMILY PROCESSES AND CHILD PSYCHOPATHOLOGY

medium-to-large effect size (Cohen, 1988) of family process factors *and* parental psychopathology on child internalizing and externalizing psychopathology.

Discussion

General Findings

The results of multilevel mixed-effects modeling with the ABCD data of 4,951 preadolescents revealed the complexity of the transdiagnostic relationships among parental acceptance, family conflicts, and child psychopathology. Our findings partially supported our hypotheses: ($H_{1.PA}$) *higher levels* of between-family and ($H_{2.PA}$) between-child parental acceptance were associated with *less* child internalizing and externalizing psychopathology; ($H_{1.FC.EXT}$) *lower levels* of between-family and ($H_{2.FC.EXT}$) between-child family conflict were associated with *less* child externalizing psychopathology; ($H_{3.EXT}$) short-term *improvements* in within-family and ($H_{4.EXT}$) within-child parental acceptance and family conflict were associated with *less* child externalizing psychopathology. However, we found nonsignificant associations of ($H_{1.FC.INT}$) between-family and ($H_{2.FC.INT}$) between-child family conflict with child internalizing psychopathology. Similarly, ($H_{3.INT}$) within-family and ($H_{4.INT}$) within-child changes in parental acceptance and family conflict were not significantly associated with child internalizing psychopathology.

The exploration of sex and within-family sibling difference effects on child psychopathology mostly yielded nonsignificant results. Although the results showed a significant short-term moderating effect (in each wave, but not averaged across waves) that males showed a stronger relationship between within-family sibling variation in parental acceptance and child externalizing psychopathology, the p-value was only .045. The effect was not stable when averaged across waves. Considering the large sample size, we refrain from interpreting this

FAMILY PROCESSES AND CHILD PSYCHOPATHOLOGY

isolated p-value with certainty. Sibling constellations (i.e., same- and different-sex siblings) did not significantly moderate within-family sibling differences in family process factors and child psychopathology.

Interpretation of Findings

We replicated some previous research findings and further revealed the complexity in the relationship between parental acceptance, family conflict, and preadolescent psychopathology at different grouping levels (i.e., population, family, and individual levels). Most existing studies in this domain have not accounted for the nesting structures of children within families and changes within individuals over time (for reviews, see Schleider & Weisz, 2017; van Eldik et al., 2020). Without variance disaggregation, our models (M2) yielded similar findings to previous research, wherein *greater* parental acceptance and *less* family conflict were significantly associated with *less* child internalizing and externalizing psychopathology. However, when we examined these relationships at different grouping levels (i.e., population, group, and individual levels), the current findings did not support all the hypotheses derived from previous cross-sectional or lagged-design studies (see General Findings above). This fine-grained approach exploits the strength offered by longitudinal data (Curran & Bauer, 2011) and highlights the importance of disaggregating between- and within-family/child effects in the research of family processes and child psychopathology.

(H_{1..}) Consistent between-family and (H_{2..}) between-child differences. Our findings suggest a significant association between child-perceived parental acceptance and general child psychopathology at the between-family and between-child levels, consistent with the parental acceptance-rejection theory and previous cross-sectional studies on parental acceptance and child psychopathology (e.g., Buckholdt et al., 2014; Rohner, 1980; Rohner et al., 2003). Contrary to

FAMILY PROCESSES AND CHILD PSYCHOPATHOLOGY

our expectation, family conflict emerged as a possible risk factor for child externalizing, but not internalizing, psychopathology. The significant associations between family conflict and child externalizing psychopathology at the between-family and between-child levels fit with past cross-sectional and longitudinal studies (e.g., Ramos, Guerin, Gottfried, Bathurst, & Oliver, 2005; van Eldik et al., 2020). Per social learning theory, high-conflict environments may reduce children's opportunities to learn and acquire emotion regulation and expression skills (Bariola et al., 2011). Some studies have also demonstrated an opposite association, whereby child externalizing problems lead to more family conflict (Cartwright et al., 2011; Hale, Keijsers, et al., 2011). The current study was not designed to elucidate the immediate causal direction between family conflict and child externalizing problems. Future studies may utilize dynamic assessment, such as experience sampling methods, to clarify the moment-to-moment causal links—in both directions—between family conflict and child externalizing problems.

The nonsignificant findings of family conflict with child internalizing psychopathology can be explained in several ways. One possible interpretation is that children with higher vulnerability to internalizing psychopathology may rely on avoidance coping strategies to reduce frequency and severity of conflicts, creating fewer opportunities for them to be involved in the conflicts themselves (see Biglan et al., 2015). However, they may still be indirectly exposed to some conflict between other family members (e.g., interparental conflicts). Individual differences in the use of avoidance-coping (e.g., which may be low in some depressed youth, such as those with comorbid impulsive aggression; Carver, Johnson, & Joormann, 2008) and direct versus indirect exposure to family conflicts (e.g., interparental conflicts vs. parent-child conflict) may yield an *overall* nonsignificant relationship despite potential subgroups-specific trends. This hypothesis requires further investigation accounting for children's coping strategies with family

FAMILY PROCESSES AND CHILD PSYCHOPATHOLOGY

conflict and precise assessment of the types of family conflicts. This type of investigation may be best conducted within the framework of the bioecological model (Bronfenbrenner & Morris, 2007), where child development is depicted as a joint function of dynamical interactions among individual characteristics and different levels of interconnected environmental systems (e.g., micro-, meso-, exo-, macro-system).

Another potential interpretation is that parental acceptance plays a buffering role between family conflict and child internalizing problems (Fogarty, Wood, Giallo, Kaufman, & Hansen, 2019; Graham-Bermann, Gruber, Howell, & Girz, 2009). The correlations among model coefficients showed that family conflict explained *less* variation of child internalizing psychopathology in families/children reporting *greater* parental acceptance ($r_{\text{family}} = 0.41$; $r_{\text{child}} = 0.39$; both $p < .001$; see Supplementary Materials). As the participants were non-clinical samples and mostly reported medium to high parental acceptance, family conflict was *not* a prominent indicator of child internalizing psychopathology in the current sample. The buffering role of parental acceptance in the relationship between family conflict and child internalizing problems is worth further investigation of clinical samples.

(H3..) Short-term within-family and (H4..) within-child changes. Short-term within-family and within-child changes in parental acceptance and family conflict across a one-year period were only significantly associated with child externalizing, but not internalizing psychopathology. The short-term within-family/child relationship between changes in parental acceptance, family conflict, and child externalizing psychopathology is supported by the core theory of positive parenting training programs (Barkley, 2013; Kazdin, 2018; Sanders, 1999). These programs propose that child behavioral problems precipitate family conflict (see also Cartwright et al., 2011; Hale et al., 2011), and negative parental emotion expression (e.g.,

FAMILY PROCESSES AND CHILD PSYCHOPATHOLOGY

absence of parental acceptance and high hostility) can further exacerbate children's behavioral problems, resulting in a vicious cycle. Thus, these programs focus on directly improving accepting and responsive parenting practices to reshape a child's behaviors (e.g., parent-child interaction therapy, level 4 Triple P (Sanders, 1999; Zisser & Eyberg, 2010)).

Counter evidence suggests that parental expressed emotion (including parental warmth and family conflict components) is a momentary state and does not have a longitudinal relationship with child externalizing problems in the six-year follow-up (Richards et al., 2014). Our results did not necessarily contradict previous findings. First, the follow-up wave in the current study was only one year later. Second, the within-family and within-child relationship had a very small effect size (although highly significant given the sample size). The previous study may not have enough power to detect such a small effect. Although small effects should be treated cautiously, a small effect of a single event is considered *clinically critical* when the individual will be frequently exposed to the same event (Funder & Ozer, 2019). As supporting evidence, clinical trials of positive parenting training programs focusing on directly improve parental warmth and reduce family conflict have shown large effects on improving child externalizing problems (De Graaf, Speetjens, Smit, De Wolff, & Tavecchio, 2008; Thomas, Abell, Webb, Avdagic, & Zimmer-Gembeck, 2017). Our findings based on a community sample further suggest the potential feasibility of targeting parental warmth and family conflict outside of an intensive treatment setting. Future research may focus on facilitating improvement in these family processes without intensive intervention (e.g., psychoeducation) and examining effects on *mild to moderate* child externalizing problems. The severity of child externalizing problems may hinder parents' ability to maintain acceptive parenting and a low conflictual environment (see Cartwright et al., 2011; Hale, Keijsers, et al., 2011). For severe externalizing problems, a more

FAMILY PROCESSES AND CHILD PSYCHOPATHOLOGY

intensive treatment setting and child symptom reduction with medication may be required.

Studies on service matching with child symptom severity is another crucial topic pending further research.

The nonsignificant relationship between short-term changes in parental acceptance and child internalizing psychopathology can be explained in several ways. An intuitive supposition would be that parents are less sensitive to short-term changes in child internalizing than externalizing psychopathology (Klaus, Mobilio, & King, 2009), and therefore we cannot capture within-person associations with internalizing psychopathology based on parent reports. However, the results of unconditional growth models indicated that around 30% of the variance in child internalizing psychopathology was due to within-family/person changes over time. This proportion was similar to the one of child externalizing psychopathology. We further discuss the controversy between parent- and child-report data sources in the limitations section. In short, the current findings can be better explained beyond being reflections of just measurement error.

The other interpretation is that *short-term* parental acceptance changes are more likely to induce rapid, externally visible improvement in emotion regulation related to externalizing than internalizing symptoms. Positive parenting training has been recommended as a first-line, evidence-based treatment for child externalizing disorders (American Academy of Pediatrics, 2018), while its effects on child internalizing disorders remain obscure. Most modified positive parenting training programs for child internalizing disorders utilize parents as the medium to conduct CBT therapy with children. For example, PCIT-CALM focused on training parents to facilitate exposure therapy for child anxiety (Comer, del Busto, Dick, Furr, & Puliafico, 2018). PCIT-ED focused on training parents to improve children's emotion recognition, expression, and utilization of relaxation techniques (Luby, Lenze, & Tillman, 2012). Mixed components in

FAMILY PROCESSES AND CHILD PSYCHOPATHOLOGY

modified positive parenting programs render it difficult to detect the exact mechanisms of change in child internalizing problems.

Some studies showed that CBT with an adjunct family component has not been more effective than CBT alone (Lewinsohn, Rohde, & Seeley, 1998; The TADS Team, 2004). Some evidence suggests that stand-alone parent-based treatment can be as effective as CBT on child anxiety (Lebowitz, Marin, Martino, Shimshoni, & Silverman, 2020). However, this type of parent-based treatment mainly focused on parental accommodation behavior, not parental acceptance (Lebowitz, Omer, Hermes, & Scahill, 2014). Further research on (1) the sufficient amount and length of change in parental acceptance to improve child internalizing symptoms, (2) the incorporation of other critical parenting components (e.g., parent accommodation behaviors, emotion-related parenting practices), and (3) treatment on parent-level factors that are broadly associated with long-term differences in family processes, such as parental psychopathology (Schleider & Weisz, 2017; Vreeland et al., 2019) are warranted.

Limitations

First, the current study was based on a nationwide survey, which, inevitably, led to a trade-off between breadth and depth in measurement. The ABCD study did not comprehensively assess the construct of family processes, focusing instead on select constructs of interest. It lacked rigorous measures for other commonly identified family process factors in child mental development, such as interparental interactions (Teubert & Pinquart, 2010), emotion-related parenting behaviors (Morris, Silk, Steinberg, Myers, & Robinson, 2007), and autonomy versus focused parenting styles (McLeod et al., 2007). Additionally, family conflict was not differentiated based on situations (e.g., parental conflict vs. parent-child conflict). Further, we could not separate the effects of maternal and paternal acceptance on child psychopathology

FAMILY PROCESSES AND CHILD PSYCHOPATHOLOGY

because the ABCD study did not assess the child's relationship with their secondary caregiver. Nevertheless, large-scale studies provide higher statistical power, flexibility, and generalizability than small sample design. Both large and small scales of research can contribute meaningfully to the field in different ways.

Second, the only dimensional assessment for pediatric psychopathology was based on parent report. The discrepancy among multiple informants (e.g., parent, child, teacher-report) of psychopathology has long been an issue in psychiatric research (De Los Reyes et al., 2015; Olino, Finsaas, Dougherty, & Klein, 2018). Given the current age and outpatient setting of the ABCD participants, both parents and children are suggested to be trustworthy informants for child internalizing problems, and parents for child externalizing problems (Smith, 2007). The current measure for child psychopathology has been widely accepted for its clinical utility (Dutra, Campbell, & Westen, 2004). However, we encourage future researchers to obtain both child- and parent-report data, and, ideally, teacher-report data on dimensional psychopathology for youths. The multi-informant approach can facilitate the development of a holistic theory regarding family processes and child psychopathology.

Third, despite the high levels of significance of our main findings, the effect sizes are relatively small. Significant results of small effect sizes should be interpreted cautiously regarding their clinical utility. Funder and Ozer (2019) suggested that Cohen's classifications of a small, medium, and large effects are meaningless without contextual specification. They suggested setting a well-understood benchmark to compare with the effect sizes of the current study. As the current study examined *child-report* family factors with *parent-report* child psychopathology, a meaningful benchmark will be the correlation between child- and parent-report child psychopathology using the *same* assessment, of which the correlation is estimated

FAMILY PROCESSES AND CHILD PSYCHOPATHOLOGY

as .26 and .32 for child internalizing and externalizing problems, respectively, across 570 studies (De Los Reyes et al., 2015). The current standardized estimates in our models are suggested to be interpreted considering the magnitude of the correlation between child- and parent-repot child psychopathology as a benchmark. Future studies are also suggested to investigate the clinical meanings of variables perceived by different informants.

Finally, the ABCD study is an ongoing project that just released its second wave. We did not include the expanded sample (i.e., new participants brought on at Wave 2). This topic should be revisited in the future in this sample after all participants have completed multiple waves. This work should particularly re-evaluate the replicability of the current results in the expanded sample and follow the developmental trajectories of family processes and child psychopathology through adolescence.

Conclusions

Family, as the first context for emotion socialization, is critical to child mental wellbeing. The current study took a fine-grained approach disaggregating the sources of variance in the dyad- and family-level family process factors to understand the longitudinal unfolding of their relationship with child internalizing and externalizing psychopathology in a large longitudinal and multilevel sample. The findings support parental acceptance as a transdiagnostic factor for preadolescent internalizing and externalizing problems, and family conflict as a risk factor for externalizing problems at the between-family and between-child level. To further elucidate the relationship between child internalizing problems and family conflict, we suggest future studies to account for child coping strategies and different types of family conflicts (e.g., interparent, parent-child conflict).

FAMILY PROCESSES AND CHILD PSYCHOPATHOLOGY

Our results also support that short-term improvements (across one year) in parental acceptance and family conflict are associated with less child externalizing, but not internalizing, psychopathology. These findings support the potential importance and feasibility of targeting these family process factors for child externalizing psychopathology outside of an intensive treatment setting. Additionally, these results inspire research questions on the effective dosage and delayed effects of changes in parental acceptance for child internalizing problems. Future studies are also suggested to account for other parenting behaviors (e.g., compensation behaviors and emotion-related parenting) associated with child internalizing disorders. Treatment of parent-level factors that are broadly associated with long-term differences in family processes, such as parental psychopathology, is also worth further investigation for child internalizing problems.

FAMILY PROCESSES AND CHILD PSYCHOPATHOLOGY

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