Symptom Profiles of CD and ODD Among Youth With Perinatally Acquired HIV

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Abstract

Objective Youth with perinatally acquired human immunodeficiency virus (PHIV) face increased risk for conduct disorder (CD) and oppositional defiant disorder (ODD) symptoms, and heterogeneous findings indicate that there may be subgroups of youth with PHIV differing in the quality and/or frequency of symptoms. The present study examined symptom profiles of CD and ODD among youth with PHIV and whether profiles differed in terms of parent–child and family correlates. **Methods** Participants included 314 youth with PHIV, aged 6–17 years ($M = 12.88$ years, $SD = 3.08$; 51% male; 85% Black or Latinx), and their caregivers who were recruited from 29 clinics in the US involved in the International Maternal Pediatrics Adolescent AIDS Clinical Trials (IMPAACT) Group's P1055 study. Caregivers reported on youth CD and ODD symptoms, parent–child interactions, and family environment. **Results** Latent class analysis indicated that a four-class model (i.e., moderate CD/high ODD, high ODD, moderate ODD, low CD/ODD) best fit the data. Ancillary analyses to validate these classes revealed differences for family cohesion and conflict; and child-centeredness, detachment, guilt-induced control, and consistency in parent–child interactions. The low CD/ODD class generally differed from other classes with additional differentiation between some higher risk profiles. **Conclusions** Findings suggest that homogeneous classes of CD/ODD symptoms can be identified among youth with PHIV, and these profiles differ in terms of family processes, consistent with previous work among chronically ill youth.

Key words: conduct disorder; family; HIV; latent class analysis; oppositional defiant disorder.

Conduct disorder (CD) and oppositional defiant disorder (ODD) involve deficits in emotional and behavioral control, typically develop in childhood or adolescence, and are among the most common referrals for youth mental health treatment (Shivram et al., 2009). They are associated with numerous negative outcomes, including increased risk for interpersonal problems, poor school performance and dropout, substance use, risky sexual behaviors, and additional psychopathology in adolescence and adulthood (Kretschmer et al., 2014). Accordingly, precision in the identification of youth at risk for CD and ODD

behaviors is pertinent for the success of intervention efforts.

Chronic physical illness is a risk factor for youth behavior problems (Barlow & Ellard, 2006), which may be heightened among youth with illnesses that affect central nervous system function (Pinquart & Shen, 2011). Human immunodeficiency virus (HIV) infection is associated with abnormalities in areas involved in executive functioning, reward processing, mood regulation, and memory (Baldewicz et al., 2004), processes that when deficient are implicated in behavior disorders (Hill, 2002). Youth perinatally infected with

HIV (PHIV) exhibit elevated rates of behavior problems (Nozyce et al., 2006) and psychiatric disorders, as well as high lifetime rates of psychological interventions (Chernoff et al., 2009; Gadow et al., 2010; Mellins, Brackis-Cott, Dolezal, & Abrams, 2006).

Although identification of youth with PHIV at risk for CD and/or ODD symptoms is important for early intervention, common risk-screening procedures (e.g., using cutoff scores) present several restrictions (van Lier, Verhulst, Ende, & Crijnen, 2003). First, CD and ODD share risk factors (Lindheim, Bennett, Hipwell, & Pardini, 2015) and often co-occur at diagnostic and subthreshold levels (Angold, Costello, Farmer, Burns, & Erkanli, 1999; Rowe, Maughan, Pickles, Costello, & Angold, 2002). Further, diagnostic criteria allow for great heterogeneity among clinical presentations; thus, the use of standard screening procedures may neglect subthreshold level symptoms, which may still cause functional impairment (Angold et al., 1999), and also obscure the heterogeneity of symptom presentation and related intervention implications.

The use of symptom profiles, as opposed to diagnostic categories, may provide more specific clinical information regarding symptom groupings (Lindheim et al., 2015) and permit assessment of risk status based on associations between subgroups and selected outcomes (van Lier et al., 2003). Symptom profiles of internalizing symptoms and psychosocial and functional outcomes have been identified among youth with other chronic medical conditions (Buckner et al., 2014; Kim et al., 2014); to our knowledge, no studies have considered profiles of CD and ODD symptoms among youth with chronic medical conditions. However, research among typically developing youth suggests homogeneous profiles of CD/ODD symptoms can be identified that differ in frequency, severity, and/or quality of symptoms. For example, Sondejker et al. (2005) identified classes characterized by high symptoms, low symptoms, and high ADHD and ODD among a sample of adolescents. Storr, Accornero, and Crum (2007) and van Lier et al. (2003) found classes characterized by high ADHD and ODD and moderate CD, moderate ADHD and ODD, and low symptoms among children. Furthermore, higher risk classes were differentiated from lower risk classes in terms of family variables (e.g., parenting stress; van Lier et al., 2003).

Problems with parenting behaviors (e.g., consistent discipline, warmth) and parent-child interactions confer risk for behavior problems among typically developing youth (Drabick, Gadow, & Loney, 2007; Drabick, Gadow, & Sprafkin, 2006); however, little is known about relations among youth behavior problems and parent-child processes among families of youth with chronic illnesses. Families of youth with chronic illnesses experience emotional and financial

stress and burden, as well as elevated levels of parenting uncertainty (Herzer et al., 2010). Unlike youth with other chronic illnesses (e.g., diabetes, cancer), many youth with PHIV have a biological caregiver also infected with HIV and thus HIV-related challenges (e.g., chronic sorrow, physical difficulties, stigma, discrimination, concerns regarding disclosure; Antle, Wells, Goldie, DeMatteo, & King, 2001) can create different difficulties for families of youth with PHIV compared to other chronic illnesses. Additionally, youth with PHIV are oftentimes placed in the care of other relatives (e.g., due to parental impairment or death related to HIV infection), who, compared to unrelated foster caregivers, report lower levels of warmth and respect and higher levels of overprotection and parent-child conflict (Harden, Clyman, Kriebel, & Lyons, 2004).

Issues within the broader family environment are also linked to behavior problems among typically developing youth (Drabick et al., 2007), but there is little research on family functioning among PHIV youth. Providing care for chronically ill youth potentially demands changes among family members (e.g., interruption to daily schedules, financial decisions, and career choices) that may contribute to increased family strife (Murray, Kelley-Soderholm, & Murray, 2007). Uninfected siblings may harbor feelings of resentment because of the increased parental attention and care demanded by their sibling's illness (Hollidge, 2001). Such stressors may lead to higher levels of negative affect among family members, which may increase the frequency of negative interactions and conflict (Lewandowski, Mattingly, & Pedreiro, 2014). Alternatively, families of PHIV youth may exhibit cohesion if they are able to successfully adapt to the challenges associated with caring for a chronically ill child; moreover, parents with HIV may be more tolerant and nurturing, perhaps because of a recognition of the parent's potentially shortened lifespan and desire to prepare the child for parental loss (Antle et al., 2001; Smith & Palmieri, 2007).

The primary goal of the present study was to characterize symptom profiles of CD/ODD symptoms among youth with PHIV. Given potentially different challenges and family functioning associated with PHIV (Antle et al., 2001), an ancillary goal was to determine whether profiles differed in terms of parent-child interaction and family environment variables to support the external validity of these profiles. We considered these symptoms and family processes among a large sample of PHIV youth that spanned multiple developmental periods. Although shifts in interpersonal processes are expected from childhood to adolescence among typically developing youth (e.g., increased focus on peers and autonomy from parents; Lee, Padilla-Walker, & Memmott-Elison, 2017), it is unclear whether such changes occur to the same extent among families of youth with PHIV given challenges specific

to this particular context. We hypothesized that at least three classes of CD and ODD symptoms would be identified (moderate CD and high ODD, moderate ODD, and low CD/ODD symptoms). In ancillary analyses, we examined whether identified classes differed in terms of parent-child and family processes, as well as youth age.

Method

Participants

Participants were recruited from 29 clinics in the US involved in the International Maternal Pediatrics Adolescent AIDS Clinical Trials (IMPAACT) Group's P1055 study, a prospective, multisite study of youth ages 6–17 with PHIV (sample size = 314; $M = 12.88$, $SD = 3.08$ years; 85% Black or Latinx; 51% male) and their families.

Caregivers ranged in age from 22 to 80 years old ($M = 47.56$, $SD = 11.12$) and participating youth lived with these caregivers for 0–18 years ($M = 10.40$, $SD = 4.03$). Individuals completing the questionnaires all identified as primary caregivers and included biological mothers (34%), biological fathers (8%), biological grandparents (11%), adoptive mothers (24%), adoptive fathers (4%), other biological relatives (14%), and nonbiological relatives (e.g., foster or step-parents, 4%). In terms of caregiver education, 29% reported less than a high school education, 24% reported graduating from high school, 27% reported some college, and 19% reported attaining a college degree or higher. Annual income was derived from primary caregivers only; 18% of primary caregivers reported income less than \$10,000; 30% from \$10,000–\$19,999; 26% from \$20,000–\$39,999; and 25% over \$40,000. With regard to biological parents, 108 mothers (34%) and 64 fathers (20%) were deceased; 52% ($n = 164$) of biological mothers and 11% ($n = 35$) of biological fathers were HIV-infected. Thirty-nine percent ($n = 122$) of youth resided with a biological parent who was HIV positive (32% with biological mother only, 3% with biological father only, and 4% with both biological parents).

The majority (59%) of youth with PHIV had undetectable viral load at study entry (<400 copies per ml); 73% had entry CD4% > 25%, and 78% did not have a prior AIDS-defining diagnosis; this diagnosis is characterized by CD4 counts < 200 cells. About two thirds (66%) were receiving highly active antiretroviral treatment (ART) with protease inhibitors (PIs), and an additional 15% were receiving ART without PIs. The median duration of ART therapy was 6.5 years (Gadow et al., 2010).

Procedure

Approval for the study was obtained from Institutional Review Boards of participating institutions. Eligible youth were recruited by each site in

blocks of eight, which were balanced by age and sex, until enrollment was closed. Primary caregivers provided written informed consent and youth provided assent. Caregivers completed questionnaires related to youth symptoms, parent-child interactions, and family environment.

Measures

Youth CD and ODD Symptoms

Caregivers reported on youth CD and ODD symptoms using the Child and Adolescent Symptom Inventory-4R (CASI-4R; Gadow & Sprafkin, 2005), a DSM-IV-TR-referenced rating scale. The CD scale has 15 items and the ODD scale has 8 items. Within the current sample, the CD ($\alpha = .75$) and ODD scales ($\alpha = .89$) showed good internal consistency. Symptoms were rated on a scale of 0 (*never*), 1 (*sometimes*), 2 (*often*), and 3 (*very often*). Items endorsed as sometimes, often, or very often were used to indicate the endorsement of a symptom, and the items were coded dichotomously to reflect symptom presence (1) or absence (0). Numerous studies provide support for reliability (e.g., test-retest, internal consistency) and validity (e.g., convergent, discriminant) of the CASI-4R in clinic, pediatric, and community samples (Gadow & Sprafkin, 2008; Gadow et al., 2010). Compared to boys in the normative sample, boys in the present sample demonstrated higher symptom severity scores for CD ($t(157) = 2.82$, $p = .005$, Cohen's $d = .22$) and ODD ($t(158) = 3.42$, $p = .001$, Cohen's $d = .28$) symptoms. Compared to girls in the normative sample, girls in the present sample demonstrated higher symptom severity scores for CD symptoms ($t(150) = 2.99$, $p = .003$, Cohen's $d = .26$) but similar levels of ODD symptoms ($t(152) = 1.17$, $p = .24$, Cohen's $d = .10$).

Caregiver-Youth Interactions

Caregivers reported on the caregiver-youth relationship using the Parent's Report (PR; Dibble & Cohen, 1974), which contains 20 behavioral items pertaining to how caregivers interact with their children. The current study examined four subscales (4 items each): child centeredness (e.g., parent's expression of concern and warmth; $\alpha = .58$); detachment (e.g., distance or withdrawal from the child, especially when the parent is angered; $\alpha = .58$); consistency (e.g., parent's commitment to established rules and procedures; $\alpha = .54$); and guilt-induced control (e.g., parent's efforts to shape behavior through guilt or anxiety; $\alpha = .72$). Items are rated on a scale from 0 (*never*) to 6 (*always*). Higher scores indicate higher levels of the dimension considered. The PR demonstrates good test-retest reliability and external validity (Dibble & Cohen, 1974), predictive and concurrent validity, and good internal consistency among community- and clinic-based

samples (e.g., Atzaba-Poria, Pike, & Deater-Deckard, 2004; Drabick et al., 2006, 2007).

Family Environment

Caregivers reported on the family environment using the Family Environment Scale (FES; Moos & Moos, 1974). The present study examined two 9-item subscales: cohesion (e.g., commitment and support among family members; $\alpha = .55$) and conflict (e.g., overt discord among family members; $\alpha = .57$). Items were rated as *true* (1) or *false* (0). The cohesion and conflict scales have demonstrated good internal consistency (i.e., α s = .62–.72) among community based-samples and high convergent validity with similar constructs (Boyd, Gullone, Needleman, & Burt, 1997; Drabick et al., 2006). The lower internal consistency on some parent-child and family subscales may be associated with heterogeneity in (a) who is identified as the primary caregiver (and thus who completed the questionnaires), (b) duration of youth's residing with the primary caregiver, (c) presence of biological parent(s), and/or (d) effects of PHIV and/or parental HIV status on family factors.

Analytic Approach

Descriptive statistics and bivariate correlations were conducted using SPSS Version 23. Latent class analysis (LCA) was used to identify subgroups of participants based on the probability of endorsing CD/ODD symptoms (i.e., *never*: 0; frequency of *sometimes*, *often*, or *very often*: 1) and was conducted using Mplus Version 8.1 (Muthén & Muthén, 1998-2018). LCA classifies individuals into homogeneous subgroups that may differ in frequency, severity, and/or quality (type) of symptoms (Nylund, Asparouhov, & Muthén, 2007). Missing data were addressed using Full Information Maximum Likelihood (FIML) estimation, which uses all available data to estimate model parameters but does not impute values, and data were considered missing at random (Graham, 2009).

LCA models initially were conducted with all 15 CD and 8 ODD symptoms. However, replication difficulties suggested that several CD symptoms were significantly influencing class membership owing to low base rates. All symptoms endorsed by fewer than 5% of the sample were omitted, which eliminated eight CD symptoms (see Table I for items). The eight items with low base rates (< 5%) in the present sample were infrequently endorsed in the normative sample; specifically, endorsement rates of at least *sometimes* for these items ranged from 1% to 3% ($M = 1.69$, $SD = .70$) in the normative sample. The decision to recode CD and ODD symptoms such that responses of any frequency (i.e., *sometimes*, *often*, and *very often*) were coded as present is consistent with findings suggesting that subthreshold disruptive behaviors may still cause

Table I Descriptive Statistics for CD and ODD Symptoms ($N = 314$)

	M	SD	Endorsed %
CD symptoms			
Plays hooky	.11	.32	11.5
Stays out at night	.10	.29	9.6
Lies	.42	.49	41.7
Bullies	.14	.35	14.0
Starts physical fights	.09	.29	8.9
Steals	.11	.32	11.1
Destroys property	.09	.29	8.9
ODD symptoms			
Loses temper	.63	.48	62.7
Argues with adults	.50	.50	49.7
Defies	.43	.50	43.3
Annoys others	.44	.50	43.6
Blames others	.43	.50	42.7
Touchy/easily annoyed	.48	.50	48.1
Angry and resentful	.37	.48	36.9
Takes anger out on others	.20	.40	20.1

Note. Items coded to reflect the absence ("0") or presence ("1") of a symptom. Symptom endorsement included ratings of *sometimes*, *often*, or *very often* on each item.

impairment (Angold et al., 1999) and with procedures used in other studies examining disruptive behavior profiles (Sondeijker et al., 2005; van Lier et al., 2003).

The LCA started with a one-class model and increased the number of classes until there was no additional improvement to model fit, which was based on fit indices, conceptual meaningfulness, and smallest class size. Fit indices included the Bayesian Information Criterion (BIC; Schwartz, 1978), Akaike Information Criterion (AIC; Akaike, 1987), and sample-size adjusted BIC (ABIC; Sclove, 1987), for which smaller values indicate better model fit. We also considered the Vuong-Lo-Mendell-Rubin Likelihood Ratio Test (VLMR LRT; Asparaouhov & Muthén, 2012), which compares model fit to that of a model with one fewer class. Entropy values of the model were also examined, with higher entropy suggesting more precise group classification. Class size of less than 5% of the sample suggests that the LCA overfit the data, which may lead to model replication difficulties. Additionally, some youth were drawn from the same family; thus, nesting within families was controlled for using the "cluster" command in Mplus. Following the LCA, the external validity of classes was assessed using tests of equality of means, which holds class membership constant and provides χ^2 statistics for omnibus and pairwise comparisons across latent classes. Pairwise comparisons were interpreted only if omnibus tests were significant ($p < .05$).

Results

Youth who had complete data had higher levels of guilt-induced control ($n = 294$; $M = 8.76$, $SD = 6.16$)

Table II. Bivariate Correlations, Means, SDs, and *n*'s of External Validators

Variable	1	2	3	4	5	6	7	8
1. Cohesion	—							
2. Conflict	-.42**	—						
3. Child centeredness	.19**	-.08	—					
4. Detachment	-.26**	.23**	-.13*	—				
5. Consistency	.17**	-.19**	.29**	-.31**	—			
6. Guilt-induced control	-.20**	.11	.18**	.37**	-.02	—		
7. CD symptom severity	-.20**	.24**	-.18**	.27**	-.21**	.26**	—	
8. ODD symptom severity	-.24**	.37**	-.16**	.26**	-.28**	.24**	.64**	—
<i>M</i>	7.44	2.40	17.95	4.33	19.33	8.57	1.38	4.14
<i>SD</i>	1.53	1.77	4.33	3.97	3.37	6.14	2.29	4.01
<i>n</i>	307	308	307	307	309	305	310	313

* $p < .05$; ** $p < .01$.

compared to youth with missing data ($n = 19$; $M = 3.36$, $SD = 2.50$); $t(303) = 2.90$, $p = .004$, Cohen's $d = 1.15$. No other differences were significant between youth with and without missing data (t 's range from .20 to 1.47, p 's range from .14 to .84, and d 's range from .04 to .50).

Bivariate correlations, means, standard deviations, and n s for study variables are presented in Table II. Small to medium correlations were found among family factors. CD symptom severity was positively correlated with family conflict, detachment, and guilt-induced control and negatively correlated with family cohesion, child centeredness, and consistency. ODD symptom severity was positively correlated with family conflict, detachment, guilt-induced control, and CD symptom severity; and negatively correlated with family cohesion, child centeredness, and consistency.

Latent Class Analysis

The LCA indicated that a four-class model provided a good fit to the data (Table III). Although the lowest BIC was associated with a three-class model, the four-class model demonstrated a high entropy value, further decreases in AIC and ABIC, and was determined to be theoretically and conceptually meaningful. A five-class model demonstrated additional decreases in AIC and ABIC, but there also was a decrease in entropy and an increase in BIC.

The classes were characterized by endorsement probabilities of CD and ODD symptoms (Figure 1). Class 1 ("Moderate CD/High ODD"; sample size = 28) exhibited intermediate endorsement of CD symptoms (e.g., destroys property, steals, and starts physical fights) and high endorsement of ODD symptoms. Class 2 ("High ODD"; sample size = 36) displayed low endorsements of CD symptoms and high endorsement of ODD symptoms. Class 3 ("Moderate ODD"; sample size = 110) was marked by low endorsement of CD symptoms and intermediate endorsement of ODD symptoms. Class 4 ("Low Symptoms"; sample size = 140) exhibited low CD and ODD symptom

endorsement. The three-class model is presented in Supplementary Figure 2 for comparison; these classes primarily differed in symptom severity as opposed to type of symptoms. Confidence intervals are presented in Supplementary Tables 5 (four-class model) and 6 (three-class model).

Comparisons of External Validators

Omnibus χ^2 analyses revealed significant between-class differences for family cohesion and conflict (Table IV). As expected, the Low Symptoms class exhibited higher levels of family cohesion and lower levels of family conflict than the Moderate CD/high ODD, High ODD, and Moderate ODD classes (χ^2 s: 11.86–26.23, $ps < .005$, ϕ s: .24–.39). Additionally, the Moderate CD/High ODD class reportedly experienced higher levels of conflict than the Moderate ODD class ($\chi^2 = 3.96$, $p = .047$, $\phi = .17$).

The Low Symptoms class reportedly experienced higher levels of child-centeredness and consistency, and lower levels of parental detachment and guilt-induced control, than youth in the Moderate CD/High ODD and High ODD classes (χ^2 s: 7.53–18.83, $ps < .006$, ϕ s: .18–.33). The Low Symptoms class also experienced lower levels of detachment and higher consistency than the Moderate ODD class (χ^2 s: 8.37–12.02, $ps < .004$, ϕ s = .18–.22). Additionally, caregivers of youth in the Moderate CD/High ODD class utilized more guilt-induced control than those of youth in the Moderate ODD class ($\chi^2 = 4.80$, $p = .029$, $\phi = .19$). Classes did not differ by age ($\chi^2 = 7.30$, $p = .063$, $\phi = .15$) or sex (all OR's $< .53$, p 's $> .24$).

Discussion

Although youth with PHIV are at increased risk for behavior problems relative to noninfected youth (Chernoff et al., 2009; Nozyce et al., 2006), the present study was the first to consider symptom classes characterized by CD and ODD symptoms among

Table III. Fit indices for LCA Models with 1–5 Classes

Class	AIC	BIC	ABIC	VLMR LRT <i>p</i>	Entropy	Smallest class size
1	5031.42	5081.66	5040.09	N/A	N/A	314
2	4292.68	4408.91	4310.59	0	.84	132
3	4114.59	4290.82	4141.75	0	.88	47
4	4082.92	4319.14	4119.32	.51	.89	28
5	4046.84	4343.04	4092.48	.03	.84	28

Note. AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; ABIC = adjusted Bayesian Information Criterion; VLMR LRT = Vuong-Lo-Mendell-Rubin Likelihood Ratio Test.

Figure 1. LCA four-class model.

Note: First seven items displayed are CD symptoms; last 8 items are ODD symptoms. Class 1 = Moderate CD/high ODD, *n* = 28; Class 2 = High ODD, *n* = 36; Class 3 = Moderate ODD, *n* = 110; Class 4 = Low CD/ODD, *n* = 140.

Table IV. Comparisons of External Validators

Variables	χ^2	<i>p</i>	Pairwise comparisons
Cohesion	32.20	<.001	4 > 1, 2, 3
Conflict	54.85	<.001	1, 2, 3 > 4; 1 > 3
Child centeredness	13.26	.004	4 > 1, 2
Detachment	17.89	<.001	1, 2, 3 > 4
Consistency	27.90	<.001	4 > 1, 2, 3
Guilt-induced control	16.14	.001	2 > 4; 1 > 3, 4

Note. 1 = Moderate CD/high ODD; 2 = High ODD; 3 = Moderate ODD; 4 = Low CD/ODD.

PHIV youth. The present results identified four ODD/CD symptom classes: Moderate CD/High ODD, High ODD, Moderate ODD, and Low Symptoms. Caregivers of youth in the Low Symptoms class reported the highest levels of family cohesion, child-centeredness, and consistency in parent–child interactions, as well as the lowest levels of family conflict and parental detachment. The Moderate CD/High ODD class was further distinguished from the Moderate ODD class, with the former exhibiting higher levels of family conflict and parental guilt-induced control.

The present findings are consistent with past research identifying distinct symptom profiles of disruptive behavior disorders among typically developing

youth (Sondejker et al., 2005; Storr et al., 2007; van Lier et al., 2003). Unlike the current study, these researchers assessed CD, ODD, and ADHD and reported a three-class model as the best fit. In the current study, a four-class model was selected based on fit indices, conceptual considerations, and external validation. The three classes identified in previous research (i.e., intermediate CD/high ODD, intermediate ODD, and low CD/ODD) were obtained; the high ODD class was introduced with the four-class model in the current study. van Lier et al. (2003) identified classes characterized by intermediate CD and high ODD/ADHD, intermediate ODD/ADHD, and low symptoms among a sample of young children, whereas a class characterized by high ODD/ADHD independent of CD symptoms was identified among a sample of adolescents (Sondejker et al., 2005). Given that the current sample included youth across a broad age range and multiple developmental periods (i.e., 6–17 years), a four-class model may better capture the diversity of profiles across development. Although shifts in interpersonal processes are expected across these developmental periods (Lee et al., 2017), the challenges faced by families affected by HIV may lead to different contextual stressors and influences and consequently these typical developmental changes

may be attenuated. It is also possible that differences emerged in the present study because ADHD symptoms were not considered and low base rate CD symptoms were not included in the LCA.

The highest levels of consistency and lowest levels of parental detachment were found among the Low Symptoms class, consistent with research highlighting the associations among parent-child interaction processes and youth behavior problems among typically developing youth (Drabick et al., 2007). The highest levels of family cohesion and lowest levels of family conflict also were found among the Low Symptoms class. These findings support those demonstrating family cohesion as a correlate and potentially protective factor against behavioral maladjustment among youth with PHIV and other chronic illnesses. The caregivers and families of individuals in the Low Symptoms class may communicate more often with the HIV-infected child, utilize developmentally appropriate and consistent disciplinary practices, provide support in times of distress, and model appropriate management of negative emotions, all of which may reduce risk for behavior problems. Alternatively, families in which children have fewer behavioral problems might generally get along better and communicate more effectively than families of children with significant behavior problems. Thus, the current study extends past research highlighting potentially reciprocal relations between the family environment and youth behaviors among chronically ill youth and also provides novel evidence for these relations among youth with PHIV.

The Moderate CD/High ODD class was distinguished from the Moderate ODD class by higher levels of family conflict and parental guilt-induced control. These findings are consistent with those of van Lier et al. (2003), who demonstrated that parents of youth characterized by intermediate CD and high ODD/ADHD exhibited higher levels of parenting stress than parents of youth in other lower risk profiles. The relation between higher levels of parental guilt-induced control and greater CD/ODD symptoms is similar to findings of increased use of parental-initiated guilt among more aggressive youth (Donenberg & Weisz, 1998) and of higher parental guilt-induction predicting delinquency (Barber, 1996), though there is little comparative evidence among youth with PHIV or other chronic illnesses. Extant chronic illness literature has demonstrated stronger relations of behavioral, rather than psychological, control to youth externalizing behavior (Ellis, Templin, Naar-King, & Frey, 2008). Although psychological strategies may also be related, research is wanting.

Families who report higher levels of conflict may model negative problem-solving strategies, and PHIV youth may adopt these strategies in times of distress.

These findings suggest that youth with higher risk symptom profiles may be responsive to family conflict and stress, which, if this is the case, may be an especially important target for intervention efforts given evidence that the development of CD from ODD is linked to family and environmental factors (Rowe et al., 2002).

The present study has several strengths. It is the first to explore and externally validate symptom classes of CD and ODD among youth with PHIV, revealing distinct and more homogeneous classes that differ in terms of contextual factors. Prior research has focused on other conditions among pediatric samples (e.g., cancer, diabetes, and spina bifida); although families with children with a chronic illness may share similar experiences, families of youth with PHIV may experience unique challenges (e.g., chronic sorrow, physical difficulties, stigma, discrimination, and concerns regarding disclosure) and/or strengths (e.g., tolerance, support) that have received relatively less attention in the literature (Antle et al., 2001). In addition, the broad age range of our sample allowed for the assessment of several parent-child interaction and family processes across development, increasing the generalizability of our findings.

The present study has some limitations. First, data utilized in the present study were derived solely from the primary caregiver. Caregiver-reported measures may fail to capture the frequency and quality of behavior problems exhibited in other settings (e.g., school, peer group) and be affected by subjective biases that may inflate associations among variables. Low base rates for many symptoms led to coding items dichotomously and may have influenced the symptom types, frequency, and configurations of classes identified. The interpretation of the findings is further qualified by the inclusion of only 7 of 15 CD symptoms. Furthermore, the internal consistency of three of the PR subscales and the FES subscales suggest that these measures were less psychometrically sound than desired, which may have influenced results, and could be a function of heterogeneity in the primary caregiver, duration of youth's residing with the primary caregiver, and/or effects on family context based on factors associated with PHIV and/or parental HIV status. Finally, the cross-sectional design limits our ability to determine the temporal relations between CD/ODD symptoms and family processes. Future studies should aim to replicate the present findings among other samples of youth with PHIV within different developmental periods to assess whether similar patterns emerge, and adopt the use of multiple informants (e.g., youth, teacher) and assessments (e.g., behavioral observation, and diagnostic interview) of behavior. It also is important that future studies use alternative rating scales to measure constructs of interest

(e.g., family processes). Utilizing a prospective design in future research to explore profiles of other symptoms (e.g., ADHD, depression, and anxiety) and external validators (e.g., additional contextual processes, academic functioning, and illness severity), and reciprocal and transactional processes among youth and their families should also be considered.

Our findings are consistent with intervention objectives and targets among youth with PHIV. Family-based, HIV-oriented interventions that address parenting behaviors, family communication, and the parent-child relationship have been shown to improve family functioning (e.g., increased family connectedness, positive parenting behaviors; Betancourt et al., 2014) and reduce behavior problems among adolescents (Rotheram-Borus, Lee, Gwadz, & Draimin, 2001). Based on our results, the areas of family conflict (e.g., discord, poor communication, and stressors) and parental guilt-induced control may be important targets for families of youth with higher risk profiles. In summary, the results of the LCA identified a four-class model (i.e., moderate CD/high ODD, high ODD, moderate ODD, and low CD/ODD); the Low Symptoms class had the highest levels of positive family and parent-child functioning, and high risk classes were differentiated from each other on family conflict and guilt-induced control. Assessments of youth with PHIV should include symptoms and contextual processes that also can be targets of intervention efforts to improve the quality of psychosocial and family adjustment and to facilitate resilience among families affected by HIV.

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Supplementary Data

Supplementary data can be found at: <https://academic.oup.com/jpepsy>.

Conflict of interest: Dr. Kenneth Gadow is shareholder in Checkmate Plus, publisher of the Child and Adolescent Symptom Inventory-4R and the Youth's Inventory-4R.

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